Developing an IT Tool for Improving Workforce Motivation and Capabilities: An Empirical Case Study With Reference to Qatar

Hussein A. Alsalemi

A thesis submitted in fulfilment of the requirements for the degree of

Doctor of Philosophy (PhD)

in the School of Computing Sciences at

The University of East Anglia

APRIL 2016

Abstract

Human, Organisation and Technology (HOT) are all important components of IS. However, organisations look to technology as the main tool of change that can help them achieve their goals. This change usually concerns the needs of the organisation, and not the needs of its human resources, despite it being the latter that is the principal actor that any organisation depends upon to achieve its goals. The aim of this research is to develop an IT tool that itself can satisfy the workforce humanistic needs.

In order to develop this IT tool, a theoretical investigation and practical experimentations were conducted in a series of case studies involving government organisations in Qatar. Based on the theoretical investigation, an approach was proposed based on Socio-Technical Theory (STT), supported by learning from the ETHICS application of STT concepts and Client-Led Information systems Creation (CLIC) application of Soft System Methodology (SSM) principles. This approach was used to guide the development of the IT tool which was then used in actual organisational work environments to assess its impact on the Qatari workforce's motivation and capabilities.

Empirical results from this research show that an IT itself cannot be used to improve workforce motivation and capabilities in the case of Qatar. However, IT can do this by supporting a work environment enabled by necessary managerial practises and work environment requirements. Based on the proposed approach, this requires firstly, an understanding of the needs of the social subsystem of the organisation to improve workforce motivation and capability; then these needs should be developed into functions that are enabled by the work environment and supported by the IT tool. Lastly, the new IT tool needs to be integrated into the existing technical subsystem of the organisation.

These findings have both theoretical and practical implications. They contribute to a better understanding of the role of IT in improving the workforce's motivation and capabilities. They extend the application of STT principles in the area of developing human-focused IS by finding an alternative to the participatory approach via learning from SSM principles. They also provide specific understanding of how to develop an IT tool as well as what the work environment needs to provide to enable the application of the IT tool, to improve workforce motivation and capabilities. This PhD research also has social implications for the way IT is utilised in organisations. It can affect areas of IS utilisation and workforce well-being, as well as the role of leadership in maximising the value of IS from a human-focused perspective and the area of utilising IT in a virtual team to consider their humanistic needs.

Acknowledgement

First and foremost, all thanks and praise to Allah, the almighty God of this universe, without his favours none of this work would have been achieved.

I would like to thank my father, my mother, my sister and my brothers for their support in this long but wonderful journey of learning. Especially my father Dr. Alaa who supported me morally and financially during this journey.

This journey of learning would not possible without the academic supervision of Dr. Pam Mayhew who provided me with the necessary guidance and support. I cannot forget her smile, kindness and power of trust she offered me during my PhD study. She deserves my thanks, gratitude and appreciation. Also my thanks and appreciation to the co-supervisor Prof. Stuart Barnes for his valuable advice and assistance.

I would like also to thank and acknowledge the efforts of my brother Abdullah who helped me in developing the version one and two of the IT tool using his brilliant skills in developing Adobe Flash Platform applications.

I also would like to thank the examiners for their comments, insights and suggestions that improved and enriched this PhD research.

To all the people who participated in this research in all Qatari organisations, who opened their hearts and minds to me, taking much time of their valuable work time, and to all people who gave me advice, shared their thoughts and made efforts to help me finish my research, I owe you all sincere and special thanks and appreciation.

Table of Contents

List of Tables

List of Figures

1. Introduction

1.1 Overview

This chapter describes the research question, aim and objectives. It includes a review of the nature of ISD practice, identifies problems in regards to developing a human-focused IS and highlight the significance of this research and the role it could play in improving current human-focused ISD practices.

1.2 Motivation

The idea of this research arose as a result of the researcher's own work experience in one of Qatar's governmental departments where he was working as a computer programmer. This department was assigned the responsibility of implementing Total Quality Management (TQM) for the parent organisation. The researcher was in charge of developing computer programs for the purpose of improving the quality of work in this department. As a computer science graduate, the researcher was not familiar with TQM principles. Therefore, he read about it in books and learnt about it from the experts who were working in this department. Understanding TQM was the beginning of the researcher's interest in the main idea of TQM, the concept of “continuous improvement” and the role of people in achieving it in organisations through their ability to innovate and solve problems. It is at this point that the researcher became interested in the idea of using his knowledge of computer science in the development of an IT solution for the purpose of enhancing workforce

capabilities. The idea was to develop an IT solution to encourage employees at the department to actively participate in quality activities of the department. This interest then formed into a new work activity at the department, entitled Technology and Innovative Solutions (TIS). The intended beneficiaries of TIS were employees who worked as clerks, doing only administrative work or data entry duties. This type of employee represented the majority of this department's staff and they were all secondary school graduates with very little work experience.

TIS aimed to change the work roles of these employees from being solely clerks to becoming actively engaged in intellectual types of work activities, mainly thinking about new ideas and solutions for the purpose of improving work quality. I started to develop IT solutions based on my personal interest rather than on scientific grounds. At this time, my belief was that providing them with an IT solution to support self-learning and collaborative thinking could encourage them to engage in quality improvement activities and hence involve them in the quality activities of the department.

The developed IT solution was an intranet website designed to be accessed by these employees to watch ready-made self-learning courses in subjects such as Microsoft Office Word, Excel, Powerpoint and Access. These self-learning courses were seen as essential for employees to help them learn how to use technology to describe their ideas, using MS Word, analysing data using MS Excel, developing some IT solutions using MS Access, and presenting their ideas and solutions using MS Powerpoint. In addition, the intranet website provided a web forum in which employees could post their ideas for improvement or suggestions which could then be discussed. This forum was intended to encourage them to think and share their ideas with the experts who worked in the department, to help them develop their ideas into quality solutions.

Although the TIS initiative was supported by the department's manager, one year after using the IT solution, no change was noticed. The IT solution did not result in any changes to the employees' role within the department. This situation at the department continued until a new National Vision came into existence. The new vision consisted of four pillars. One of these pillars was the human pillar and one of its objectives concerned improving the Qatari workforce's motivation and capabilities (GSDP, 2008). This new vision for Qatar added a new dimension to my interest in using IT for change, not only to develop workforce capabilities but also to improve motivation. It was then that the researcher recognised the need for a scientific research to answer the question of whether IT itself can be used to improve workforce's motivation and capabilities in organisations.

1.3 Background

This section provides the background to the research, briefly outlining the focus of the study and introducing the problem. This discussion will explain why this study is worth pursuing and leads up to the statement of the research aim and objectives.

1.3.1 Understanding the Research Question

First of all, in order to state the focus of the study, it is necessary to clearly understand the research question. This question is: whether IT itself can be used to improve the workforce's motivation and capabilities in organisations. In a broader sense, the inquiry relates to the branch of knowledge that recognises the interactive nature between the three elements of the research question, which are Human, Organisation and Technology (HOT). More specifically, the researcher is interested in exploring this branch of knowledge from a perspective that considers the IT role in this interaction as a change agent that focuses on the workforce.

The branch of knowledge that can help to answer this research question is the discipline of Information Systems (IS). It is the discipline that utilises in its study the sciences of management and technology (Probert, 1997). IS has the foundations to provide an explanation of the HOT interaction. This is evident from early definitions of the subject (Boland & Hirschheim, 1985):

> "A combination of two primary fields: computer science and management, with a host of supporting disciplines eg psychology, philosophy, sociology, statistics, political science, economics, philosophy and mathematics. IS is concerned not only with the development of new information technologies but also with questions such as: how they can best be applied, how they should be managed and what their wider implications are" (p vii).

The above definition identifies the two main areas of IS research. The first concerns the theoretical understanding of how technology is applied, managed and how it impacts its environment while the second concerns the practises of developing IT solutions. In other words, the former focuses primarily on understanding the underlying phenomenon of the HOT interactions as described by Lee (2001):

> *"*Research in the information systems field examines more than just the technological system, or just the social system, or even the two side by side; in addition, it investigates the phenomena that emerge when the two interact" (p. iii).

Langefors (1996) also considers IS as a discipline in its own right and not just a combination of parts from other disciplines like “computer science, administration and systems theory” (p.43). Langefors further suggests that the application of these disciplines represents a unique area of research in IS. Probert (1997) approaches this issue from the perspective of those who oppose IS being viewed as a discipline. In Probert’s view, they want to “reduce” the functionalities of IS discipline to either “computer science” or “management science”. Probert argues that this view restricts the IS discipline's role in understanding organisational realities which consists of different types of phenomena, demanding a mix of knowledge areas. Or in other words, he concludes that IS as a discipline, needs to be studied through adopting a multidisciplinary approach (Probert, 1997). It is also appropriate here to define the main terms that are used in this thesis. According to IFIP WG 8.2 (1996):

> “[By technology WG] mean[s] technologies that can be used to store, transfer, process or represent information. By organizational context, [WG] mean[s] the institutional arrangements in which information is used or created ” (Para 1).

Taking the second area of concern of IS research, as identified in Boland & Hirschheim's (1985) definition, into consideration, led us to look at the practical objective of the IS discipline and specifically, the task of developing IT solutions in organisations. This task from the researcher's point of view is about utilising IS consideration of the HOT interaction in practise to achieve a predetermined goal for an organisation. Naturally, the predetermined goals differ from one organisation to another but they usually include some form of change initiative. This view is founded in the work of researchers who are concerned about the actuality of IS, such as Mingers and Stowell (1997) who link IS as an academic discipline with “real-world practices” and suggest that the role of the discipline is to “cope” with the new realities that arise from its “interaction” with practices (p.24). This description of IS demonstrates how practical the discipline is but at the same time, the issue is in understanding the role as well as applying that role in the real world. For example, Hirschheim, Klein &Lyytinen (1996) define an information system as

> “a technological system that manipulates, stores, and disseminates symbols (representations) that have, or are expected to have, relevance and an impact on socially organized human behaviour” (p.2).

This definition includes physical computer-related aspects as well as social human-related aspects. Hence, researchers need to apply IS not solely to develop the physical computer-related aspects of

an information system but also to understand the social human-related aspects of the information system. Otherwise, IS research will only duplicate the research of other subjects such as computer science or management, as Hassan (2014) argues. It is the inquiry into problems that other disciplines do not or cannot investigate where the value of IS research resides (Hassan, 2014). It is this last point that represents the focus of the study in this research by practising both aspects of the IS discipline: the social human-related aspects and the physical computer-related aspects of an information system.

To further describe the focus of this study and to relate it with the notion of change used above, three types of change are proposed here based upon the researcher's work experience as well as relevant IS literature. These change types are: changes initiated out of a desire to apply new technology; changes initiated out of a need for new organisational strategic direction; and changes initiated to satisfy a workforce's needs. In the following, these three types of changes in organisations are used to describe three different IS perspectives applied in practise to achieve predetermined goals for organisations:

- **A change initiated out of a desire to apply new technology:** This type of change focuses primarily on applying or developing new technology to maintain the technical advancement status of the organisation. It is in essence a technological change that is enabled by selecting the best possible technical specifications. On the other hand, this change requires subsequent changes in the organisation and changes in the way a workforce performs their work. Hence, in this type of change the IS discipline is practised from a **technical-focused perspective**. In IS research, this type of change is sometimes approached from a professionalism point of view of developing an IS. For example, Jones (2004) argues that practices related to project management of software development are critical factors in the IS's success or failure. Also Tang (2012) suggests in his article that project management can enhance the success (income) of projects involving the development of enterprise information systems such as the logistics information system. Other researchers may not agree with Jones but may still adopt the practises of a technical-focused IS perspective. For example, Markus (2004) insists that when organisations go through a change initiative that includes IT as the "trigger" of change, the issue of users' efficient IT utilisation and the issue of a need for new "work practises" can not be handled when the domain of IT project management alone is practised. She suggests the "technology driven organisational change or *technochange*" approach as an alternative approach to deal with these two issues. This approach is another example of practises that are based

upon the technical-focused IS perspective described earlier. It looks at the workforce as merely users of the IT solution and the organisation as an operational environment for this IT solution.

Thus this type of IS perspective can be described using the term "technological determinism" (Mingers & Stowell, 1997; Orlikowski, 2009; Symons, 1991). Braverman (1998) describes this term from a social science perspective as "the attributes of modern society are seen as issuing directly from smokestacks, machines tools and computers" (p.11). That is, when IS is practised from this perspective, IS analysts regard IS's impact on workforce or organisations as "a function of the technology alone" (Symons, 1991, p. 182). This perspective creates disadvantages, some related to the organisation and some related to the workforce. Organisational disadvantage is seen as not getting the right information system due to a dedication of less time on understanding the problem and more time on developing a "technically sound solution" (Mingers & Stowell, 1997, p. 4). On the other hand, workforce disadvantage can be seen from a work design angle (Mumford, 1995; Symons, 1991) or in terms of the increased power enjoyed by those who control it (Markus & Robey, 1988; Stowell, 2007; Symons, 1991).

- **A change initiated out of a need for new organisational strategic direction:** this type of change initiative involves a significant evolution in how an organisation works. In this case, all the HOT components of the organisation are important for the success of this change and hence the IS discipline is practised to allow them to interact to make this change happen. From an organisational perspective, this means changes in work design, processes and structures. Consequently from a technical perspective, it means either the application of new technology or using the existing technology differently. It also means from a workforce perspective, subsequent changes in the way they perform work. So, when this type of change is sought, the IS discipline is practised from an **organisation-focused perspective** to utilise HOT interaction to facilitate the success of this type of change, whether the predetermined goal of the change is explicitly declared to provide strategies for better achieving organisational goals (Kling & Lamb, 1999; Michael D. Myers, 2003) or implicitly as a means for improving effectiveness and efficiency (Pendse, 2008; von Alan, March, Park, & Ram, 2004).

This perspective is observable in the IS literature when failures of information systems used in business process re-engineering (BPR) projects are discussed. In these projects, issues related to workforce and organisation are considered important for the success of the change. For example, Willcocks and Smith (1995) argue that when BPR is used with IT to implement change in an

organisation, issues related to “human and organisational” in “the change process” are neglected. Davenport (2013) also argues that IT should enable not drive BPR and when this happens other “change enablers” such as culture and policies of human resources may not be “aligned” properly with the new processes brought about by IT. These examples imply the recognition of the importance of the social and human aspects of the information system in projects that has BPR as its main objective. Another way to look at this IS perspective is through a user-centred design approach (UCD). This is a perspective that Beers (2014) argues allows the desired changes in organisation to happen with greater success, especially in this very competitive and “complex” world. But in the case of Beers (2014) the UCD method focuses on the achievement of organisational goals as the main goal to be achieved by the change initiative, in parallel to the recognition of the role of the workforce as a success factor for this change. Other examples of the UCD methods being applied in IS practices that adopt organisation-focused IS are the Multiview and the client-led design methodologies (CLD). The aim of the Multiview methodology is to achieve through the ISD process the support of organisational goals but at the same time to consider “the needs and freedom of the individual” (Avison, Wood-Harper, Vidgen, & Wood, 1998, p. 126). The role of the CLD as a methodology, by contrast, is to equip the client himself with the necessary power to “control” all phases of the ISD process, because CLD understands that the cause of information systems failures usually comes from the restricted role of the client in the process of ISD (Stowell & West, 1994). These methods exhibit the recognition of workforce's needs but from a perspective that serves organisational change.

- **A change initiated to satisfy a workforce's needs:** This change primarily focuses on satisfying a workforce's needs because they are considered the most valuable asset or resource in the organisation. In this case, subsequent changes in the organisational design, policies, culture etc (based upon a study of the workforce's needs) are required to attain the workforce's humanistic needs in the workplace. Technology in this change initiative is used to support these organisational changes. Hence in this type of change, the IS discipline practised here, views the workforce as the main enabler of any organisational change and therefore information systems are used to satisfy the workforce's needs. This perspective is not new in the IS discipline. For example, Drucker (1988) investigates technology utilisation through the lens of the human, arguing that the role of technology in organisations should become a supporter of “human skills”. He indicates the importance of using technology as a tool to leverage human abilities by supporting team work and knowledge sharing capabilities. This way of looking at the role of humans in organisations has been

recognised also by Gill (1991) who uses the term “human-centeredness” to demonstrate the role of technology in satisfying the humanistic needs of the workforce. He defines human-centeredness as “a new technological tradition which places human need, skill, creativity and potentiality at the center of the activities of technological systems”. Supporting this perspective practically is a study conducted by Bjorn-Andersen & Turner (1995) who investigated an organisation called Oticon. They discovered the critical impact technology had on achieving organisational goals when it was utilised from a human-focused IS perspective. In Oticon, technology was considered as “an enabl[er] rather than a driv[er]” of change, that is, an enabler of the workforce at Oticon by means of improving their work satisfaction and capabilities. The practise of this particular IS perspective at Oticon was linked to the ability of Oticon's leadership to imagine how technology could be utilised to enable the workforce rather than to become a driver that imposes specific organisational structures, processes which Gordon & Tarafdar (2010) argue “hampers [people's] work and presents barriers to their creativity and productivity” (p39). Sharing this IS perspective is Hart & Gregor (2005) who view IS's role as going beyond just the area of technology or the area of organisational behaviour to the area of human behaviour. This perspective, in their view, is similar to other ‘design disciplines’ such as medicine, which requires an understanding of the interaction between the products (the medicine) and the people (patient) who use them. That is why the IS discipline should lead the way to understanding the interaction between the workforce, the organisation and technology, which Orlikowski & Barley (2001) call “inter-organisational dynamics”. One example of an ISD methodology that focuses on the human resources in its approach is the Effective Technical and Human Implementation of Computer Systems (ETHICS). ETHICS takes the humanistic needs of the workforce into consideration for the purpose of delivering an information system that will positively affect workforce psychological and work needs (Mumford, 1995). Mumford (1996) argues that the results of using the ETHICS approach are jobs which are “meaningful and fulfilling” for the workforce which consequently generate better efficiency at a workplace.

Figure 1.1 summarises the differences between the above three perspectives. In this figure, the shape of the pyramid represents an IS project which aims towards achieving a change in an organisation (what the pyramid points towards). The pyramid is divided by three lines representing three general levels of thinking about an IS project from the researcher's point of view. In this figure, the Information System Enabler level represents the foundation on which IS projects depend to achieve the required changes. The Information System Development level represents the stages

in IS projects in which the information system requirements are analysed, then developed and lastly implemented. Lastly, the Information System's Operational level represents the stage in IS projects at which the impact and the benefits of the information system are delivered to achieve required changes.

Starting with pyramid (A), here the IS discipline is practised from a view that considers technology as the aim and the focus of the IS project. The foundation of this IS project (the enablers level) is technology itself. Hence, in the development level the task is mainly about finding the best possible technical specifications. Therefore, the main impact this IS project delivers is advanced technical operation of the organisation. Pyramid (B) presents another IS perspective that views the workforce, organisation and technology (HOT) as all the critical foundations required for the success of an IS project that focuses on delivering benefits to the organisation as a whole in the operational level of the information system. Hence, at the development level, the task in this perspective is about studying the needs of the HOT and then develop the social context as well as the technical solutions to ensure the information system delivers its benefits.

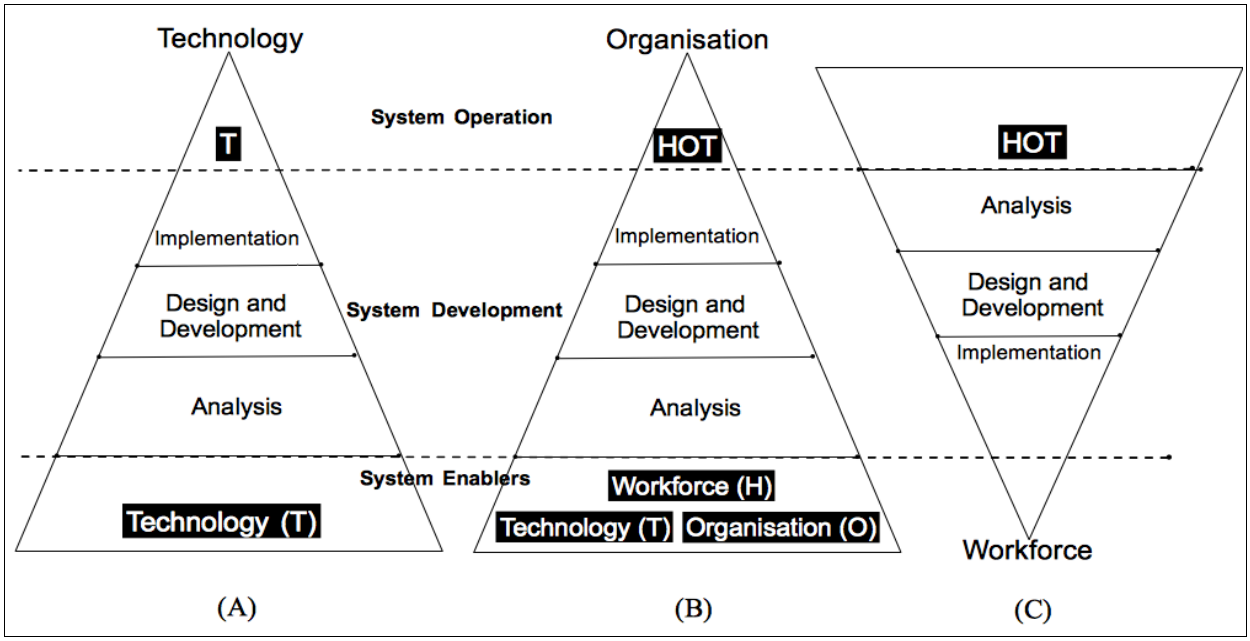


Figure 1.1: Three views of ISD practises

Pyramid (C), in contrast to pyramid (B), is overturned because it shares the same understanding of pyramid (B) regarding the importance of the HOT components in the system at operational level, and considers HOT as the foundation of IS success (the base of the pyramid). In pyramid (C), by contrast, instead of focusing on a change that points towards the operational level of the systems, it

focuses on a change that points to the level of system enablers, which in this case is humans.

In the following section, the above view will be discussed with reference to the literature in the area of human-focused IS which appears in the literature under different terms such as “human centred systems”, “human-centeredness”, “human-centred design”, “human-driven design” and “life-based design”. However, the original term was human centred systems which first originated in 1997 (Kling & Star, 1998).

The discussion in the following will be specifically related to how the literature considers the importance of focusing on satisfying human needs at the levels of system operation and system development of IS projects.

In terms of the information system’s operational level, in this research, I argue that an IS project that applies the practises of a human-focused IS perspective focuses on delivering positive impacts and benefits to the human resources of an organisation by satisfying their needs while the information system is in operation. This is an argument shared by several researchers, who use it to differentiate between the human-centred design approach (HCD) and the user-centred design approach (UCD). One example is Gasson's (2003) who argues that when human issues are approached with a user-centred approach, they are considered only from the perspective of “user interactions with computers […] rather than questioning how and why technology may be of service in supporting human work.” (p.30). This point of view, which I agree with, represents a position by UCD that looks to the human agent in an information system as only a “user of technology”. In addition, Giacomin (2014) also believes that UCD methods “address well the needs of the users of the tool” but the problem as he argues is in their persistent thinking of people who will use the tools as users forgetting they also have “human interests” (p.608).

On the other hand, with regards to the information system’s development level, I argue that an IS project that applies the practises of a human-focused IS perspective develops an information system that focuses on human needs in the process of developing an information system. This argument is shared with Ikonen (2009) who also argues that a human-driven design approaches should include people in “all parts and levels of the design” and also to extend their “role and scope” in the design process (p.135). This extension of the role and scope can be seen in a study by Braund and Schwittay (2006) who studied an “intelligent community” in Costa Rica in which ICT was used to enrich the social life of people. This exploration brought in reflections about the need to make ICT development driven by “human needs”. They propose that for this to be achieved, an approach to

system development should acquire “in-depth knowledge about local conditions” of the people using a four dimensional approach that involves “local practices; participatory design processes; socio-cultural contexts, and political conditions” (p.3). They call this approach the human-driven design and research (HDDR) and they argue that for this approach to be practical, it needs to be conducted using “long-term participant observation” rather than “rapid ethnography” (p.8).

HDDR represents a type of human-focused IS approach that primarily emphasises the development level of the system. However, there are other IS approaches that share the researcher's view in that they consider the human dimension of equal importance at both information system levels. Examples of this kind of approach are value sensitive methodology (VSM) (Friedman, Kahn, & Borning, 2006), human-driven design approach (HDD) (Niemelä et al., 2014) and life-based design approach (LBD) (Saariluoma & Leikas, 2010). In the following paragraphs these approaches will be described and discussed.

We will start with an approach that appears in the literature of HCI, which is value sensitive methodology (VSM), focusing primarily on delivering “human values” in the design process (Friedman et al., 2006). Their understanding of value follows the Oxford dictionary definition of “what is valuable and important in life” (p.2). Their approach includes three phases: the “conceptual investigation” phase, which develops the understanding about the values people are looking for in the information system; the “empirical investigation” is the second phase in which an empirical evaluation is carried out in the “human context” using different qualitative and quantitative methods to assess the success of the proposed design based on these values; the third phase is the “technical investigation” phase which concerns itself with the development of the technology that conforms with the value needs identified in the empirical investigation. These three phases of VSM show how this approach focuses on satisfying human needs from a value-based perspective as an objective for the information system. The approach focuses on human needs in the process of ISD (system development level) as well as focusing on these needs in the system operation level by ensuring it delivers these values to the people who will use the information system. The limitation that this approach exhibits, is that it is theoretically “grounded” (Friedman et al., 2006) and provides no practical “guidance” as to how to apply it (Niemelä et al., 2014).

Another approach is suggested by Niemelä et al. (2014) who, based on a review of the principles of five “human-driven” approaches, propose the human-driven design (HDD) approach. In their study, they conclude that an HDD approach should focus on: “human and social values, seeking true

collaboration and empowerment with various stakeholders in the design process, and being reflective in terms of responsibility and ethics in design" (p.78). This approach views the human as the system enabler of any information system and therefore considers that the starting point in the design is to find out about the human "needs, goals and desires". In addition, this approach focuses on the human in the system's development level, as it refers to collaborative design methods that "empower users" throughout the ISD process. Lastly it focuses on the human at the operational level of the system when it becomes "responsible" for delivering "wellbeing". HDD authors have not explained how their approach could be used to collect and define the requirements of human needs and then transform them into an information system.

In a similar vein, life-based design (LBD) looks to "all design issues [as] biologically, psychologically and socio-culturally motivated" (Saariluoma & Leikas, 2010, p. 22). This approach as discussed in the HCI literature, is a holistic approach that understands the role of technology development as a means for "improving the quality of life of people" (Saariluoma & Leikas, 2010, p. 22). They argue that for this idea be realised, the development process needs to move away from the traditional approach of designing interfaces and interaction with computers, to a holistic approach that looks to the entire context of human's biological, psychological and social aspects. They give an example of such a holistic humanistic development approach in which the developer biologically considers the age of users, psychologically, considers their self-esteem, and socially, considers their preference to work in teams. This approach includes an explicit thinking about human needs in order to bring them to the surface throughout the development process. Hence, the LBD approach starts by determining the area in life that technology can make better or what they call "technology-supported actions" and then works on describing the technical specifications of these actions that makes the information system (Saariluoma & Leikas, 2010). It is noticeable that the LBD approach provides both operation and development focus on human needs but it also does not suggest specific methods to operationalise its principles into the development process of an information system.

This section has described the focus of the study in the area of human-focused IS and related it with the researcher's view and the literature. To summarise the result of this discussion, we can say that for this research to answer its question, an ISD methodology that can be practically used to develop an IT tool based on the human-focused IS perspective is required. Based on this requirement, the next section (Section 1.3.2) formulates the research problem by briefly exploring existing ISD

methodologies in the area of human-focused IS and how they can be used to answer the research question.

1.3.2 Background of the problem

Research in the areas of computer science (CS) and information systems (IS) when approached from a practical dimension are considered as “a structured process for solving complex problems, formulated as research questions” (Berndtsson, Hansson, Olsson, & Lundell, 2008, p. 14). Under normal conditions, the research question tends to be general at the start of the research project. Nevertheless, it allows researchers to keep their “focus” on the objective of the research and helps them select the appropriate research design and methodology (Berndtsson et al., 2008; Bryman, 2007a). In this research, the researcher's work experience as described above motivated the research question and hence it is approached with a practical problem-solving objective. This implies that before the task of answering the questions, the problem must be identified and then existing approaches that can solve it need to be explored (Rowland, 2014). In the following, these two tasks are discussed to introduce the research problem.

The research problem is a general statement that “points to the need for meaningful understanding and deliberate investigation” (Labaree, 2009, para. 1). It also helps to further articulate “what the research question is trying to answer” (Mildeová, 2013, p. 329). Based upon the discussion in Section 1.3.1, the research question focuses on developing an IT tool using an ISD methodology that adopts the practices of the human-focused perspective of IS. In doing so, the research will answer a question which is related to the Qatar Vision that considers the workforce as one of the objectives of its human development pillar. In this vision, the workforce role in the economy is to be increased by focusing on improving “their ambitions and abilities” (GSDP, 2008, p. 18; The Ministry of Development Planning and Statistics, 2013), and thus to overcome an issue that discourages some private sector employers from recruiting new employees due to their inappropriate “skill level, work attitudes and motivation” (GSDP, 2011, p. 149). The attention to workforce motivation and capabilities in the Qatar Vision and the researcher's own work experience prompted the researcher, to develop an IT solution for improving workforce abilities. In addition, interest in the practical role of the IS discipline and the researcher's own understanding of the human-focused IS perspective derived from working in this field, shaped the research problem as:

To use an ISD methodology from a human-focused IS perspective to develop an IT tool to answer the research question which is: can IT itself help organisations improve their workforce motivation and capabilities.

This then lead to the need to review the literature to find an ISD methodology that can be used to develop the IT tool from a human-focused IS perspective.

Hirschheim, Iivari, and Klein (1997) argue that selecting an ISD methodology is determined by "philosophical assumptions regarding the nature of the phenomena studied and what constitutes valid knowledge about those phenomena" (p.3). Thus, it is necessary to firstly differentiate between three abstract understandings in the area of information systems development (ISD), which are: the paradigmatic or philosophical assumptions, ISD approaches and ISD methodologies. Livari, Hirschheim, and Klein (1998) define an ISD approach as:

> "a set of goals, guiding principles, fundamental concepts, and principles for the ISD process that drive interpretations and actions in ISD" (p.166).

They describe an ISD methodology as:

> "a set of goal-oriented procedures that guide the work and cooperation of the various parties (stakeholders) involved in the building of an IS application" (p.165).

In other words, Livari et al. understand an ISD methodology as an "instance" of an ISD approach. In addition, in their view each ISD approach adopts a particular "paradigmatic assumption" or "school of thought". This differentiation between ISD approach and ISD methodology is important in their view in order to propose a "framework for the paradigmatic analysis" of ISD methodologies. This framework adopts some of Burrell and Morgan's paradigm (1979) with the exception that Livari et al's. framework does not accept the notion of "mutually exclusive dichotomies" for Burrell and Morgan's dimensions to be applied in IS, because as they argue, within ISD methodologies different philosophical assumptions can coexist. This understanding of the nature of ISD methodology which will be described in more detail in the Literature Review Chapter Section 2.2 exhibits two main issues in selecting the appropriate ISD methodology to develop the IT tool for this research:

1- **Theoretical issue**: the paradigmatic assumptions influence the process of developing information systems by directing the understanding towards different ideas concerning required "work processes, goals and needs" (Gasson, 2003). In doing so, the paradigmatic assumptions affect the methodology for collecting and analysing requirements from the prospective users of the

information system (Gasson, 2003). For example, most traditional ISD methodologies as Iivari (1991) argues, adopt “functionalist” paradigmatic assumptions. This paradigm sees “IS as a largely technical system with social implications” (Burrell & Morgan, 1979, p. 166).

2- **Design issue**: in the context of human-centred approach by Gasson (2003) this is defined as “the process by which meanings are explored and then translated into organisational procedures, with their supporting technical artifacts” (p.31). This process has not been given much attention in the IS discipline as argued by Gasson (2003). The design issue from Gasson's perspective is in selecting methods to understand a situation that has two different "worlds of socio-cultural work and technology-interaction” (p.42). From a human-centred perspective, Gasson points firstly to the issue of understanding the problem situation using systemic inquiry methods and then to the issue of transforming it into technology using user-centred methods. Because as she puts it, the “problem investigation” method should be separated from the technology design method, she suggests that we as IS analysts can “synthesize” between the information we get from the two different approaches to develop the human-centred solutions.

An exploration of the IS literature to select an ISD approach based on these two issues, revealed a range of possible approaches, starting with the ETHICS approach (Mumford, 1983, 1995) in which "people should be able to influence the design of their own work situations” (Mumford, 1983, p.1). However, there are two limitations in using ETHICS alone in developing a human-focused information system. The first is related to the system operation level, in which ETHICS utilises technology to only satisfy two of the five workforce's humanistic needs. The second limitation is related to the development level of the system, in which the ETHICS approach to system development tends to focus more on technological aspects due to its participatory approach (Champion, Stowell, & O’Callaghan, 2005). The approach has also been criticised as looking to technology as a tool for management to gain more “control” over employees (Kensing & Blomberg, 1998) and the difficulty of using it to understand “system specifications” from users who have no technical background (Symons, 1991). These limitations will be discussed in more detail in the Literature Chapter Section 2.3.1. The other ISD approach is the client-led information system creation (CLIC) approach (Champion et al., 2005) which operationalise soft system methodology (SSM) principles (Checkland & Scholes, 1990; Checkland, 1981, 1999) and provides an alternative human-focused system development approach when compared with the participatory approach of ETHICS, as will be discussed in Section 2.3.2.

1.3.3 Significance of the Study and Expected Contributions

In this research, the role of IT as an agent of change in organisations (Avgerou, 2001) is used to create a change in organisations that focuses on satisfying workforce's humanistic needs. This involves a practical study to find out whether IT itself can help organisations improve their workforce motivation and capabilities. That is, the significance of this research has theoretical aspects but it is mainly practical to learn from socio-technical theory (STT), ETHICS and CLIC's operationalising of SSM principles to provide an approach for investigation and development of human-focused information systems then to apply it in order to obtain detailed practical technical and organisational guidance about this process. Answering this question will make a contribution by:

- Allowing a better understanding of the role of IT in satisfying workforce's needs and specifically, workforce's motivation and capabilities in the case of Qatar.
- Providing a practical approach that finds an alternative to ETHICS participatory approach in developing human-focused information systems.

1.4 Research Aim and Objectives

As discussed above, the research aims to answer the question of whether IT itself can help organisations improve their workforce's motivation and capabilities. It is a problem that needs to be addressed through learning from other ISD methodologies and then using this learning to develop the IT tool to answer the research question. Hence, based on this discussion about the research question and problem, the following three main research objectives are identified. (Table 1.1)

Research question: Can IT itself help organisations improve their workforce motivation and capabilities.	Objective one
	Proposing an approach based on theoretical and practical understandings of STT supported by learning from ETHICS and SSM principles to develop an IT tool for the purpose of improving the workforce's motivation and capabilities.
	Objective two
	Developing the IT tool based on the proposed approach.
	Objective three
	Experimenting with the IT tool on a workforce to assess its impact on their motivation and capabilities.

Table 1.1: Overview of the research aim and objectives

1.5 Research Overview and Structure of the Thesis

This section provides a research overview using the “argumentation map” techniques which can be used to give an overview of the research as well as to structure the review of literature as suggested by Rowland (2014). This technique was also used in Checkland's (1981) book to summarise the argument and ideas of system thinking. In the following the argumentation map is used to provide an overview of the research's significance in Table (1.2), current approaches to the research problem in Table (1.3), the proposed approach in Table (1.4) and the experimental study that will assess the proposed approach and answer the research question in Table (1.5).

We need to learn about ISD methodologies that adopt a human-focused IS perspective (because)
• Based on the researcher's work experience and relevant IS literature, three types of IS perspectives related to the practises of developing information systems were discussed. • To answer the research question, an ISD methodology that adopts the practices of human-focused IS perspective is required.
Why answering this research question is important for the IS discipline:
• It contributes theoretically by reflecting on the results of applying the research's proposed approach in answering the research question to better understand the role of IT in improving the workforce's motivation and capabilities in Qatar. • It contributes practically with a relevant-to-practise study that provides organisations with guidance for developing IT tools to support the work environment to satisfy a workforce's needs. It also provides organisations with descriptions of necessary practises for enabling a work environment to satisfy a workforce's needs.
In general, answering the research question will:
• Allow a better understanding of the role of IT in satisfying a workforce's needs and specifically the workforce's motivation and capabilities in Qatar. • Provide a practical approach that finds an alternative to the ETHICS participatory approach in developing human-focused information systems.

Table 1.2: The map of research significance and rationale

We need to propose an approach that learns from the principles and methods of other ISD methodologies that adopt a human-focused IS perspective (that is)

• ETHICS methodology adopts social-technical theory (STT) concepts, focused on satisfying the workforce's humanistic needs.
• But ETHICS has two main limitations that render it inadequate for use on its own at a system development level, to develop the IT tool to answer the research question. These main two limitations are:
  • It does not utilise IT to satisfy all the five identified humanistic needs.
  • Its participatory approach has been criticised due to its focus on developing the technology more than an understanding the problem or the situation.

Table 1.3: The map of current ISD approaches

The limitations identified above can be overcome by learning from principles and methods of other ISD methodologies in Chapter Three by:
• Learning from SSM principles to understand the problem in depth and from the perspective of those people in the situation. However, SSM lacks the ability to transform this understanding into technical specifications. • The CLIC approach which adopts SSM is learnt from in order to transform the understanding about the “system to be served” into the development of the serving system • So we need to understand STT concepts in theory and in practise supported by learning from ETHICS as well as SSM principles to propose human-focused approach to develop the IT tool.

Table 1.4: The map of research proposed approach

There was a need to conduct an experimental study because
• The proposed approach needed testing by using it to develop the IT tool and thus to assess its effectiveness on improving workforce's motivation and capabilities.
The results of the experiment study were validated by:
• A survey that was sent to HR and training managers working in governmental organisations in Qatar to review the experiment's results

Table 1.5: The map of the experimental study

This thesis is structured into nine chapters. The **first chapter** is the introduction chapter. This chapter presents the research question and introduces the subject under study within the IS discipline. It ends with a presentation of research aim and objectives and the structure of the thesis.

The second chapter: The Literature Review Chapter – This chapter concerns **objective one**. It first reviews the literature to clarify this researcher's framework of ideas in order to identify a theoretical foundation and a practical approach for developing the IT tool for the purpose of answering this research question. It concludes with a proposed approach for applying socio-technical theory supported by learning from ETHCIS and SSM approaches. This approach comprises the three phases.

Chapter Three: Research Methodology – This chapter describes the methodological approach selected for developing the IT tool based on the framework of ideas declared in the Literature Review Chapter. It describes the research methodology that was used to study social and technical organisational subsystems, as well as how the results of both studies were brought together to develop the IT tool.

Chapter Four: Understanding the Social Subsystem Needs and Identifying its Functions - This chapter is the first to deal with **objective two** of this research. It starts **phase one** of the research's approach by studying the needs of the social subsystems in Qatari organisations. This study proposes a theoretical model that describes these needs as well as allowing the identification of the social functions that can improve Qatari workforce motivation and capabilities.

Chapter Five: Transforming the Social Subsystem Functions into IT Functions - This chapter continues to address **objective two** in which its concern was **phase two** of the research's approach. The aim of this chapter is to describe how the social subsystem functions discovered in the previous phase is transformed into IT functions. These identified IT functions were then used in the next phase to develop the IT tool.

Chapter Six: **Understanding Technical Subsystem Requirements for Developing the IT Tool –** This chapter deals with **phase three** of applying the research's approach which studies the needs of the technical subsystem in order to develop the IT tool to perform its functions. The outcomes of this phase allowed the research to develop the IT tool for the next experimental phase, when its impact on the improving the Qatari workforce's motivation and capabilities was assessed.

Chapter Seven: **Experimenting with the IT Tool and Assessing its Impact on the Workforce** – This chapter deals with the **third objective** of this research. Experiments were carried out with the developed IT tool in actual organisational work environments and its impacts on the workforce's motivation and capabilities were assessed.

Chapter Eight: Findings and Discussion - This chapter brings all the results and findings of the previous chapters together and discusses them in relation to the literature.

Chapter Nine: Conclusions - This chapter concludes the research. It answers the research's question and presents conclusions, recommendations and contributions. In addition, it discusses the research's limitations, implications and future work.

2.Literature Review: Identifying an Approach for Developing the IT Tool

2.1 Introduction

This chapter concerns the first objective of the research as identified in Table 1.1 which is proposing an approach based on theoretical and practical understanding of STT and learning from ETHICS and SSM ISD methodologies. This chapter, reviews the literature with the purpose of synthesising, critiquing and developing existing knowledge in the area of ISD methodologies that can be used to answer the research question.

In the first part of this chapter in Section 2.2, literature about the role of ISD methodologies in system development from a human-focused IS perspective is reviewed. This review addresses two issues identified as part of the background to the research problem, in Section 1.3.2, which are: first, the philosophical paradigmatic assumptions of the ISD methodologies that will affect how this researcher defines the problem; secondly, how this understanding of the problem can be transformed into technical specifications for the IT tool. This will permit the understanding gained in Chapter One to be enhanced, with the ability to set "the theoretical foundations and context of the research question" (Okoli & Schabram, 2010, p. 2). Then the theoretical foundation later in this chapter will allow the researcher to decide on his "school of thoughts" which will become the grounding for his

framework of ideas.

In the second part of this chapter in Section 2.3, based on the first part of this chapter, ISD methodologies will be reviewed in order to select the appropriate methodologies that adopt a human-focused IS perspective and that will guide the ISD process to develop the IT tool.

In Section 2.4, based on part one and part two of this chapter, common problems and themes in the literature will be identified. This will allow the researcher to declare his framework of ideas, which will guide the selection of data collection methods and analysis in the research process and consequently to the interpretation of the results based upon the selected theoretical perspective (Rowland, 2014).

In Section 2.5, the approach adopted for the purposes of this research will be described, based on learning from the STT principles and in accordance with the discussion in this chapter about ETHICS and SSM principles.

2.2 Critical Review of IS Discipline Role in Developing Information systems

To start the search for the appropriate ISD to develop the IT tool that will answer the research question, we start with a critical review of the role ISD methodologies have in information system development from the two issues identified in Section 1.3.2 which are: first, the philosophical paradigmatic assumptions of the ISD methodologies that will affect how the problem will be defined and understood in this research; secondly, how to transform this understanding of the problem into technical specifications of the IT tool. These two ways of looking at ISD methodology are discussed by Hirschheim et al. (1996) who state that these two issues are well-known in the discipline of IS. They are referred to respectively as “development strategies for information requirement determination” and “development strategies for implementation” (p.44). The first represents “the understanding of the required features of the new developed IS”, while the latter represents the endeavour of bringing these features into existence (Hirschheim et al., 1996, p. 45). According to Hirschheim et al. (1996), developers in IS use the ISD methodology that suits the “outcome” they require the information system to produce. Consequently, they propose a framework in which the “outcomes” of the developed information system depend on two factors which are: IS developer's orientation and the domain of change (Hirschheim et al., 1997).

Regarding the first factor, the IS developer orientation, Mingers and Stowell (1997) argue that those who develop an information system need to recognise the difference between developing an IT solution to process "data" and an information system that provides "information". This issue of data versus information is well-known in the IS discipline since Mason and Mitroff (1973) indicated that the problem that the IS discipline faces is due to a "general" definition of the "concept of information". They suggest that information should be understood as the outcome of the process of how humans understand data. Researchers further argue that people in an information system are essential for its existence because for the information system to operate, data should be processed ("interpreted") to get information, which is a process that usually requires people (Boland, 1987; Langefors, 1996). It is from this point of view that the "participation" of users in system development is necessary because it is these users who will "interpret" the data to gather information (Langefors, 1996). Therefore, Mingers & Stowell (1997) ask that educators in the subject of IS equip future IS developers with the level of "thinking" that matches the "complexity of information systems" (p.4). Applying Hirschheim et al.'s (1996) framework will allow the selection of a personal "orientation" that dictates the "attitudes, beliefs, assumptions and intentions" of this researcher. Consequently, this will affect the "values, goals and epistemological underpinnings" the process of developing the IT tool in this research (p.10). In addition, Hirschheim et al.'s (1996) framework will be used in this research to identify the domain of change of the ISD process.

Hirschheim's et al.'s (1996) personal orientation towards ISD is concerned with the approach in which the developer understands the situation through "control", "sense-making" and "argumentation" perspectives. Hirschheim et al. (1996) give descriptions of each perspective as follows: the control perspective sees that the goal is to attain the objective of the development project by defining it through people in the environment. In this perspective the human's behaviour can be controlled through "natural laws" which predicts their behaviour as if they are "controllable objects". That is, humans are "independent, conscious agents" but their behaviour can be influenced through means of power and control (p.10-11). In this perspective two types of orientations arise, the first is the "instrumental orientation" which considers people in the study as "physical" entities that have equal importance as non-human things, whereas the second is the "strategic orientation" that recognises that people are human agents of change because they have the ability to think and take their own decisions. The sense-making orientation aims to reach a common understanding and "interpretation" of the situation through the means of direct contact and dialogue with concerned people to reach "consensus". The last orientation is the "argumentation/discursive orientation"

which aims to accept only discussions that are supported by “evidences”.

Based on the above description of the four orientations, in developing the IT tool this researcher has adopted the sense-making orientation. This orientation fits with the researcher's understanding of his question in that it requires an understanding of the real situation in which the interaction between HOT happens and the appropriate way to do this is through direct communication with the people involved in the situation. This is in contrast to the instrumental and strategic orientations that are concerned mostly with organisational goals. The argumentation orientation, on the other hand, is more concerned with abstract meanings such as ethical values and hence it applies a “critical and reflective” approach in the ISD process (Hirschheim et al., 1996).

The second exploration of the Hirschheim et al. (1996) framework is in the domain of change which indicates “what and where” the change will happen during the ISD activity. These domains are: technology, organisation and language. In the technology domain change only happens in the technical artefact or in other words, the ISD process is all about designing an IT solution. While in the organisation domain, all the organisational components (HOT) are included in the ISD process. Lastly, the language domain is more concerned about a change that can facilitate communication.

Based on the above description of the three domains of change, in this thesis, the ISD methodology domain of change is organisation. It is the domain that will allow the development of the IT tool and that includes understanding people, organisation and technology in organisations to focus on improving workforce motivation and capabilities.

These philosophical requirements of ISD were addressed by the same researchers later (Iivari et al. 1998), proposing a framework that allows differentiation between ISD methodologies that adopt traditional philosophical assumptions and other new ISD methodologies that adopt different philosophical assumptions.

Iivari et al. (1998) used four fundamental paradigmatic assumptions which are based on Lyytinen's (1986) work to argue that an ISD methodology should have three components: paradigm, normative and resource components. The paradigm component is the one responsible for “providing solutions to organisational problems” through a “set of designs”. The main three elements of this component are epistemology, ontology and theory. The other three, which are rationality, meta-rules and exemplars, are less important from their point of view. Lyytinen (1986) argues that in order to obtain knowledge, it is essential to understand the epistemology of the methodology. Ontology is

about recognising the methodological position concerning the importance of human impact. Lastly, theory is to understand the underlying account of what directs the organisational process. The normative component is the one responsible for providing the standardised behavioural guidelines for the operationalisation of the methodology. Meanwhile, the resource component defines the resources needed by the methodology such as money, people and computers (Lyytinen, 1986).

The above concepts will be used in the next Section 2.2.1 to understand Iivari's et al. (1998) four fundamental paradigmatic assumptions of ISD methodologies. The purpose of studying these assumptions is to clarify the link in this thesis between the researcher's epistemological and ontological stance and the selection of the ISD methodologies.

2.2.1 The Paradigmatic Discussion of ISD methodologies

Figure 2.1 is used to illustrate Iivari's et al.'s (1998) four fundamental paradigmatic assumptions used to differentiate between ISD methodologies. They are described from the perspective of Burrell and Morgan (1979) and Iivari et al. (1998).

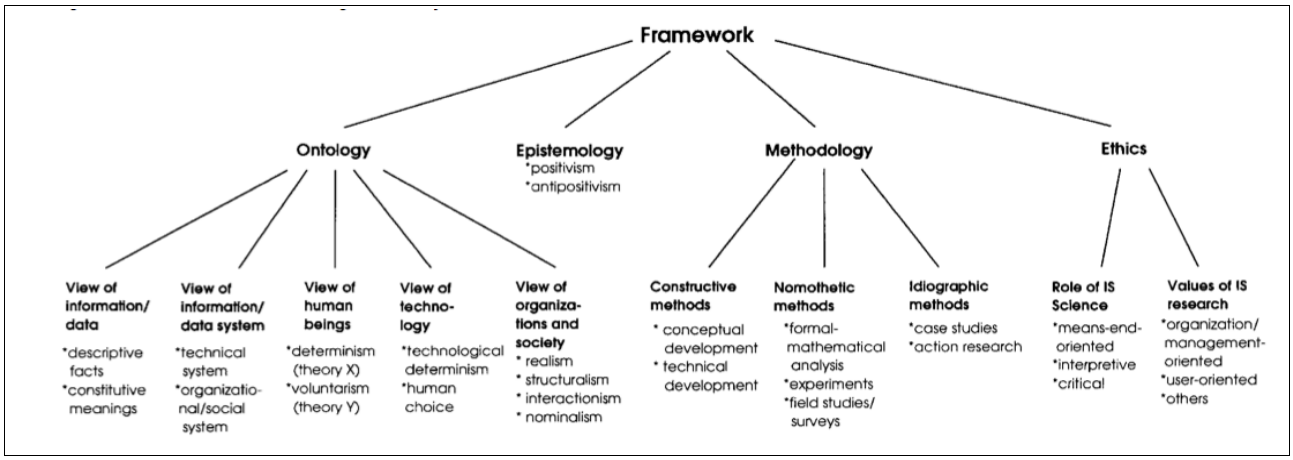


Figure 2.1: A framework for paradigmatic analysis (Iivari et al., 1998)

First of all, Burrell and Morgan understand paradigms as providing a "set of basic assumptions" which can be used to define the nature of the "social world" in organisations and also suggest approaches for studying them based on these assumptions (Burrell & Morgan, 1979, p.24). They add that these paradigms can be related to two main dimensions that define the nature of social science which are the subjective and the objective. These two dimensions, together with aspects related to the "context of sociologies" in organisations, are used to classify social theories into four broad social paradigms which are: the radical humanist, the radical structuralist, the interpretive and

the functionalist.

From an epistemological stance, Burrell and Morgan (1979) look to social theories from two distinct views: positivism and anti-positivism. They use positivism "to characterise epistemologies which seek to explain and predict what happens in the social world by searching for regularities, causal relationships between its constituent elements" (p.5). This is an epistemology that is usually used in natural science studies. On the other hand, anti-positivism opposes the role of the positivist epistemology to study social situations for the purpose of finding out "laws or regularities", instead understanding that "the social world can only be understood from the point of view of the individuals who are directly involved in the activities which are to be studied" (p.5).

When applied to IS, the epistemological stance refers to "what kind of knowledge is sought and can be obtained by the academic/scientific IS community and what its limits are" (Iivari et al., 1998, p. 174). From this perspective Iivari et al. suggest that positivism requires ISD methodology "to produce engineering-like, highly generalizable methods". In contrast, anti-positivism requires ISD methodology "to provide constructs or metaphorical templates" which the IS developer can use to get "useful insights". Based on the above understanding about differences between the two main epistemological stances an ISD methodology that uses anti-positivism epistemology methods has been adopted for the purposes of this research. This type of methodology allows the researcher to inquire about both social and technical information required to develop the IT tool for the purpose of this research. At the same time, positivist methods are also needed to construct the technical specifications of the IT tool.

From an ontological stance, Burrell and Morgan (1979) describe two ontological views of reality: realism and nominalism, in which the realist ontological position is employed to dictate that the understanding of the social world is "external" to and "independent" of the people who are involved in it because the reality exists before them and they did not "create" it. By contrast, nominalism as an ontological position sees anything outside people's "cognition" as not reality because there are just "names" which are an "artificial creation" of the people themselves (p.4). Or in other words, social reality exists in "ideas" rather than in "data of sense perception" (p7).

From the perspective of IS, the realist view concerns with the objective facts of the information systems. In this view, reality exists independent of the social context and hence technology is considered the agent causes effects on organisations as a whole and the "human activities" in particular (Iivari et al., 1998, p. 171). The idealist view or nominalism, in contrast, regards

technology as “socially-constructed product” (Orlikowski, 1992). This view explores reality from the perspective of people who are in the situation under study rather than from the perspective of the researcher as an external observer (Burrell & Morgan, 1979). In other words, technology is influenced by “social and human choice” (Iivari et al., 1998, p. 172). It is also essential here to mention that critical realism (CR) is a recent alternative philosophical view in IS research but it is still not well-developed from an IS methodological stance (Carlsson, 2011). In CR the focus is on understanding the objective structure of the situation as a starting point for being further studied from the perspective of social science theories and methods (Carlsson, 2011).

Based on the above understanding about differences between two main ontological views, an ISD methodology that is grounded in an idealist view of reality is adopted in this research. This ontology allows the researcher to understand the situation from the perspective of the people involved.

Iivari's et al, (1998) framework of ISD methodology classification includes philosophical assumption related to “ethics”. The ethics of research refers “to assumptions about the responsibility of a researcher for the consequences of his/her research approach and its results” (Iivari et al., 1998, p. 175). In this research, ethics is one of the main factors that the researcher based his design upon when selecting the ISD methodology. This is because the objective of the research is to design an IT tool which will improve the workforce's motivation and capabilities. Iivari's et al, (1998) describes this concept from two angles: the first is related to IS’s role in science, that is means-end, interpretive, and critical. The second is related to the value of IS research. Regarding the first angle, IS’s role, the means-end “aims at providing knowledge about means” required to accomplish goals, without considering it ethically. An interpretivist perspective understands that sometimes organisational goals outweigh people’s involvement in actions of system development and thus an interpretivist stance aims “to enrich people’s understanding of their action” (Chua 1986, p. 615 cited in Iivari's et al, 1998). On the other hand, the critical role requires the system developer to be critical of the situation by trying to remove any “domination and ideological practice”.

Regarding the second angle, the value of IS research, Iivari et al. (1998) concisely describe it by indicating that research sometimes may be used to promote “interest” of some groups inside or outside organisations which will have an impact on the system development process.

Based on the above understanding about the concept of ethics in ISD methodologies, an ISD methodology has been chosen that adopts the interpretive role. This role in the ISD process is important to facilitate rich and inclusive participation that allows the researcher to develop his

understanding about the social situation from the view of all stakeholders, giving no privilege to any group inside or outside the organisations of the case study.

The last assumption suggested by Iivari et al. (1998) for classifying ISD methodologies is the "methodology of research". Burrell and Morgan (1979) define two broad methodologies: the nomothetic and the ideographic, whereas Iivari et al. (1998) add a third one specifically applied to the IS discipline which they call constructive, and which is primarily "concerned with the engineering of artefacts" (p.175).

With regards to the nomothetic methodological approach, it is a method applied by those adopting positivist paradigm to collect data and analyse the social situation using "systematic protocol and techniques" to discover general "laws" that can be used to "explain" what regulates and controls the situation under study (Burrell & Morgan, 1979, p. 3,6). These methods include for example experimental methods and surveys. On the other hand, the anti-positivist approach applies an ideographic methodological approach based on a direct, "detailed" and "close" studying of the situation. The aim of this methodological approach is to facilitate understanding of the social situation from the perspective of those involved in it by studying "the way in which the individual creates, modifies and interprets the world" (Burrell & Morgan, 1979, p. 3,6). These methods include for example case studies and action research. Lastly, the constructive methods include either "conceptual artefacts" such as models and frameworks or "technical artefacts" such as software, which does not "describe any existing reality but rather helps to create a new one" (Iivari et al., 1998, p. 175).

It can be noticed that the differences between the nomothetic and the ideographic methods are linked to particular differences in the epistemological and ontological philosophical assumptions they adopt. While, the constructive methods can bring these two epistemological and ontological assumptions together. That is, in constructive methods, the conceptual models can be developed through ideographic anti-positivist methods while the technical models can be developed through nomothetic positivist methods.

Thus to summarise this section based on Iivari's et al.'s (1998) discussion about the paradigmatic analysis of ISD methodologies and Burrell and Morgan's (1979) four social paradigms analysis, the main philosophical assumptions adopted by this researcher are the anti-positivism, idealism, ethical and the use of constructive methods.

In this regards, the functionalist paradigm can be considered the most appropriate of the four social paradigms of Burrell and Morgan's (1979) even though the functionalist paradigm does not conform completely with this researcher's philosophical assumptions identified earlier, especially its philosophical understanding that "social engineering" includes "effective regulation and control of social affairs" that drives "social change" (Burrell & Morgan, 1979, p. 26). It is a positivist approach but one that is influenced by the idealist approach. This combination of ideas makes it more popular than other social paradigms, as discussed by Burrell & Morgan (1979). As they further discuss, the most well-known and used theories of this paradigm are those that bring together the concepts of "social system theory and objectivism" (p.123). In addition, the functionalist paradigm is practical and problem-oriented, which supports the nature of this research's question.

The theories of the functionalist paradigm will be explored in the next section (Section 2.2.2). In this exploration, the appropriate theory should be supported by ideas that conform to the human-focused perspective. Or in other words, as argued by Gill (1996) should overcome the "intellectual challenge" that has faced the human-centred approach in the past, which was a "mechanistic view of science". Therefore, weaknesses in the functionalist paradigm's theories will be addressed by ideas and concepts from other theories, as will be discussed in the following section.

2.2.2 A Theoretical Discussion of ISD methodologies

It has been argued that the reason why IS is not recognised as a discipline by some critics is because it lacks a known "core theory" or "recognised methods" for inquiry into new knowledge that other disciplines have (Probert, 1997). This view highlights the importance of theories in any discipline in making possible the task of understanding situations and then contributing to it with new knowledge. For example, Checkland and Holwell (1998) argue that it is the lack of theories that "make sense of the happening" to the practises that "discover and exploit [...] technical possibilities" is the reason for the "confusion in IS discipline" (p.55). They suggest that this "mismatch" between theory and practise in the IS discipline is due to the unmatched pace of development of technology with the development of theory which makes the IS discipline, as they argue, a "technology-dominated field". That is why the development of information systems in organisations becomes a task of solely using technology regardless of whether it matches the needs of the people of the organisation or at least its impact on them (Checkland & Holwell, 1998).

The importance of theory in IS is taken further by Gregor (2006) who argues that a theory in IS is required to allow the understanding of the discipline as an interrelated combination of natural, social and design science. From this point of view, she describes five types of theories related to IS discipline: analysis theory, explanation theory, prediction theory, explaining and predicting theory and design and action theory. She argues that the type of theory impacts the selection of the "epistemological approach". Gregor (2006) describes these theories as follows:

Theories for analysing describe constructs or the entities that exist in a situation and the relation between them. The epistemological paradigm is an interpretivist paradigm as it usually describes a situation that is little known about. Grounded Theory can be used as a research method.

Theories for explaining allow the understanding of the casual relationship between the construct, or in other words it describes why and how some construct of a situation has an impact on the other. The epistemological paradigm is an interpretivist paradigm and the research method adopted can be case studies and surveys.

Theories for predicting enable predictions to be made about the future state of the situation. In other words, they can describe the impact of one construct of the situation on the other but they can not explain why. It "allows the discovery of regularities" which can help forecast about the future situation if these regularities are applied. The nature of this type of theory needs a positivist paradigm and the methods used are usually quantitative statistical methods.

Theories for explaining and predicting represent general theories that can describe, explain and predict. They are theories that study the "process" of actions in the situation and predict the "variance" with which one construct can affect others. Both interpretivist and positivist epistemological paradigms are adopted in these theories. Hence the research methods adopted here can vary from qualitative methods such as grounded theory and case studies to quantitative methods such as experiments, surveys and statistical analysis.

Theories for design and action, are specifically developed to prescribe how to create and develop something. Gregor argues that in IS these theories are usually assigned with research in the area of software engineering, system development approach (such as Multiview) and design sciences. However, she states that design science is the preferred approach in IS due to the validity it has through the work of March and Smith (1995). These theories adopt research methods such as action research or case study.

Orlikowski (2009) also recognises the existence of the relation between theory, methodology and practises from a sociomateriality view. She links theory with methodology by arguing that researchers usually have three different positions of "organisational account of technology" which differently address the relation between technology and social aspects of the organisation (Orlikowski, 2009, p.4). She describes the first view as the "absent presence" that presents no effective relation between the technology and social action in organisations. The second view is the "exogenous view" which describes technology as the main agent of change in organisations that can have a "significant and predictable impact" on the social context (Orlikowski, 2009). This view adopts the positivist paradigm that understands the process of technological development as a key factor in the success or failure of the technological artefact. In other words, people have no effective impact on the application of technology. The third view is the "emergent process" which understands the relation between technology and social context of the organisation as interactive and mainly controlled by human agency (Orlikowski, 2009). Orlikowski explains that in this view humans are considered the change agents rather than the technology because technology "is relevant only to the people engaging with [it]" (p.8). Thus, this view is based on the interpretivist paradigm that facilitates the understanding of the situation from which the technology emerges. However, Orlikowski argues that researchers need to think differently about the relation between the technology and the social aspects of an organisation as "inseparable" and "entangled". Thus she suggests an alternative view that considers a basic relation that continuously associates with and affects social and technological aspects in organisations. In other words, her proposed view does not look at organisations from a "categorical" point of view but rather, from a relational and connected point a view that attains the concept of "contemporary organisation" which represents the reality of a "dynamic sociomaterial configuration performed in practice" (Orlikowski, 2009, p. 13,15).

This view is a type of understanding that from the researcher's perspective can relate to Gregor's (2006) design and action IS theories which will produce the relevant-to-practise value that IS research currently does not deliver very well.

To summarise, due the practical and problem-solving aim of this research, the paradigmatic philosophical stance adopted here as described in the previous Section 2.2.1 is primarily anti-positivist but also accepts the need to use positivist methods to construct the technical specifications. Hence, the "entangled" view of social and technical systems in an organisation that can be prescribed in design and action theories can be adopted to answer the research question. This

type of view or theory does not strictly adhere to one specific paradigmatic. Saying that, the theories of the functionalist paradigm that was selected in Section 2.2.1 will be explored in parallel with other interpretive human-focused theories.

To start exploring theories of the functionalist paradigm, Burrell and Morgan (1979) describe three main areas of theories in the functionalist paradigm. The first includes theories that understand organisations from a "managerial perspective", less concerned with linking it to "social science". The second area includes theories that focus on the sociology of organisations and they understand organisations from a sociological perspective. The third area includes theories that focus on the behaviour of individuals to study the organisation from a "psychological" perspective.

Because the concerns of this researcher are linked to human interactions in the organisational context, the theoretical focus is on theories concerned with workforce behaviour. Burrell and Morgan (1979) state that theories grounded in a psychological perspective are:

Classical management theory: it understands the nature of the organisation from the most objectivist view, as prescribed by Taylor and Fayol who were the pioneers in this area. In other words, it sees the organisation as a "hard" entity that can be investigated using methods of "natural" science. Hence, the human component in the organisation is treated as "passive" and only "responding" to the environment in a "cause and effect" manner (Burrell & Morgan, 1979, p. 128).

Industrial psychological movement: it understands the nature of the organisation from "humanitarian" and "managerial" views. It was behind the foundation for the British National Institute of Industrial Psychology in 1921 in which the main objective was to "ease [workers] difficulties" at work to cause their performance to rise and their "personal satisfaction" to increase (Burrell & Morgan, 1979, p. 129). But as they suggest, this movement has considered the human component of the organisation from the same positivist angle as classical management theory in which the organisation is studied as a "hard" entity and everything in it can be understood using a "cause-effect" relation.

The Hawthorne and the Post-Hawthorne studies: the Hawthorne studies are concerned with the human component of the organisation, like the industrial psychological movement, from an objectivist angle in which they understand the social reality of an organisation as a relationship between "employees, work environment and work performance" (Burrell & Morgan, 1979, p. 143). They add that the only difference between the Hawthorne and the post-Hawthorne studies is in the

concepts of the human characteristics that they study, in which the former studies “fatigue” and “monotony” and the latter studies “job satisfaction”. Both studies lack an understanding that identifies a “clear relationship” between an employee's job satisfaction and other “factors in the work environment” (p.144). Although the view of the workforce has shifted towards seeing it as comprising “social beings motivated by affective needs” as Maslow and Herzberg proved, the approach in studying human physiology still uses the same “systemic empirical investigation” approach (p.145).

Socio-Technical Systems Theory: it is the theory that understands that there is a relation between social and technological factors which affect each other “interdependent[ly]” (Burrell & Morgan, 1979). One important concept in this theory is its recognition that there are “social and psychological” factors that exist in both “work organisation” and “work technology” which can be understood when the organisation that contains them is studied as a “whole” or in other words in a systemic way (Burrell & Morgan, 1979).

Theory of executive functions: this theory was developed by Chester Barnard, who defined the notion of an organisation and then proposed his theory for its “survival”, in which the manager plays the core role to maintain a “state of equilibrium” (Burrell & Morgan, 1979). Burrel and Morgan add that this equilibrium as prescribed by the theory, is achieved through manager's “adjustments” into the work environment by “training”, “inculcation of attitude” and the “construction of incentives” (p.149). This theory is criticised by Burrell and Morgan (1979) as closely related to Hawthorne studies in that it does not take much account of the role of technology.

The structural functionalist approach to organisation: this theory was developed by Philip Selznick who defines an organisation as a structure that exhibits “non-rational” behaviour which is caused by “informal and social aspects of the organisation” (Burrell & Morgan, 1979, p. 153). This theory views the work environment as having a direct impact on the “formal and social structure of the organisation”, which means that analysing the structure from a sociological perspective is not enough. Rather, it needs to be analysed from a structural and functional perspective. Therefore, the organisation should be seen as a system that includes both an “economy” as well as an “adaptive social structure” which “maintain itself internally” through providing the needs of both economic and social system to achieve “organisational goals” (Burrell & Morgan, 1979, p. 154). In this view, the human component of the organisation is still not given adequate attention compared to the attention given to organisational goals.

Organisations as open systems: this is a view where an organisation is considered as a whole "unitary system" that has connected subsystems work together to achieve a common goal or "primary task" in order to "survive" (Burrell & Morgan, 1979). This theory is based on the assumption that for the common goal of the organisation to be achieved each subsystem's needs or "functional imperatives" should be fulfilled. Therefore, the design of the system's functions requires finding a fit that satisfies the needs of the subsystems as well as driving the organisation in a "harmonious" way, as is the case in the socio-technical system in which the focus is on understanding and then satisfying the needs of the technical subsystems and the human component through the work design of the organisation. It is all about designing the system after understanding its functions are impacting the achievement of the goal of the system; based on this, these functions are brought together as a system that "has functional unity" and when this system is not achieving its goal then it implies that the needs of the subsystems are not fulfilled (Burrell & Morgan, 1979, p. 159).

From the above description of functionalist paradigm theories in the area of human behaviour**,** the socio-technical theory (STT) is the most relevant theory. It is in line with the researcher's philosophical assumptions described in Section 2.2.1; epistemologically it allows understanding the organisational context as both social and technical; and ontologically, is one in which the organisation is perceived as a socially constructed system and hence technology is subject to human choice. Ethically, the STT researcher understands the role of technology not as a means to an end but rather as an interpretive role that engages a workforce in understanding and then developing it to consequently improve their life at work.

In the following section, socio-technical theory is discussed in depth. Then, other human-focused theories and principles are explored in Section 2.2.2.2 and Section 2.2.2.3. In Section 2.2.2.2 the critical social theory and neohumanism principles will be discussed, while in Section 2.2.2.3 the systemeering studies and infology will be discussed.

2.2.2.1 Socio-Technical Theory

Socio-Technical Theory (STT) started out as a philosophy in 1949 when the Tavistock Institute in the UK started focusing on carrying out research investigating people's relationship with their workplaces in the industrial age, in which the introduction of new machines at the workplace caused this relationship to became not focused on humans but rather on machines (Trist, 1981; Walker,

Stanton, Salmon, & Jenkins, 2008). In other words, the relationship became what was called a "dehumanised" one (Scacchi, 2004). Socio-Technical Theory (STT) was developed in response to the unexpectedly poor results of IT systems on organisations' efficiency and productivity. The theory relates this deficiency to "implementation problems", in which the human component of the organisation rejects the full utilisation of the IT component, which results in a gap between the desired benefits of the system and the achieved ones (Larsen, Allen, Vance, & Eargle, 2010). The theory explains this problem as a result of a lack of a "fit" between the "technical subsystem" and the "social subsystem" of the developed organisational system and argues that an IT system can only be successful when the "interdependency" between these subsystems is "recognised" at the design and development stage of the system (Larsen et al., 2010).

Walker et al. (2008) give an overview of the history of STT starting from the first paper published in 1951 by Trist and Bamfourth which was the first to suggest that utilising technology at work had an impact on the human workforce. The paper dealt with the impact of introducing new technology to a work system, which might not only change the nature of the work but also the style of management in the organisation. This was a change that could also negatively affect the "productivity and absenteeism" of the workforce (Walker et al., 2008). This study of the social and technical aspects of the organisation became what is now called socio-technical theory (Walker et al., 2008).

STT first started as a concept or philosophy (Ropohl, 1999; Trist, 1981), a set of principles which eventually evolved as system design characteristics (Walker et al., 2008). It then became design methods and approaches and lastly, some proposed that it should become a design engineering method (Baxter & Sommerville, 2011). All of these STT studies aimed to find the right "fit" (Trist, 1981) or the right "joint optimisation" situation between the two subsystems (Walker et al., 2008) in organisations, for the purpose of developing socio-technical systems (STS). STT is considered one of the "emergent process" human-centric theories based on Orlikowski's (2009) classification.

STT rejects the techno-centric approach of traditional work design and accepts on the other hand independent interrelation between the social subsystem and the technical subsystem and hence they should be jointly developed (Mumford, 1981). ISD methodologies based on STS focus on developing information systems that recognise the importance of the interrelation between the machine and the human by considering all factors that guarantee that "efficiency and humanity would not contradict each other" (Ropohl, 1999, para. 2). A limitation in socio-technical theory is

its reliance on prototyping and participatory approaches to understand the problem situation as Gasson (2003) argues. The issue is when a prototype of one subsystem (social or technical) is used to engage participants in discussion about the prospective information system requirements, then it may naturally direct the view of the problem towards one subsystem (Gasson, 2003).

On the other hand, the socio-technical participatory approach was criticised in the 1960's by the Scandinavian trade-unionist movement (in its first and second generations) (Hirschheim et al., 1997). Their criticism was due to the power it gives managers when they select the design team (Symons, 1991). This led the trade-unionist movement to also criticise a well-known IS scholar in Scandinavia, Langefors, about his THAIS approach to information system development which he did not accept, arguing that his understanding of IS was not dictated by any political view (Saevik, 2013). Langefors' view of IS is centred around the idea that technology can be utilised to improve life (Symons, 1991). His ideas will be discussed in more detail in Section 2.2.2.3.

On the other hand, also in 1960's a more democratic approach to participation was initiated by Tavistock and Shell called the Shell Philosophy Project which adopted a “management philosophy” that considered the participation of the workforce at all levels of an organisation (Trist, 1981). This was done by bringing all workers together in “residential conferences” where they would all be involved in a process of “work re-design” which would end when they could agree on a set of “values and principles” that would guide the redesign process (Hill, 1971).

It is necessary to mention that in the 1980's, the third generation of the Scandinavian movement - the "cooperative design" generation, became more open to the participatory approach by starting to adopt technical participatory tools such as prototyping, to support user understanding of technical requirements and hence achieve better and “effective user participation” (Hirschheim et al., 1997).

The above broad understanding and application of STT is considered one of its strengths as argued by Stahl (2007). This strength is due to the nature of STT, which is not “algorithmic” but in contrast allows the information system developer to “reinvent central concepts as needed” (Stahl, 2007, p. 481). However, as Stahl further suggests the “freedom” in using STT can also become its problem, especially when it is used in the organisational context. This problem was what motivated Mumford to introduce a “more formal structure” in the STT organisational application in an approach called ETHICS (Stahl, 2007). Mumford's ETHICS approach (Mumford, 1983) based on STT principles, had the aim of attaining a situation in the workplace where work becomes “more satisfying” for the workforce and concurrently more “technically efficient” (Mumford, 1996, p. 115).

It is also necessary to mention here that STT was considered by Orlikowski (2009) as a type of theory that adopts the emergent process view, discussed in Section 2.2.2. This is the view that Orlikowski associates with the human-centric approach because "of the emergent process perspective inhibits assigning agential power to the distinctive technological capabilities that interact with human interpretations and social action" (Orlikowski, 2009, p. 11).

2.2.2.2 Critical Social Theory and Neohumanism Principles

Critical Social Theory (CST) has been used by IS researchers to deal with issues related to ISD of a social and technical nature (Stowell, 2009a). CST is mainly about understanding the two main concepts of human activities, which are work and communication (Klein & Hirschheim, 1993). They argue that the way out of the traditional approach of ISD "functionalism" (Burrel and Morgan, 1979) is via the application of CST, because it allows the nature of obstacles of communication that may happen in the process of system development to be understood and hence looks at how to overcome them. It also frees the system developer from an epistemology that is based only on empirical observation to one that considers "shared beliefs" and "personal insights" (Klein & Hirschheim, 1993, p.270). These are termed in CST neohumanist principles as the "emancipation" and "mutual understanding" objectives of ISD. That is, in the ISD process the system analyst is required, based on CST and neohumanism, to establish a "rational discourse" with people of the organisation that emancipates them from any unnecessary "constraint" caused by psychological internal or socially external "compulsions" (Klein & Hirschheim, 1993). They further add that this will lead to the removal of any "social biases", hence preventing misrepresenting communications to allow a better understanding of the needs and so to improve the information system's development.

With regards to using the CST neohumanist principles in ISD methodologies, Klein & Hirschheim (1993) state that no one has the "tools" to apply these principles. They add that some ISD methodologies such as ETHICS (Mumford, 1983) and soft system methodology (SSM) (Checkland, 1981) understand the importance of removing any communication obstacles in the process of system development. In this regards, Churchman (1979) and Checkland (1981) observed the importance of drawing the boundary of systems when they are studied to make it clear for both analysts and people within the situation, of what to take into account. This important aspect of system thinking is something taken up later by Ulrich and Stowell. Ulrich (1988) studied the

boundary aspect in the process of problem appreciation and introduced the Critical Systems Heuristics (CSH). This approach considers boundary definition as a "prime consideration" which should be explicitly expressed to allow people in the situation to "question and debate boundary claims by others. Ulrich, like Stowell (2009a), places great emphasis upon dialectic as a means of establishing boundary in such a way that there is an equality of opportunity to express opinion" (Stowell and Welch, 2012: 67-68)].

From the description of CST and neohumanism principles, communication that allows better understanding of people in the situation should be one of the critical factors in selecting an ISD methodology. In this research, to make up for the limitations of the functionalist STT approach, ETHICS and SSM are suggested here as appropriate ISD options which will be further studied in Section 2.3.

2.2.2.3 Systemeering Studies and Infology

Another important ISD theory from a human-focused perspective can be seen in "systemeering studies", a concept developed by Langefors (1978, 1996). It is a study which has an interest in understanding six "types of fundamental problems", namely: human cognitive limitations, systems complexity, systems multidisciplinary, systems dynamics, infology, human and social aspects of IS (Langefors, 1996, p.86). Langefors argues that these problems are common to all IS, hence successful methodologies are ones that can deal with them. In summary, these problems explain why sometimes IS analysts cannot develop successful information systems. These reasons are described by Langefors (1996), starting from the cognitive limitation of human ability to the stage of thoroughly understanding the situation.

Regarding understanding problem situations, Langefors (1996) suggests that the complexity of systems makes the understanding of situations even harder and leads us to think about a system as a collections of parts rather than thinking about it "holistic[ally]". In this case, as Langefors (1996) argues, multidisciplinary is needed in the methodology of investigation to facilitate the understanding of such complex situations.

Infology, an IS theory also developed by Langefors, views the form of language used between users and analysts as well as the "pre-knowledge" of the people as essential factors in communication. According to Langefors (1996) in infology, information is defined as data interpreted based on people's "life experience". Then based upon them, data is "interpreted and understood" (Langefors,

1996). The notion of infology underlines the importance of “user participation” in system development, which also requires understanding about social interactions and how they impact the pre-knowledge of the people. This consequently positively “motivates” the users to make use of the prospective information system as well as “motivating” them to use it to achieve organisational goals (Langefors, 1996, p.91).

Langefors (1996) raises an important point about the philosophy of systems development, which he describes in terms of two objectives of any systems development project. The first is to fulfil users’ needs that they themselves are “aware of”. The second is to imagine new needs “unknown” to the them, which they may become interested in. He argues that when the first is the objective of systems development, the objective will be in formalising a common language between system analysts and users so analysts can clearly understand the needs of the users. While he believes that when the second is the objective of systems development then, the first issue of communication as well as the analysts' imagination of new needs will be the problem.

The issue here is that users are not always capable of determining if this new need is really the “new good” (Langefors, 1996). Therefore, he suggests the need for “methods” different from the “traditional” ones to be used to deal with both issues described above. The method from Langefors' (1996) point of view should serve two functions: the first is the identification of what users want and the second is to determine whether these are “feasible”.

2.2.3 Key Insights and Summary

These issues of communicating with people, understanding their actual perception of the problem situation and how an information system can deal with it, are all important aspects which will be considered along side the concepts of STT when the ISD methodology selected for this research is discussed in the following section (Section 2.3). These issues are key aspects that differentiate a human-centred design approach (HCD) from a user-centred design approach (UCD), as Gasson (2003) argues. She believes that UCD approaches misconduct the process of defining the problem by basing it on assumptions about people needs. These assumptions are usually “implicit and difficult to communicate” and thus understood differently by people in the situation. Thus, she suggests that the way to overcome this design issue is through a new communication approach in which people in the situation define the problem themselves. This, from her point of view, will produce an information system that embeds all views of organisational stakeholders and at the same

time allows the information system to "shift and evolve as the design proceeds" (Gasson, 2003, p. 32). This is a characteristic that the UCD approaches lack because they they focus on achieving the goals that the technological component of the system will deliver but forgets to "revisit" the original problem that the information system project was initiated to solve (Gasson, 2003). On the other hand, the HCD approach emphasises the process of continuous learning about the problem situation and better "goal-definition" (Gasson, 2003).

These aspects are also supported by Beers (2014) who believe that the issues facing researchers in the IS discipline with regards to developing "human-centered organisations" can be solved with a change in the way they think about an ISD methodology. In this respect, he proposes three ideas and approaches, which are: system thinking, shared understanding and design-oriented problem solving.

First, system thinking enables the process of understanding the problem situation to be holistic, that is, it looks to the organisation as a whole not at "individual interactions" (Beers, 2014; Checkland, 1981; Symons, 1991). That is in contrast to the reductionist or positivist view of thinking which neglects these interactions together; which are very important to consider to comprehend any emergent properties produced out of these interactions (Beers, 2014; Checkland, 1999; Stowell & Welch, 2012). Thus, system thinking can be considered a human-focused system development approach because of its concern with understanding "meaning" of "what someone needs or wants" from the holistic context of the organisation (Beers, 2014, p. 21). This is in opposition to reductionist approaches, which are functionality oriented and efficiency concerned (Beers, 2014; Stowell & Welch, 2012).

Second, shared understanding allows the workforce to be in the centre of the "intersection" between organisational goals and technological development. This approach emphasises that the workforce should be involved in the harmonisation of both organisational and technical aspects for the achievement of system goals (Beers, 2014). That is, it encourages people of the organisation to be involved in a "dialogue" to reach a shared understanding that eventually constitutes the "commitment" to the organisational goals (Beers, 2014). This view is also shared by Baroudi, Olson and Ives (1986), Avison et al. (1998) Lynch & Gregor (2004) and Mumford (1981) who all present in-depth studies of how the participation of a workforce in an ISD process can have a positive impact.

Third, the design-oriented problem solving approach gets users to feedback throughout the ISD process, thereby learning about their "needs, goals and tasks" (Beers, 2014, p. 25). It is an iterative

learning process that aims to compare a workforce's “expectations” with “organisational assumptions” by using methods such as social methods to understand the problem while using prototyping and testing as a means to continually improve the design of the solution in a process they call “divergent and convergent double-diamond diagram” (Beers, 2014, p. 27). This process does not only provide an analytic framework to develop the IT solution but it also makes the developers aware of the everyday reality of the environment (Beers, 2014).

This approach for understanding the problem situation as a learning process that involves people throughout the ISD process, is one of the principles that exist in the soft system thinking adopted by the soft system methodology (SSM), to be discussed in Section 2.3.2. It is also these differences between the HCD approach to system development and its UCD counterpart from the paradigmatic assumptions and theoretical understanding that were the key factors in pulling together the researcher's framework of ideas, to be outlined in Section 2.4 as well as the selection of ISD methodology for developing the IT, to be discussed in the next section (Section 2.3).

2.3 Information System Development Methodologies

In this section, different ISD methodologies are explored based on the paradigmatic assumptions and theoretical understandings identified in Section 2.2 in order to select the appropriate ISD methodology that will enable us to develop the IT tool.

2.3.1 ETHICS

ETHICS is the acronym for the Effective Technical and Human Implementation of Computer-Based Systems (Mumford, 1993). It is a methodology developed by Professor Enid Mumford based on the idea that a workforce's “job satisfaction” is as important as the work efficiency that information system development projects usually aim for (Mumford, 1993, 1995, 1996). ETHICS has three principles which are: to allow “users” of the new information system to engage in the ISD, to ensure that the new information system has a positive impact on “user” satisfaction as well efficiency; and lastly, to improve “users” competencies in managing change that involves technical aspects (Mumford, 1993, 1995, 1996). The philosophy of this approach revolves around the idea that when developing information systems, the needs of the human resources of the organisation need to be taken into consideration in the new computer system so that the information system will not be rejected by the users (Mumford, 1995). The basic idea of Mumford's ETHICS is built upon STT

principles which understand that human needs in the workplace are affected by any new IT system because it changes work tasks and the internal organisational environment. However, what differentiates ETHICS from STT is it addresses specifically the work design (Gasson, 2003). Mumford argues that when new technology is implemented, the tasks of employees are consequently changed because of the technology's "opportunities and constraints" that can influence the "task structure of functions or departments" (Mumford, 1995, p. 8). This change can "positively and negatively" impact the level of job satisfaction. Therefore, the ETHICS approach, in her view, can ensure that new information systems are developed to produce positive changes with respect to a workforce's job satisfaction or at least not negatively impact them.

The ETHICS methodology was helpful in learning from its application of the STT concepts in this research because as discussed in Section 2.2.2.1, it is based on a theory that ethically focuses on humans in the workplace. Also ETHICS adheres with the researcher's understanding of the human-focused IS perspective stated in Figure 1.1 (C), in which HOT components are all utilised at the system development level to focus on the human needs at the system operational level. In the following section, ETHICS is discussed in detail to find out if its approach to system development is appropriate for sole use to develop the IT tool in this research.

2.3.1.1 The Main Design Principles of the ETHICS Methodology

ETHICS includes "jointly" two main principles in its methodology, the user participation approach and socio-technical systems design (Mumford, 1995, 1996). User participation is used in the methodology to interact with the situation and understand it while the socio-technical systems design principles are used to structure this understanding so that it can be used to develop the information system.

First, user participation is considered important in ETHICS, because it represents the core of what is called the "human design task" as indicated by Mumford (1995). It is the user participation principle, as Mumford argues, that allows the change to successfully occur in the organisation due to its nature of encouraging knowledge sharing between all the users and the design team (Mumford, 1995). Hence, as Mumford argues, the participation principle becomes a "learning" and "problem-solving process" in the system development process. She adds that because this social process of involving users is used to gain effective participation from them rather than being a superficial exercise, "high commitment" from them is needed. However, this participatory approach

to ISD process should be used with caution in practice because as Gasson (2003) argues, participants are selected sometimes by managers based on their "affiliations and compliance", rather than for their competencies in the area of system development. This could consequently limit users' effective role in system development and thus the ability to develop a human-centred system (Howcroft & Wilson, 2003). The limitations of using participatory approach in developing a human-focused IS will be discussed in Section 2.3.1.2.

Second, socio-technical principles are applied in ETHICS methodology because it is based on a theory that understands the importance of achieving a "balance" between the technical subsystem and the social subsystem of the organisation to work effectively. ETHICS and STT consider "technology as a means not an end" Mumford (1995, p.50). ETHICS achieves the balance between the two subsystems from a humanistic lens. It focuses in its approach to "solve problems or provide opportunities" for better work efficiency and effectiveness by recognising human needs. This is evident in the ETHICS approach as described by Mumford (1995, p28):

1- Diagnosing user needs and problems phase.

2- Setting efficiency, effectiveness, job satisfaction and quality objectives phase.

3- Proposing possible design strategies to achieve the defined objectives phase.

4- Selecting the most appropriate strategy phase.

5- Formulating the details of the system design (technically and organisationally) phase.

6- Implementation phase.

7- Evaluation phase.

It is noticeable from the above description of the ETHICS approach that it is dependent on the task of redesigning the work system to satisfy the workforce's humanistic needs. This is more evident in the diagnostic and design tools used in the ETHICS approach, which are summarised in Table (2.1).

In Table 2.1, the stage (1) and stage (2) of the ETHICS approach are used to identify the problems and requirements of each department in the organisation. Based on these requirements the efficiency, effectiveness and job satisfaction objectives are set by each department, then discussed to find the optimum strategy that can accommodate different departments' "common objectives" (Mumford, 1995). She adds that the role of the system analysts in these stages is critical to facilitate and understand the needs of all "interest groups" and to allow them to participate effectively throughout this process.

Stage No.	Diagnostic and design tools	Objectives
1	A framework for allowing IS developers to determine organisation mission, main tasks and key factors affecting effective operation.	-Specification of mission and description of key tasks -Diagnosis of needs: -Efficiency needs -Effectiveness needs -Job satisfaction needs
2	An analysis tool to point out key problems.	
3	A questionnaire to evaluate the level of employee's job satisfaction.	Designing the IT system so as not to conflict with the STS design principles of job design and work organisation, specifically: - Task variety - Multi-skilled work - Self-managing group - Work group as the design unit
4	A framework to spot changes that will happen internally and externally when the new system is implemented.	
5	Guidelines for designing the work.	

Table 2.1: Using diagnostic and design tools in ETHICS approach

Stage (2) is used to assess the actual level of each employee's job satisfaction in order to identify the gap between what employee needs are and what they actually experience at work. Then, to use this information in group discussion to ask why this gap exists and what solutions can be used to bridge it (Mumford, 1995).

Stage (4) and (5) are concerned with the application of socio-technical design principles. Mumford (1995) suggests that the use of these principles should ensure that the job and organisational design fit with the new technology. Mumford (1995) specifically selects four STT principles, which are: task variety, multi-skilled work, self-managing group and work group as the design unit. She describes them as follows:

Task variety principle is described as a work design that allows either more tasks of the same job to be given to employees or that these tasks are diversified. This principle is essential to keep the job satisfaction level high for the group of employees as “work monotony” dissatisfies them (Mumford, 1995).

Multi-skilled work is the next level of job complexity that employees require for achieving job satisfaction. It focuses on allowing employees to try doing new things and thinking of new ideas (Mumford, 1995). Mumford considers that this principle affects “job enrichment” because it

requires employees to improve their work capabilities through training for example. This principle encourages employees to carry out "development activities" such as problem solving and innovation, which are work activities that create new work opportunities for employees to apply their skills for new work challenges (Mumford, 1995).

Work group as the design unit and self-managing group principles are necessary to be applied in parallel with the multi-skilled work principle as Mumford argues because in order for employees to apply new ideas at work, they need to take decisions. These two principles require top management to give a group of employees who have the necessary skills, the power to control themselves and hence to become responsible for their actions (Mumford, 1995).

Mumford (1995) presents the ETHICS's understanding of job satisfaction using the term "fit". In her view job satisfaction occurs when there is a fit between what a workforce's satisfaction needs are and what the workforce actually experiences. She specifically defines this fit using five core areas of needs that a workforce needs to attain job satisfaction which are: the knowledge fit, the psychological fit, the efficiency fit, the task structure fit and the ethical fit.

The noticeable gap that ETHICS has in applying socio-technical principles, in terms of this research, is in utilising technology to satisfying the workforce's needs in only two of the five areas of a workforce's needs. This is shown in Table (2.2), which presents a synthesis of how STT principles are used in ETHICS to provide job satisfaction, utilising technology for the structural and knowledge fits needs. This synthesis is based on the description provided by Mumford (1995, p.34) about the core areas of job satisfaction needs.

STT principles	Social subsystem role	Technical subsystem role
Task variety	Structural fit To provide employees with different types of tasks.	Selection of technology support based upon discussions with the design team.
Multi-skilled work	Knowledge fit To allow employees to improve their knowledge for the purpose of using it at work.	Selection of technology support based upon discussions with the design team.
Work group as the design unit and self-managing group	Structural fit To allow employees to control their work activities.	Selection of technology support based upon discussions with the design team.

Table 2.2: The job satisfaction needs in ETHICS that can be satisfied with socio-technical changes

Other core needs of the workforce in ETHICS are met not through utilising technology, but through changes in organisational policies and work design, as shown in Table (2.3).

In ETHICS, the knowledge and psychological fits are related with “needs associated with personality” of an employee (Mumford, 1995, p. 35) while, the efficiency and task structure fits are “needs associated with competences, control and efficiency” requirements of an employee (Mumford, 1995, p. 40). The Ethical fit, on the other hand, is associated with the employee needs of recognising employees' values in the workplace. It is clear that in ETHICS, the role of technology in achieving human needs is limited to providing “opportunities for changes presented by the new computer-based work system” for the organisation to better create the fit in two of the five core areas of the workforce's needs (Mumford, 1995, p. 34). This partial utilisation of technology is the first limitation that makes ETHICS approach not the appropriate ISD methodology to develop the IT tool in this research because it means that in ETHICS, a workforce's needs cannot be satisfied with the sole usage of technology. It also means that ETHICS depends on changes that include work policies, design and even structure, requiring an action research type of change, which is out of the scope of this research. The next section describes another limitation of the ETHICS approach related to the participatory approach.

Job satisfaction needs	Social subsystem functions to improve job satisfaction	Technical subsystem functions to support job satisfaction
Employees need to fulfil their “personal interest” at work.	Psychological fit To understand and fulfil employee's personal objectives such as “recognition, achievement, responsibility and work interest”	Not available
Employees need different types of support to carry out their work efficiently , they need a fair “effort-reward” system and they need some sort of work control.	Efficiency fit To provide proper work support such as “information, material, technical aids, specialist knowledge and supervisory help” to provide a fair rewards system and to allow employees to work under a type of supervisory control that matches their needs.	Not available
Employees need to work for organisations that have “values” that they do not disagree with	Ethical fit To make these values known to employees through means of “communication, consultation and participation” and make them match the employees' ones.	Not available

Table 2.3: The job satisfaction needs in ETHICS that can only be satisfied by social changes

2.3.1.2 Limitations of ETHICS in Relation to the Participatory Approach

Mumford herself understands the limitations of the participatory approach (Mumford, 1993) when she admitted that for ETHICS approach to achieve its intended benefits, issues such as "trust, the selection of the design group, conflict of interest, stress, communication, the role of system designer and the role of manager" needed to be addressed (p.31-33). These issues limit the understanding of the situation from a human-focused perspective because of the power and control issue. This issue of power in the application of the participatory approach was discussed in Section 2.2.2.1, which shed light on how it sometimes restricts participants to express their view in the ISD process and impacts the ability of developing a human-centred system design (Howcroft & Wilson, 2003).

The participatory approach is also criticised as looking to technology as the tool for management to gain more "control" over employees (Kensing & Blomberg, 1998). This argument is shared with Hedberg (1980) who considers any process of information system development controlled by managers, produces in the best case an information system that improve work from managers' perspectives. The issue of power in the participatory approach has also been criticised by the Scandinavian movement. The Scandinavian movement took an alternative approach, based upon the idea that in an ISD process a "truly" participative approach cannot be achieved without all system stakeholders being given "equal resources in terms of knowledge of what can be the possible outputs" (Symons, 1991, p. 185). According to Symons, for the Scandinavian movement a "truly participative design" is one that allows both managers and IS developers to meet and discuss the new system with the workers.

The issue of power described here has been discussed in this thesis from the perspective of critical social theory (CST) and Neohumanism principles which suggested communication as a means to overcome the issue of thinking in isolation from other stakeholders of the system. Controversially, Klein & Hirschheim (1993) propose ETHICS as a tool to apply CST principles; in this research we were unable to find enough evidence to support this and thus turned to the other alternative suggested by Klein & Hirschheim (1993), soft system methodology (SSM), which will be discussed at the end of this section.

The second participatory approach issue that limits ETHICS from a human-focused IS perspective is presented by Champion et al. (2005) who argue that the participatory approach puts special emphasis in delivering the technology by increasing the involvement of those who apply it in the process of developing the IT aspects of the system, rather than in the process of learning about the

problem situation and how this may be solved or improved. Gasson (2003) makes a similar point, arguing that even though the participatory approaches are considered by some as human-centred approaches, “its implementation has been problematic, because of the persistence of the goal-driven, technology focus in IS design” (p.39).

Here we should clarify that this emphasis on technology is not in ETHICS system operational level but it is at the system development level due to the desire to think about the most feasible technical solution that can satisfy both the needs of the organisation and those of the workforce. Consequently, it may cause the members of the design team to exert more efforts on understanding and developing the technical aspects of the information system than in understanding the humanistic needs. Indeed, Gasson (2003) believes that participants may be hindered by focusing on the development of the technical systems, especially in the phases that follow problem definition where prototyping is usually the method used by the participatory approach to get stakeholders’ feedback about the technical system. Symons (1991) also points to the amount of effort required in the participatory approach in defining technical specification by non- specialist participants.

To summarise this section, we can say that although ETHICS was an advanced step in understanding STT principles and applying them in the context of human-focused IS, there are limitations related to its utilisation of technology as well as its adoption of the participatory approach. These limitations mean that ETHICS cannot become the ISD methodology to be used to develop the IT tool in this research. However, in this research, ETHICS application of the STT will be learnt from, as will be described in the next section.

2.3.1.3 The Main Learning Points from ETHICS Methodology

The ETHICS view emphasises that information systems can be developed if the development team and organisation's managers believe that IT “must be used to achieve human as well as technical objectives” (Mumford, 1996, p. 11). ETHICS's care about the workforce's humanistic needs can be viewed only from a system operational level. On the other hand, its adoption of the participatory approach diverts its focus to technical rather than humanistic needs at the system development level. This limitation can be addressed by using an alternative approach to participatory approach which Symons (1991) suggests are the principles of soft systems thinking (Checkland, 1981). He further indicates that the system development principle of soft systems methodology (SSM) can address the participatory approach's limitations. Also recently, the limitations of the participatory

approach were one of the reasons for the development of a new framework for applying SSM called client-led information system creation (CLIC) (Champion et al., 2005). It adopts the principle of client-led design (CLD) methodology (Stowell & West, 1994) that considers the client as being at the forefront of the ISD process who controls and is directly involved in all phases of the ISD process. In addition, CLIC is characterised by its practical operationalisation of SSM principles, constituting its main strength. CLIC's approach to understanding the situation allows participation not be limited to the problem definition phase but continues throughout the process of ISD. In addition, CLIC supports participants to understand the situation as a whole not only from a technical perspective, and also supports them to think about the solution (Champion et al., 2005). These important insights about SSM constitute a viable alternative to the participatory approach which meet the need to focus on the humans at the system development level, as will be discussed in the next sections when SSM principles will be explored with the main approaches that apply them such as Multivew, CLD and CLIC.

The following points summarise this section:
1- The ETHICS application of STT can be learned from in the system operation level as will be presented in Section 2.5.
2- The limitation of an ETHICS participatory approach at the system development level can be addressed by learning from the SSM principles which will be discussed in Section 2.3.2.

2.3.2 Soft System Methodology

The soft system methodology (SSM) originated with Checkland in 1981 (Checkland, 1981). It is considered by Iivari et al. (1998) as an ISD approach more than a methodology. It is also considered by Checkland and Scholes (1990) as an approach for studying and improving a situation “and not necessarily a methodology”. The main strength of this approach as indicated by Symons (1991) is that it is a hybrid between traditional systems theory and a more interpretive methodology, i.e., one that takes seriously the differences in points of view between those involved in a given situation. Or in other words, it allows system developers to see the problem situation from the perspective of those who are involved in it. This ISD approach is further explored in this research because it has been suggested as a human-focused alternative to the participatory approach of ETHICS, as discussed in the above Section 2.3.1. In addition, the SSM approach has been recognised by neohumanist researchers as one of the tools, which allows better communication with people in the situation under study.

2.3.2.1 The Main Design Principles of SSM

Soft system research is a special type of system thinking approach that incorporates action research methodology in its inquiry method (Checkland & Poulter, 2010; Checkland & Scholes, 1990; Checkland, 1981, 1999). It differs from action research by the approach it adopts which needs a "declared-in-advanced intellectual framework" (Checkland & Holwell, 1998). Stowell (2009a) describes the strength of this methodology as its deep understanding of system theory, which transforms it from being based only on the "holist" view for developing understanding into "models" to become a methodology of "learning about the situation of interest" or what is known as FMA, the acronym for framework of ideas (F), Methodology (M) and Area of interest (A) (p.882).

Checkland's (1999) idea of "soft" system thinking has emerged as an alternative view to "hard" system thinking when there is a need for understanding a problematic situation involving humans that requires "modelling purposeful human activity systems" to perceive the "real-world action" (A7). Since this purposeful activity can be seen differently and in many forms, Checkland suggests that there is a need to see this purposeful activity in the context of the "Weltanschauung", the viewpoint relevant to the situation under study and the viewpoint which decides on the "content of the model". It is this type of thinking that shifts the ideas of systems development from solving a "problem" to understanding about a "situation which some people" consider as "problematical" (Checkland, 1999, p. A8). The SSM takes these concepts of solving the problem further with a methodology that starts with preliminary "pure ideas" in the form of a model that describes the purposeful activity in the situation, then uses it to ask questions about the "real situation". He continues by explaining that the preliminary outcome of this process is "new knowledge" about the situation, which allows new models about it to be built. It is an iterative "learning" process that ends when these models receive consensus from the different interested groups of people in the situation and thus "the action" is put to work.

In adopting soft systems thinking, researcher accepts the duality of theory and practice. It proposes a change in the role of the researcher from merely being an observer of the situation to a role that involves he or she directly in the situation, participating and "taking actions and reflecting upon" in a continuous process that aims to reach an understanding through "experience and learning" rather than to just find a "solution" (Stowell, 2009a, p. 883). In this case, researchers need to understand that what they learn about the situation from people's perspectives are "holistic ideal types of certain aspects of the problem situation rather than accounts of it" or in other words there is "no objective

and complete account of a problem situation [that] can be perceived" (von Bulow,1989 cited in Checkland and Scholes, 1990). This is why we can consider SSM as primarily anti-positivist (Iivari et al., 1998). It also involves in its approach tools to understand and develop the technical aspects of the situation, which also means it has some positivist elements in its approach to system development (Iivari et al., 1998).

2.3.2.2 Limitations of SSM

Although SSM links practice with theory via its process of conducting the inquiry, there are concerns about the active involvement of the researcher himself in the situation under study which makes its results open to discussion. Stowell (2009a) argues that these weaknesses can be overcome through six “contributions” in the field of systems thinking, namely: “Weltanschauung; selection of approach; recoverability; assessing the process of research; identifying the boundary; and participation and power” (p.884). But they are not easy for beginner researchers to apply, in addition to the difficulty of using SSM as an ISD methodology, which is an argument supported by Hirschheim et al. (1997) who state that SSM does not provide “clear guidelines on how to proceed from the debate on the relevant human activity systems to the implementation of systematically desirable and culturally feasible changes” (p.12). This is particularly true with regards to the issue of linking the learning from the first stage of inquiry with the information system requirements (Champion et al., 2005). Some researchers have also pointed to the difficulties of using SSM to generate theories (Durant-Law, 2005).

2.3.2.3 The Main Learning Points from SSM

This researcher can learn from SSM principles the followings:

1- SSM is an approach that allows participants and researchers to “engage in a cycle of learning about a situation” and then together to discover required changes to improve the situation under study (Stowell 2009a, p.885).

2- The SSM approach to learning about a situation is not restricted by “the rigidity of a technique” (Checkland & Scholes, 1990). This allows using different social science methods to understand people's needs from different angles.

3- SSM recognises “the existence of conflicting worldviews” in the situation under study and it emphasises the importance of the different perspectives of people in the situation (Checkland & Poulter, 2010).

For these learning points to be operationalised, an ISD methodology that has been used to develop information systems using SSM principles is needed. The main three approaches as suggested by Champion et al. (2005), which apply principles of SSM are Multiview2 (Avison et al., 1998) and client-led design (Stowell & West, 1994) in addition to client-led information system creation (Champion et al., 2005). In the following section these three ISD methodologies are explored to decide on the appropriate one to be learnt from in this research.

2.3.3 Multiview

The Multiview methodology (Avison & Wood-Harper, 1990) has passed through two phases, the first is the Multiview1 and the second is the Multiview2. The aim of the Multiview methodology is to achieve through the ISD process the support of organisational goals but at the same time consider "the needs and freedom of the individual" (Avison et al., 1998, p. 126).

The Multiview methodology is theoretically founded on the understanding that ISD needs the "joint" recognition of the three components of human needs, organisational needs and technical needs (Avison et al., 1998). Multiview2 applies the concept of "mediation" as shown in Figure 2.2 in which all the organisational components are "co-present" but they need to be looked at separately and the ISD process mediates between them ("objectivist account" and "subjectivist account") to bring them into an alignment rather than to bring them together and then their "interests" will come together (p.133).

Multiview has as its role that of acting as a bridge between the "content of a problem situation" under study and the "thinking about" it. It suggests that each information system development task is different, based on the methodology used to understand the situation, the problem situation itself, and the analysts who are going to develop the system (Avison et al., 1998). Avison et al. describe Multiview2 (illustrated in Figure 2.2) as having four main "components" in the ISD process that work based on an "interpretive scheme" to utilise the multi-perspective and complex nature of inquiry. The four components require four different methodologies. The first is to analyse the organisational situation to understand its needs (organisational analysis); the second is to analyse the socio-technical situation to understand the needs of the users (socio-technical analysis); the third is to design these requirements into a system (information system modelling); and the fourth is to develop this system technically (software development) (Avison et al., 1998).

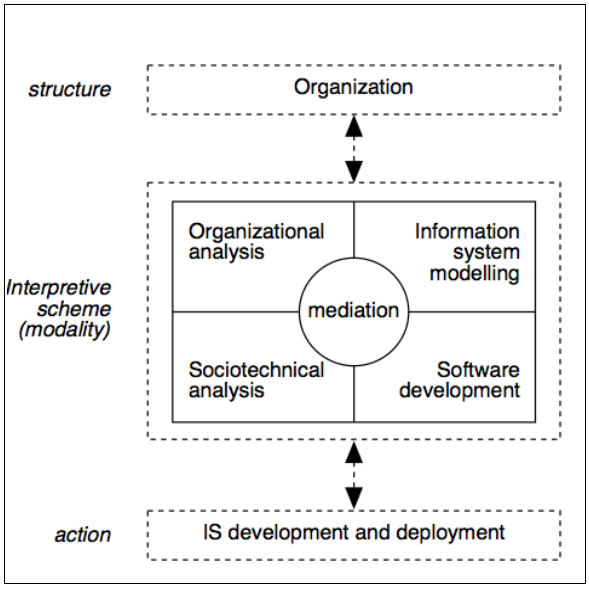


Figure 2.2: The Multivew2 framework (Avison et al., 1998)

Multiview2 focuses on the change process on organisation structures while at the same time the technology as the framework is based on structuration theory using "IS development practise" (Avison et al., 1998). In this methodology, a change that utilises technology requires the fulfilment of needs of all the organisational components through the ISD process. Avison et al. (1998) indicates that understanding the needs of one component "informs" the understanding of the other and hence he states that there is no "reason to make one prior to, or higher than, the others" (p.133).

Using Multiview2 is to adopt a "situation-specific methodology" approach, which means that it allows the system developer and users to engage in the situation under study and think about the required methodology to use in the understanding of the situation (Avison et al., 1998).

Multivew2 promises to be more practical than its predecessor. Multiview1 focuses specifically on the design phase while Multiview2 tends to be very practical as it focuses on "development and implementation"; the role of analysts is to "learn" and "reflect" while the information system is being used "through software maintenance, changing user procedures, and local practices" (Avison et al., 1998, p. 131). Thus, in Multiview2 there is no single solution to information systems development and thus it is the task of the analyst with the users to "continually modify their behaviour (including the methodology) in recognition of this uniqueness" (Avison et al., 1998, p. 129)

In practise, in this thesis, I agree with the idea that ISD is a "social inquiry" which requires a "situation-specific methodology" emerging from a thorough understanding of the situation under

study. This is an important aspect of the system thinking approach in which Multiview emphasises the problem-solving nature of the process of developing an information system. Hence, this process requires the adoption of the "multiple perspective" concept (Mitroff & Linstone, 1995). In this perspective, the utilisation of different "paradigm of thoughts" is needed to understand the problem situation and how the people in the situation look at it.

The Multiview principle of multi-perspective is helpful for this researcher to understand the problem situation in an organisation. But for the purposes of developing the IT tool, this methodology's complex approach in applying the SSM principles makes it unsuitable. In addition, the difficulty of transforming an understanding of the problem from the people who are involved in the situation to technical specifications makes it problematic (Champion et al., 2005; Savage & Mingers, 1996). Multiview applies the SSM principles using the "old functionalist methods [but] in hybrid schemes" which means that it does not give the appropriate focus on the humans at the system development level (Alshawi, Elliman, & Paul, 2000, p. 2).

2.3.4 Client-Led Design

The role of Client-Led Design (CLD) as an ISD methodology is to equip the client him/herself with the necessary power to "control" all phases of the ISD process. Stowell & West (1994) suggests that CLD is not a participatory approach but an ISD methodology within which the cause of the IS failure is usually seen as due to the restricted role of the client in the ISD process.

It is the change that happens when the new information system is implemented that should be the focus of the ISD methodology to understand its requirements. But as Stowell & West (1994) argue, most ISD methodologies fail to understand this change and how it will impact the current situation in the organisation. They go further and say that, ISD methodologies focus on understanding technical and operational aspects of a new information system to make it more efficient. Thus, CLD methodology was developed to overcome the problems caused by these technical-focused methodologies in which the focus is on improvement of the "current operations" of the work with less attention placed on the "potential changes" that the newly developed information system will have on future work operations. In that respect, Stowell & West (1994, p. 9) indicate that the CLD approach deals with the two main issues that some ISD methodologies lack, which are:

1- A weak understanding of the importance of “problem identification” in the success of the information system.
2- The nonexistence of tools in the ISD methodologies to analyse the problem and look into it.
These two issues have been addressed in the CLD's five phases approach as stated by Stowell & West (1994):

1- Problem appreciation, definition, and analysis.
2- Definition of the information system.
3- Definition of the supporting technology.
4- Implementing the technology supported information system.
5- Maintenance, development and review of the technology.

The emphasis in these five phases is clearly on the success of the information system, which depends, in this ISD methodology, on thoroughly understanding and defining the problem through the user. The CLD authors claim that its approach differs from other ISD methodologies which adopt the philosophy of engaging users in the ISD phases (such as the participative approach and the Multiview methodology) in its ability to provide a practical tool that “allows full client involvement” based on a clear theoretical foundation (p30).

Theoretically, CLD is based on the concepts of system thinking. It is argued by Stowell & West (1994) that system thinking can be used to allow the understanding of the problem holistically and at the same time it can provide a means through which to “translate” the understanding of the problem into “technological specifications” (p.17).

In this regard, in CLD, Stowell and West (1994) differentiate between two types of analysts. “computer system analysts” (CSA) and “information system analysts” (ISA). This difference is based on an argument that an analyst is an “information receiver” whose “interests” affect the “meaning” of the information. CSAs provide an understanding of the situation under study from a positivist perspective as if the information system can be “dismantled and quantified” and then developed into a new structure that employs technology. On the other hand, ISAs provide an “holistic” perspective in which the situation is understood from multiple perspectives that affect the organisation and its culture. In CLD the role of an analysts is as a “facilitator” who first gets users' requirements for the information system and then transforms them into a computer-based information system through his knowledge and experience in developing technology artefacts.

Practically, the first phase of CLD – the appreciation of the problem phase, gets users to start thinking about the problem, appreciate it and finally agree on its "description". The second phase, the definition of the information system, engages users to "define" and "describe" the information system that can deal with the identified requirements that deal with the problem. The third phase, -the definition of supporting technology, requires the IS analysts to use their technical expertise to develop the "technical specifications" that "support" what the users have defined. The fourth phase, the implementation of the technical support in the IS, is about the activities in the ISD process that put the information system into operation in the organisation, which is the "responsibility" of the client who makes the plan and decides on the training. The IS analysts in this phase only provide the client with "expert" suggestions. The CLD has a phase that requires the evaluation of the IT supported system after its operation. This phases bring IT experts and users together to assess the IT system.

To summarise this section, CLD offers an IS analyst a practical understanding of the SSM principles to develop information systems. This approach allows the problem situation to be understood and solved by users who define the required information system with the help of the technical experience of the IS analyst (Stowell & West, 1994). On the other hand, Savage & Mingers (1996) have raised the issue of how to transform the understanding of ideas for purposeful action using CLD's conceptual models into technical understandings. This argument is also supported by Champion et al. (2005) who develop their CLIC approach to overcome this issue and to make the application of SSM principles more practical.

2.3.5 Client-Led Information System Creation (CLIC)

The main objective of Client-Led Information System Creation (CLIC) is to apply SSM principles in a way that allows people in the problem situation to engage effectively in the ISD process (Champion et al., 2005). In the application of SSM principles using CLIC, information systems are viewed as "serving systems" and therefore it is not appropriate to consider it as the problem of the ISD; rather, the people of the "served system" should be allowed to think about their aims and problems and the kind of "purposeful actions" needed to solve them (Checkland & Scholes, 1990). The CLIC approach came as an alternative to participative approaches, which "fail" to allow people in the situation to be the focus of the ISD process. As Champion et al. (2005) argue, participative approaches do not allow people "active involvement" in this process. This happens in other ISD

methodologies due to their concern with the system definition phase with the "future action" of the information system, rather than the "current ways of working" which cause them to develop understanding that in many cases may not be a "useful support" for dealing with the problem situation (Champion et al., 2005). CLIC is also developed to deal with the issue of focusing on technical development at the level of system development, an issue discussed in Section 2.3.1.2. CLIC deals with these issues by focusing on supporting people in the problem situation so they become aware of the nature of the problems they have at the time of ISD, or may have to face in the future. This way to ISD is necessary from Champion et al's. (2005) point of view because it will allow people of the system to "appreciate the difference (or gap) between the purposeful action they wish to take and the support that will be required in order to implement that action" (p.214). In practise, the CLIC approach has mainly four phases as described by Champion et al. (2005) in the following:

The appreciation phase

This phase is dedicated to "explore the problem".

The phase of designing the system to be served

In this phase, SSM's "conceptual activity model" is applied in an iterative process to engage people in discussions about the problem situation focussing on "actions" that can be used to design "the system to be served" (Champion et al., 2005).

The phase of designing the serving system

The aim of this phase is to develop a "conceptualisation" of the process that represents people of the situation proposed actions using technology (Champion et al., 2005).

Ideas into practice phase

The last phase of CLIC is to use the ideas and understanding of the previous phases in developing the computer-based information system.

These CLIC phases will be described in more detail in Section 2.5, when in this research the approach for developing the IT tool is proposed.

In summary, the focus of CLIC on humans at the level of system development and its practical application of SSM principles makes it an appropriate alternative to the ETHICS participatory

approach. This concludes the exploration of different ISD methodologies that adopt SSM conducted in this chapter. The next section summarises the common problems and identifies the main themes as identified in the literature for developing a human-focused information systems and lastly presents the researcher's framework of ideas.

2.4 Common Problems, Themes and a Framework of Ideas

From the above discussion in this chapter, **two main problems (limitations)** were identified in the literature on ISD methodologies in the area of human-focused IS:

First: some ISD methodologies consider satisfying human resources needs at the system operational level but do not apply the appropriate methods to actively engage them in all the phases of information system development level. ETHICS (Mumford, 1995) was the main example of this, with its focus on human resources at the system operational level but not at the system development level.

Second: some ISD methodologies that do consider human resources as the focus at both system development level and system operational level, provide few details on the practical approach to transform these considerations into an IT tool. In this respect, different ISD approaches were explored such as: value sensitive methodology (VSM) (Friedman, Kahn, & Borning, 2006), human-driven design approach (HDD) (Niemelä et al., 2014) and life-based design approach (LBD) (Saariluoma & Leikas, 2010).

A review of the literature for ideas on how to address these two limitations highlighted **two main themes:**

1-The analysis theme: the need for a methodological approach for studying and understanding the organisational situation in order to identify the workforce's humanistic needs in organisations.
2-The development theme: the need for a methodological approach for developing an IT tool to satisfy these needs.

Figure 2.3 is an overview of this research's approach. In this figure, the information system operational level represents the stage at which the impact, the benefits of the information system are delivered. The information system development level represents the stages at which the information system is analysed, developed and put into implementation. At both levels the STT concepts are the

main foundation of the proposed approach, supported by learning from ETHICS and SSM principles.

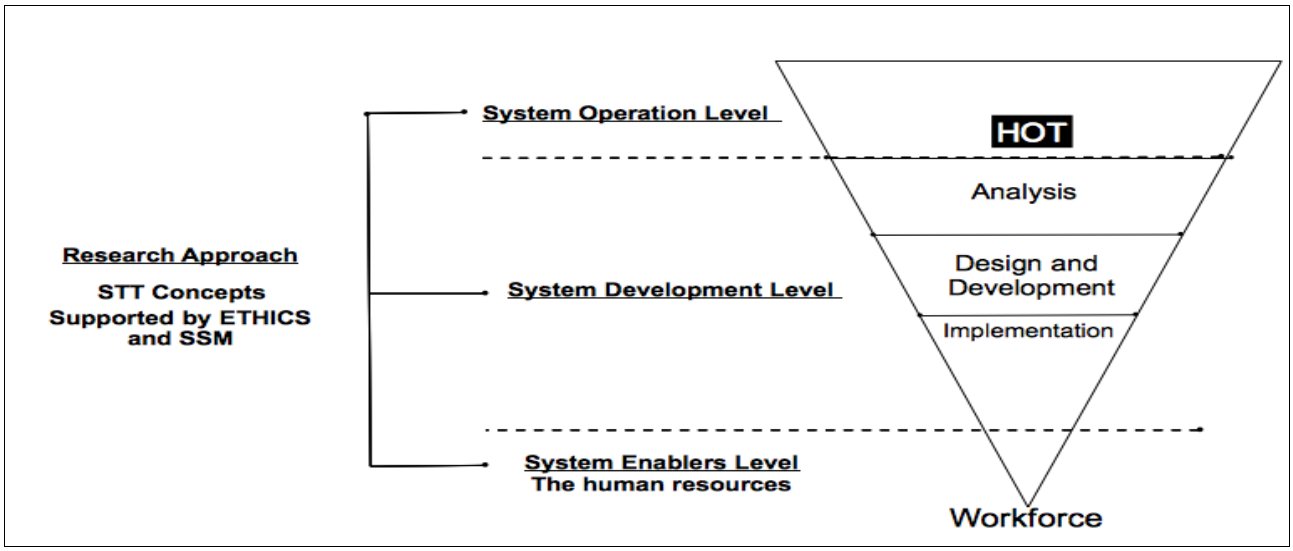


Figure 2.3: A general understanding of the research approach

With regards to the researcher's framework of ideas, the framework is an essential means to make sure that the researcher's "interaction" and understanding of the situation is based on some clear "perception and [philosophy for] interpretation of actions" (Stowell & Welch, 2012, p. 136). This researcher as discussed in Section 2.2.1, understands the importance of a sense-making orientation to understand situations through people, when developing an information system (Hirschheim et al. 1996). But the researcher also understands that in developing an information system technical aspects need to be accurately specified. In other words, both social and technical subsystems and their "interaction" need to be studied and understood. Gasson (2003) argues that this interaction is "incommensurable", and thus traditional methods "cannot analyze" them (p.42). The researcher concurs with this view, based on experience, that as a discipline, IS cannot be utilised from a computer science (applied science) stance only. It also requires the science of management (social science) to understand the social aspects of IS. This implies bringing together the two sciences to allow the phenomenon produced out of this interaction to be understood. In this case, the research requires a dualistic approach that allows the understanding of the social subsystem and also the required technical specification of the technical subsystem.

The review in Section 2.2.1 clarified this researcher's philosophical stance with regards to epistemological, ontological, methodological and ethical aspects. In summary, the researcher's philosophical stance is: anti-positivist, idealist, ethical and adopts the usage of constructive methods

in ISD.

In this regards, based on Burrell and Morgan's review (1979) of the four social paradigms the functionalist paradigm was identified as the most appropriate. However, the functionalist paradigm does not conform completely with this researcher's philosophical assumptions identified earlier, particularly in its philosophical understanding of “social engineering” as including “effective regulation and control of social affairs” that drives “social change” (Burrell & Morgan, 1979, p. 26). Hence, it is a positivism paradigm in nature but one that is influenced by idealism. This combination of realist and idealist ideas makes the functionalist paradigm more popular than other social paradigms, as Burrell & Morgan discuss (1979). They argue, the most well-known and used theories of this paradigm are those which bring together the concepts of “social system theory and objectivism” (p.123).

This overview of the functionalist paradigm was followed by an exploration of its theories in Section 2.2.2. In this exploration, the appropriate theory was selected based on the researcher's philosophical assumptions that support the human-focused perspective. Socio-technical theory was considered the theory that can be learnt from to answer this research question. The weaknesses of this paradigm's STT theory related mainly to communication and problem understanding in the ISD process, addressed in this section by drawing on ideas from other theories such as CST and Infology. In the study of these theories, soft system ideas adopted by soft system methodology were recommended as a means to overcome the issues of the functionalist paradigm (Stowell, 2009a and Langefors, 1996). The literature on human-focused IS (Beers, 2014 and Gasson, 2003) support this approach. Thus this researcher's framework of ideas adopts the functionalist paradigm of socio-technical theory supported by the system thinking approach of SSM.

STT concepts, which are mainly functionalist and positivist (Burrell & Morgan, 1979), and the SSM principles, which are mainly anti-functionalist and interpretivist (Hirschheim et al., 1997), are both underpinned by dualistic epistemological and ontological stances and also ethically, both focus on humans (Burrell & Morgan, 1979; Iivari et al., 1998). In addition, they both use constructive methods, which are primarily concerned with design of artefact (Iivari et al., 1998). In other words, in this PhD research, the framework of ideas places the information system development process between the functionalist ideas which are linked to realist ideas and the interpretivist ideas which are linked to idealist ideas. These ideas represent a view of information systems requirements called by Iivari and Hirschheim (1996) the “subjective view”. In this view, the functionalist ideas represent

the the “objectivist” construction of information system requirements using the “measurable” aspects of users needs, while on the other hand, the interpretivist ideas represent the “subjective” “personal choice and interpretation” (Iivari & Hirschheim, 1996, p. 557).

In this regard, Iivari and Hirschheim (1996) suggest that STT concepts and SSM principles share ideas of both functionalism and interpretivism. They explain that STT concepts as adopted by ETHICS are mainly “objectivist” since its process includes “impersonal” or neutral activity analysis when defining organisational requirements and technical specifications. But the ETHICS participatory approach “brings in subjective element” in the process of defining the requirements (p.568). Iivari and Hirschheim (1996) also suggest that SSM principles look at information system requirements from subjective and objective stances. In the subjective stance they refer to the concept of “intersubjectivity” to emphasise the need to “accommodate” the relevant system model of SSM with the different needs of organisation stakeholders. That is, in SSM the information system requirements definition is “a matter of social agreement” (p.557). Then, when the relevant model is agreed upon, the SSM continues to define the technical specifications of the information system based on an objectivist stance (Iivari & Hirschheim, 1996).

In this respect, STT concepts were identified as the underpinning the proposed approach to answering the research question. In addition, ETHICS application of STT, and CLIC application of SSM were identified as important ISD methodologies and their respective principles to learn from. In the following section (Section 2.5), the approach will be proposed.

2.5 Proposing an Approach for Answering the Research Question

Taking into consideration all the organisational components (human, organisational work environment and technology) but with a focus on the human resources when developing information systems, the socio-technical theory (STT) will be explored in this section to learn from its concepts, having learnt from ETHICS and soft system methodology (SSM) principles to support this approach human-focused perspective. The outcome of this section is an approach to develop the IT tool that can be used to answer the research question.

The following sections will review the literature of STT, exploring how STT has been approached from both theoretical and practical perspectives. The approach followed in this review is to

conceptually analyse what the literature discusses about STT theoretically in Section 2.5.1 and Section 2.5.2, practically in Section 2.5.3 with emphasis on what can be taken from ETHICS and SSM principles to support this approach.

Through this review, this researcher develops his own account of the discussion in the form of conceptual statements **(CS),** in which STT concepts are identified, connected and assigned a meaning with regards to the research aim. Together, these CSs will assist in framing the approach that will be used to develop the IT tool.

2.5.1 Socio-Technical Theoretical Perspective Through Work Methods

In this section, the literature is reviewed to find out about theoretical approaches in which the social and technical subsystems have been studied from a perspective of work methods. In this review the social subsystem is defined as a system that includes "human resources, job design and the control structure" and the technical subsystem is defined as including the "the production structure, technical equipment" and "systems from the field of information and communication technology" (Molleman & Broekhuis, 2001, p. 272).

The review begins with the foundation paper of socio-technical theory by Trist and Bamforth, (1951) which sets out three main principles, described by Walker et al. (2008) as follows:

1- Responsible Autonomy: A work organisation based on a small group structure; each group has its own "internal supervision and leadership".

2- Adaptability: The ability to adapt to the requirements of individual's needs to do things. These requirements are simple organisational structures and complex work tasks, and are in addition to allowing individuals to set their own targets and work goals as a form of participating in decision-making.

3-Meaningfulness of the tasks: A principle that understands the importance of the optimisation of workforce needs and organisational performance by jointly linking the previous two principles "responsible autonomy" and "adaptability" with a set of "core job characteristics" allowing the workforce to engage in a "whole task" manner that creates a sense of significance and meaningfulness to what they are doing at work (Trist and Bamforth, 1951 cited in Walker et al., 2008).

These three principles are the results of the Tavistock Institute studies which showed that the introduction of new technology did not necessarily mean the need for more bureaucratisation, as other organisations thought (Trist, 1981). Trist suggested that organisations adopting this way of thinking, wrongly linked the nature of designing technology, which tended to be determined by specific rules and boundaries, with the approach of implementing technology in the work environment. Further, these principles were classified into two main themes: the first was the organisation of the work and the second was the nature of the workforce's job. These themes are discussed in relation to how they can be affected by a new technology in a study by Walker et al., (2008), who explain that:

1- The new improvement in production equipment 'tools' brings new 'work methods' and new 'work tasks'.

2- The new work methods bring new patterns of tasks for a workforce to carry out based on the 'mechanised method' imposed by the introduction of the new 'tools' (Walker et al., 2008). The new patterns of tasks affect the “social organisation” of the workforce as well as the nature of the task's difficulties and specification (Trist, 1981). As the task becomes a “one-man-one-task” it affects the social organisation of the worker, eliminating group structure and promoting an individual work structure (Trist, 1981), in which tasks' difficulties and specialisation become simpler and very specialised (Walker et al., 2008).

3-The new work methods also bring a new “management organisation” to the work which is translated into a new level of management between higher management and the workforce. This middle management comes in the form of “supervisors” who are required to manage the new social organisation that arises after the implementation of the new 'tools'.

So from the point view of Walker et al. (2008) the FIT approach suggested was based on work methods that brought social and technical subsystems together focusing on the human component of the organisation. It was the work methods that created the need for change in the social subsystem, to adapt to the new technology.

To understand the role that work methods play in creating the FIT between the social and technical subsystems in organisations, Pasmore and Khalsa (1993) report two cases carried out by Trist and staff of the Tavistock Institute to understand the impact of implementing new technology, leading to two contrasting situations. In the first case, the human component of the organisational system was

negatively affected while in the second, the workforce's “personal commitment”, productivity and cooperation between groups positively improved and levels of absenteeism and in-work accidents decreased. The only difference between these two organisations was their approach to creating the FIT using work methods represented by work paradigms. The “old paradigm of work” involved a number of attributes, 'work methods fundamentals', that negatively affected the human component when new technology was introduced into the organisation. These attributes can be summarised in three points according to Trist (1981), “one-man-one-task role”, “externalised supervision” and the lack of participation in the decisions of “work arrangements' (p.24).

The other organisation, by contrast, took advantage of the new technological advancement without negatively affecting the workforce's needs by introducing a “paradigm of work” that “disobeyed” the “technological imperative” that arose from the implementation of the new technology and brought to the organisation a FIT approach that understood the “requirements of social and technical systems” (Emery, 1978a cited in Trist, 1981). Trist (1981) lists these attributes as : “group cohesion” and workforce “responsibility of the entire cycle” of the job, “self-regulation” and “power to participate in decisions” (p.44).

In the following paragraphs these work attributes will be analysed in detail to understand what can be learnt from them for the purposes of this research. This will assist the framing of the approach required for developing the IT tool. We start with the seven principles which evolved from the previously listed work attributes (work methods fundamentals) and reported by Trist (1981):

- Principle 1: The “work system” allows work activities to be carried out as a whole by the workforce rather than giving the workforce part of the job or a “single job”.

- Principle 2: The “work group” is the main structure in the workplace rather than a structure where everyone does a job on their own.
- Principle 3: The work environment is an “internal regulation” which is managed and supervised by the work group rather than by external individuals. Emery (1980) indicates that a self-managing group requires an educated management that knows how to effectively utilise this concept in socio-technical systems.
- Principle 4: Mumford (2006) describes Emery's “Multiskilling” concept of the work environment that allows a workforce to practise different skills and functions allowing the work to become more “adaptive” to future needs.

- Principle 5: Individuals (workforce's abilities) can act in a “discretionary' way with regards to their work roles rather than a “prescribed” one (Jacques, 1963).
- Principle 6: Machines (technology) in the work place should be recognised as “complementary” rather than as an “extension” (Jordan, 1963).
- Principle 7: Focus should be on “variety-increasing” rather than “variety-decreasing” for individuals and organisation.

Summarising the essence of these principles, Trist (1981) argued that old work methods focused on “improving the socio-economic conditions of employees” as well as the “human relations” but did not succeed in minimising the “cost” of introducing new technology on the workforce because it failed to solve the problem of the “split at the bottom of the execution chain” which occurred when the new technology was introduced (p.10). The reason was that these work methods did not affect the “structure of [workforce] jobs” and consequently the “nature of [their] immediate work experience” remained the same (Trist, 1981, p. 10). Consequently, these work methods did not satisfy human needs in the new socio-technical organisational system. On the other hand, work methods that incorporated socio-technical principles were successful. Within these methods, the social subsystem and the technical subsystem are considered separately and then the change that the organisation is looking for is created, at the level of the workforce's experience that involved the new technology (Trist, 1981), rather than a change in technology that involved people and work. These work methods link the two subsystems, creating “socio-technical relations” via an understanding of “people and equipment” as “substantive factors” of the organisational system and “economic performance and job satisfaction” as “outcomes” of this system (Trist, 1981). Trist further argues that the magnitude of the success of the organisational system is “dependent on the goodness of the FIT between [these] substantive factors” (Trist, 1981, p. 10)

Based on this discussion, it can be argued that theoretically, these socio-technical based work methods are focusing on human needs at work and any new utilisation of technology should not negatively affect them just for the purposes of improving technology utilisation. These principles have been recognised by some manufacturers such as Volvo and Saab in that their approach to car production embraces job-enlargement ideas promoting “autonomous work group arrangements for the production” (Walsh, 1978, p. 60), and a multi-functional worker approach (Kuipers & Witte, 2005). These principles were also applied by Mumford in her ISD methodology as discussed in Section 2.3.1 about ETHICS.

Understanding the FIT concept from the perspective of work methods shows the importance of developing an IT tool which does not impose new work methods that negatively impact the human component of the organisation. The application of this perspective also raises two issues related to the understanding of the social situation and how it may be affected by power and control structure when developing a human-focused IS because technology can be designed in a way that requires an organisation to introduce new work method that imposes more structure and control on the workforce (Gasson, 2003). Checkland's SSM principles of exploring the problem from multi-perspective views of people involved in situation – as discussed in Section 2.3.2, can prevent this issue from affecting the ISD process (Checkland, 1981). This leads to the first theoretical STT understanding expressed in the first conceptual statement:

CS1: A theoretical understanding of the STT concepts through work methods:

- Understanding the social subsystem → FIT ← Developing a technical subsystem
- Realising humanistic needs → FIT through work method ← Developing technology

This statement shows that in order to establish a FIT relation between the social subsystem and the technical subsystem, the personal and work needs of the workforce need to be understood, then the work method designed accordingly with technology as well, as technology should be developed so as not to negatively impact the work method. The importance of the FIT between the two subsystems is in accordance with Mumford's ETHICS approach (Mumford, 1995) of applying STT as discussed in section 2.3.1. However, the above STT approach to FIT to be implemented in this research requires an action research study that involves organisations changing their work methods in accordance with a study of their workforce's humanistic needs, which is out of the scope of this research. Hence, in the next section we explore how IT can enable these changes to occur in the work environment to fulfil a workforce's humanistic needs.

2.5.2 Socio-Technical Theoretical Perspective Through System Theory

Emery (1959) introduced the idea of socio-technical systems based on system theory. Trist (1981) described Emery's understanding of developing a socio-technical system (STS) as a “matching process” which recognises the differences in the nature of the social and technical subsystems as well as differences in the way they operate. He also pointed out that these two subsystems were required to work in a “correlative” manner in order to produce the desired outcome of STS.

According to Emery and Trist (1965), who based their ideas on open systems models, argue that technological change is making the study of organisational change more problematic and they suggest a new way of thinking about systems. Based on open system theory, the correlation between social and technical subsystems means that one subsystem output should become the other subsystem input after passing through a "transformation" process to achieve a goal that allows the organisation to maintain a "steady state" with changes in the outside environment (Davis and Taylor, 1972). This understanding of the FIT approach in system theory can be summarised in the second conceptual statement:

CS2: A theoretical understanding of the STT concepts through system theory:

- Social subsystem → **FIT** ← Technical subsystem
- (Outputs) of the subsystem →**(Transformation)**← (Input) for the subsystem

  That is, transforming the output of the social sub-system into an input for the technical subsystem to achieve the goal of the system

This statement introduces a new understanding of the socio-technical FIT concept. It is the transformation that brings together the two subsystems to achieve a specific goal of the system. But for this transformation to happen, Trist (1981) suggests that organisations need to accommodate a number of requirements into the "primary work system" so that the matching and the transformation can affect the whole organisation. These requirements as described by Trist (1981) are:

1- "Joint optimisation" of the two subsystems to handle the dissimilarities of both subsystems to produce the desired output.

2- An understanding of the "functional task of the work system" to address the "social and technical components" so as to work in a "directively correlated" manner to produce the desired goals. This concept is also described by Emery (2000) as "a necessary condition for the subsequent occurrence of a certain event or goal" (p.624). Optimisation of the social and technical subsystems is also one of the objectives of the ETHICS approach. Mumford (1996) uses it, defining the socio-technical approach as "a design method which tries to optimise both the use and development of technology and the use and development of human knowledge and skills" (p.110).

This researcher's understanding of the socio-technical FIT concept has evolved to include a description of the tasks required to produce the matching and the transformation processes required to initiate a FIT relation, as presented in the third conceptual statement:

CS3: A theoretical understanding of the STT FIT concept through system theory:

- Social subsystem → **FIT** ← Technical subsystem
- (Outputs) of the subsystem →**(Transformation)**→ (Input) for the subsystem

  That is, transforming the output of the social sub-system into an input for the technical subsystem to achieve the goal of the system requires:

  - **Joint optimisation** of the two subsystems to handle the subsystems' dissimilarities AND
  - **Correlation** of the functional tasks of social and technical subsystems.

The above statement does not give details about how a joint optimisation situation can exist nor how to identify the functions that can be described as correlated. This particular point is addressed by Ropohl (1999) whose view on establishing the socio-technical FIT concept through the system theory rotates around understanding the system as a set of elements related to each other by a set of relations and functions; each element receives inputs and transforms them into outputs based on defined "internal states" in which:

- Relations between elements of the system define the structure of the system.

- The structure of the system defines its function.

This understanding about the importance of defining the system relation and structure can also be identified in SSM. For example, Stowell (2009b) suggests that the boundary of a system is better identified through identifying activities that constitute the meaningful whole system. The environment as Stowell suggests is the outside layer of the situation (the meaningful whole under study), which does two things: first it provides the resources needed by the system and secondly, it affects its operation. Stowell adds that only factors that directly affect the system and its parts should be selected in the study of the situation. Checkland's SSM approach also includes the concept of "conceptual models" which is used to understand with people in the situation under study "relations" and their "logical interrelations", to produce "primary task models" that include detailed information about necessary activities to be carried out to support the new system (Wilson, 1990).

Ropohl (1999) suggests, based on the above description, that a socio-technical FIT between the social subsystem and the technical subsystem is controlled by a specific goal determined by the system's internal states that carries out the functions of transforming inputs into outputs. These

functions, as he further explains, can be performed by either humans or technology and therefore both structures could be integrated into one system. Combining the understanding of the FIT concept from Ropohl (1999), Trist (1981) and Checkland (1981) have provided a better description of the matching and transforming between the two subsystems:

1- Understanding the structure of a subsystem.

1.1 By identifying relations between the elements of the subsystem.

1.1.1 By studying the subsystem's internal states.

1.1.2 (input → state → output)→ Goal of the system.

2-Understanding the structure of both subsystems.

3-Recognising the fit relations between the two subsystems.

4-Determining the correlated functions.

For a better understanding of the situation, the CST principles in the ISD process discussed in Section 2.2.2.2 need to be revisited. The emphasis is on supporting the communication between the IS analyst and the people in the situation, especially the “internal and external compulsions” (Klein & Hirschheim, 1993). These compulsions as stated by Klein & Hirschheim (1993) are constraints resulting from either internal “psychological forces” or external organisational influences. The understanding of these forces is important in the process of problem definition to allow IS analysts to predict difficulties that may occur when operating the new system. Klein & Hirschheim (1993) suggest that based on these understandings the IS analysts should either propose change programmes in the organisation before the operation of the new system or, if it is outside his/her power, to propose these changes; then they should consider them as limitations of the “benefits of the new system”. One more important aspect to mention here is the Langefors' infology (Langefors, 1996) approach to ISD which he relates to the problem that IS analysts sometimes fall into when defining the requirements of an information system. He argues that this happens when IS analysts “interpret” information system requirements “according to their ideas and solutions” (Langefors, 1978, p. 1). Langefors proposes that to deal with this problem, the term “information” should be understood differently by IS analysts as described in Section 2.2.2.3. He states that information is related to “what is required or desired from the data processing. It ignores how the data system works, internally.” (p.14). He suggests, that studying the situation for developing an information system should start by developing an understanding of the situation by “organisational analysts”

who represent the different types of users and then the "object system" specifications (the technical specifications) should be conducted later. It is appropriate to mention here that the above principles of CST and Infology to problem definition is in accordance with the Checkland SSM approach as described in Section 2.3.2 and therefore this review links the critical review of literature in Section 2.2 and 2.3 with the approach this researcher is proposing to apply STT in developing the IT tool.

The above understanding is built into the fourth conceptual statement which further elaborates on the definition of what a system is from the perspective of the researcher, as well as defining the transformation process required to achieve the system's goals. In this research, a system is understood through Checkland's soft system thinking and Langefors's Infology. That is, an organisational system is a "living" system composed of people, social and technical subsystems. Hence, an information system development process is not just about developing the "data processing system" but also about understanding other subsystems and thus, not a process that can be handled by "computer specialists" alone (Langefors, 1978). In addition, the transformation process of the requirements of the social subsystem to the technical specification to achieve the goal of the system can be carried using SSM principles operationalised by the CLIC as was discussed in Section 2.3.5.

CS4: A theoretical understanding of the STT concepts through system theory:

Social subsystem	→ **FIT**←	Technical subsystem
(Outputs) of one subsystem	→**(Transformation)**→	(Input) for other subsystem

- **Transforming the output of the social sub-system into an input for the technical subsystem to achieve the goal of the system requires:**
  - **The correlation of the functional tasks of both subsystems and joint optimisation to handle the subsystems' dissimilarities by:**

    1- Determining the goal of that system.

    2- Understanding the subsystems' structures to identify the fit relation between the two subsystems.

    3- Identifying the correlated functions based on the fit relation for transforming inputs of one subsystem into outputs for the other subsystem to achieve the goal of the system.

CS4 specifically describes the steps to achieve the transformation process through applying the concept of joint optimisation as well as identifying the correlation of the functional tasks of each subsystem. In this research this means that the goal of the system is the socio-technical FIT

objective, which is to improve workforce motivation and capabilities. Then, the socio-technical FIT objective guides the process of understanding the relations that exist between the components in each subsystem, which leads to an understanding of their structure and hence a recognition of the socio-technical FIT relations between them. Eventually, the structure of the whole system leads to identifying the appropriate correlated functions that will achieve the socio-technical FIT objective in one STS.

In the following three sections, Section 2.5.2.1 , Section 2.5.2.2 and Section 2.5.2.3 the three points presented in **CS4** will be explored in relation to STT concepts and ETHICS principles.

2.5.2.1 Determining the Goal of the Socio-Technical System

This section is concerned with point number 1 in **CS4,** determining the goal of the socio-technical system. In this research the objective is to develop an IT tool that can improve workforce motivation and capabilities. This means that the objectives of both technical and social subsystems focus on the workforce in organisations. Hence, the proposed approach should allow this objective to be achieved.

The determination of humans as the focus of the ISD has been explored theoretically in this research in sections concerning human-focused IS perspective (Section 2.2) and practically (Section 2.3). Therefore, we limit our discussion in this section on the importance of determining humans as the focus of an information system. Langefors (1978) criticises the old STT tradition that attributes equal importance to the social and technological aspects of the system. Instead he proposes his infological approach that gives “priority to the human aspects” in the ISD process. This understanding is put into practise by Avgerou (2003) who provides an example of the importance of people in making technology useful. The Computer Support Cooperative Work (CSCW) system is described by Avgerou as, requiring users' “interest” or motivation to change their personal practices at work to adapt and utilise this new technology. She adds that it needs users to also have the “capacity” to learn about the new technology and then use it in an effective manner to “transform their work” in order for the organisation to get the desired advantages from this new system. In other words, people’s motivation and capabilities are as important as the technological functions in an information system. This is why it is important to develop information systems that take into account the motivation and capabilities of the workforce, because if we think about it from the perspective of “an end that justifies the means”, it becomes an issue of dealing with change. This

change in organisations has been studied by Vickers (Vickers, 1965, 1995) who argues that the main objective for managers to achieve is to keep the organisation in a state that secures its "survival" in an environment that always changes and also imposes changes on others. According to Vickers, for managers to achieve this state in the organisation, they need to continuously "learn" about the surrounding environment and then accommodate to it. This process is called "relation maintaining" with the environment, which in essence depends upon the "appreciation" of what is happening in the environment based on the "appreciation settings" set of ideas and experiences, then reflecting on them and taking decisions that achieve the "ideal state" of relations with the environment (Stowell & Welch, 2012, p. 107).

Vickers's (Vickers, 1995) understanding of change, has been approached in the IS discipline from the point of view that the workforce in an organisation can help it to maintain the state of "equilibrium" with the environment and hence survive the change. For example, Maton (1988) describes the "mutual matching" between social and technical subsystems that needs to achieve maximum "organisational efficiency, flexibility and adaptability". He emphasises the importance of human resources in an organisation, calling it "essential" and as needing to have "priority over technology" for the socio-technical systems to be successful. Eason (2008) concurs, suggesting that successful adaptation with the environment requires effective use of the information system by the human resources, as it is the only resources in the organisation that can easily change "work roles" to reflect the needs of the system to adapt to external changes. In this situation, technology should **support** the human component in the process of adaptation. Otherwise, as Eason (2008) argues, technology becomes a hindrance. On the other hand, Lee (2004) tries to explain why human resources in a change project that involves technology are critical to its success. He suggests that there is an iterative relationship between technology and the organisation that will continue as "information technology is enabling an organisation as much as an organisation is enabling information technology" (p.12). That is why from his point of view, some information system projects fail as a result of "human resistance" because the social subsystem is not fully "designed" and "prepared" for "satisfying the information technology requirements", which consequently causes the information system as whole to fail (A. S. Lee, 2004).

This is how Checkland's SSM has approached change in organisation from a perspective that focuses on the human element. This change is understood to be continuous as Vickers' appreciation model describes and therefore it is reflected in the SSM principles to developing an information

system which allows continuous learning about the situation from the perspective of people who are involved in it (Stowell & Welch, 2012). It is a view that this researcher adopts, as declared in the framework of ideas in Section 2.4. ETHICS (Mumford, 1995), on the other hand, also focuses on the human in its approach. It utilises STT concepts to achieve this objective through four STT principles: task variety, multi-skilled work, self-managing group and work group as the design unit as described in Section 2.3.1. Its approach to achieve this change is via applying STT, with more emphasis on the organisation than on the technology, one that Avgerou (2003) shares when she argues that technological artefacts are only one important part in the implementation of an information system innovation in an organisation. The part that creates the real value is the "socio-technical process of innovation situated in the organisation", which, as she suggests, depends on providing "policy intervention" to create the environment for this change process to happen and "actors' capacity" to utilise the technology and create the "value" out of it.

To conclude, change, as indicated in the Introduction Chapter (Section 1.3.1), is the implicit objective of any IS activity and it is important to decide who will enable it to happen, which in this research is the workforce. This leads to **CS5**:

CS5: A theoretical understanding of the STT concepts through system theory

1- Determining the goal of the system.

- The socio-technical FIT objective focuses on the human resources of organisations

2.5.2.2 Exploring STT, ETHICS and SSM to Understand the Subsystems' Structures and to Identify their Correlated Functions

This section concerns points number 2 and number 3 in **CS4** which are about understanding the subsystems' structures and determining their correlated functions based on the socio-technical FIT objective. This understanding will allow the researcher to define the approach, based on STT, for transforming the output gained through studying the social subsystem into inputs to develop the technical subsystem to achieve the goal of the system. It is important here to clarify that the concept of transforming the output of one subsystem into another is understood from a SSM perspective from which an "entity" rather than "actions" are changed from one state into a new state (Checkland & Scholes, 1990, p. 33).

We will start this review with Baxter & Sommerville (2011) who understands work as a set of processes that operate to achieve organisational goals. They add, that lack of integration between

the two different processes of social and technical subsystems in an actual ISD process leads to the development of unsuccessful systems. In this case, in the ISD methodology a system engineering (SE) or a hard system approach (Checkland & Poulter, 2010) is adopted. Baxter & Sommerville (2011) describe the issue from a socio-technical perspective, as an issue of disconnection between organisational components in terms of processes and their impact. They argue that this lack of connection is due to the lack of information flowing between two activities: the system development activity and the organisational changing activity. This issue relates to the importance of understanding the problem situation for which the information system is being developed which for Langefors, in his infology approach, requires learning about the social situation as well as "creating a process" that can represent it (Langefors, 1978) because in his view, the ISD process is mainly "a social change process". This is also the SSM approach which also studies the social situation for the purpose of learning about it, then decides with the people in the situation on what processes will improve it, which they call "relevant purposeful activities" with a consideration of a worldview that "encapsulates" it (Checkland & Poulter, 2010). The SSM approach results in an understanding of what are "desirable" and also "feasible" changes in accordance with "history, culture and politics [...] accommodat[ing] between different worldviews" (Checkland & Poulter, 2010, p. 193). In this way the disconnection of the two subsystems as indicated by Baxter & Sommerville (2011) can be addressed. Hence, this researcher understands that in bringing the social and technical subsystems together to achieve the goal of the system, which in this case is the human (workforce), their processes should be studied and correlated so that the output of the functions of the social subsystem in an organisation can be transformed into input for the technical subsystem functions, to achieve the goal of the whole information system. This is summarised in in conceptual statement number six:

CS6: A theoretical understanding of STT concepts through system theory

2- Understand the subsystems' structures to identify the fit relation between the two subsystems.

3- Determine the correlated functions based on the fit relation for transforming inputs of one subsystem into outputs for the other subsystem to achieve the goal of the system.

- Organisational components are connected through processes
- The processes of both subsystems are studied to find the correlated processes that achieve the FIT objective.

This conceptual statement also draws on Mumford's application of STT, which recognises that efficiency depends on a balance of understanding between the technical and the social subsystem of the organisation. Within ETHICS technology is seen as "a means not an end" (p.50), as discussed in

Section 2.3.1. The means that ETHICS utilises to achieve the balance between the two subsystems is “solv[ing] problems or provid[ing] opportunities” for better work efficiency and effectiveness by recognising human needs. Mumford looks at ISD as a process in which technology can support the organisational social subsystem to provide the humanistic needs of the workforce. Also supporting this understanding of a balance between the technical and social subsystem is Whitworth (2006), who argues for an ISD that involves the fulfilment of the technical level's needs of delivering the required functionalities as decided by the social level's needs of “operating and observing” the system. He, therefore defines the existence of a socio-technical system as a situation which arises when IT acts as “mediator” between computing and human sociology. This requires each subsystem's processes to be studied and understood in a way that SSM proposes so as to achieve the goal of the system. It also emphasises the essential task of studying how technical processes can affect the human component positively and not negatively, as ETHICS proposes. Conceptual statement number seven draws on the above understanding by adding two more points to **CS6**:

CS7: A theoretical understanding of the STT FIT concept through system theory

3- Determining the correlated functions based on the fit relation for transforming inputs of one subsystem into outputs for the other subsystem to achieve the goal of the system.

- Organisational components are connected through processes
- Processes of both subsystems are studied to find the correlated processes that achieve the FIT objective.
    - IT can become the mediator between the social and technical subsystems.
    - The role of the social subsystem is to **provide** workforce's humanistic needs.
    - The role of the technical subsystem is to **support** the social subsystem functions.

Summing up this discussion, a balanced understanding of the needs of both subsystems is needed to achieve the FIT objective in which the processes of the social subsystem should focus on satisfying and fulfilling the human resources' needs while the role of the processes of the technical subsystem should be developed to positively support the social ones. In this way, both subsystems' processes will work together to achieve the goal of the system. This approach allows the functions of the social subsystems to be identified and then transformed into functions of the technical subsystem.

2.5.3 Socio-Technical Practical Perspective

This section presents a literature review of the practical approaches to learn about the ways in which STT, ETHICS and SSM can be applied in this research to develop the IT tool which will answer the research question. Building upon the theoretical discussion in the previous section this review considers the two main themes of the research, understanding the workforce's humanistic needs in organisations and developing an IT tool to satisfy these needs, from a practical view point.

2.5.3.1 Socio-Technical Practical Approaches

In the theoretical review of literature in Section 2.5.2, two CSs (**CS6** and **CS7**) built up from (**CS2**, **CS3, CS4** and **CS5**) were identified as useful in transforming the output of the study of the social subsystem into input to develop the IT tool to answer this research question. In this section, these CSs will be supported from learning from ETHICS and SSM principles. In addition, new CSs will be discussed to further understand practically how STT concepts can be supported by ETHICS and SSM principles to define the technical specifications of the IT tool.

We start with the conceptual statements number six and number seven (**CS6 and CS7**) which draw on learning from the SSM principles, in that they view understanding the social aspects of the new technology as requiring a study of existing processes of the social subsystem and how these may be affected by the new technology. In this way, the IS analyst can avoid imposing new social processes to satisfy new technical functionalities. This helps to avoid developing a system that is not in harmony with the workforce's "organisational and workplace concerns" (Baxter & Sommerville, 2011). To practically address the disconnection of processes of the two subsystems by applying SSM, technology in an information system has to be seen as only a "serving system". Therefore it is not appropriate to consider it as the problem of the ISD, but rather it is the people, who are the "served system", who should be allowed to think about what kind of "purposeful actions" are needed from the new information system (Checkland & Scholes, 1990). In practise, CLIC (Champion et al., 2005) has developed a specific method of developing information systems, as discussed in Section 2.3.5. In this regard, the CLIC's (phase one) and (phase two) can be used to support this research approach in applying **CS6** and **CS7.** These two phases are explained in the following:

Phase one: the appreciation

This phase is dedicated to "exploring the problem" with the aim of reaching "a shared appreciation" of it (Vickers, 1995) among IS developers and the client (Champion et al., 2005). In this phase the researcher explores the problem and understand it.

Phase two: designing of the system to be served

In this phase, the focus is on designing "the system to be served" by discussing ideas that participants believe "might bring improvement to their situation" (Champion et al., 2005). As these discussions also include participants who look differently about the problem situation, they bring a shared appreciation about the required solutions. Once ideas for actions have been agreed, CLIC initiates further discussions on how these ideas can be "operationalised in the real world situation" (Champion et al., 2005, p. 222). Hence, it allows the people in the problem situation to think about "the implications" of the proposed actions.

This phase of CLIC has similarities with the ETHICS (Mumford, 1995) approach, stages one, two, three and four discussed in Section 2.3.1 in which the concern is about understanding the problem from the perspective of those who are in the situation, determine their goals and organisational goals and develop ideas about possible solutions. However, in the ETHICS approach, people use a participatory approach, while CLIC provides support for people in the situation to think about their problems and solutions through using conceptual models that make them focus on their problems without concerning themselves with the technology in this stage.

The new conceptual statement number eight is influenced from a learning from CLIC (phase three) as will be explained:

Phase three: designing the serving system

The aim of this phase is to develop "conceptualisation" of the process that represents client's proposed actions using technology (Champion et al., 2005). Champion et al. explain that in this phase, the IS developer is enabled to gain a technical understanding about the future situation using technical language for developing IT solutions. Hence, authors of CLIC suggest using "Class diagrams" and "collaboration diagrams" to come up with IT "prototypes" (Champion et al., 2005). These models are used to develop the supporting technical specification of the information system for the "scenarios" that arose in the ideas for actions in the previous phase.

This phase is similar to ETHICS (Mumford, 1995) stage number five, described in Section 2.3.1, about formulating the details of the system design (technically and organisationally). In ETHICS the focus is to apply what was learned from previous stages and integrate it in the design of the information system. On the other hand, CLIC is an iterative learning cycle, in which the technological solution is created by the people in the situation, with the support of the technical team.

The prototyping method is sometimes considered a limitation, as discussed in Section 2.2.2.1, because it could direct the view of the problem towards one subsystem causing a situation of unbalanced understanding in the development process (Gasson, 2003). It became clear after further reviewing the literature, that prototyping can become a method within human-centred ISD methodologies, as discussed in Section 2.2.3, when it is used with approaches other than participatory ones, such as ethnography (Beers, 2014).

Prototyping and testing or piloting are methods used in design-oriented problem solving in ISD projects to get users' feedback through out the ISD process as a means to continually improve the design of the solution (Beers, 2014). Klein and Eason, (1991) also describe the practicality of designing and developing IT systems informed by STT principles using “prototyping” and piloting approaches (cited in Eason, 2008). The aim of these approaches as described by Eason (2008) is to create the “time and space” needed for ideas and thoughts about the socio-technical aspects of the new IT system, which will be discussed between IT developers and users. This dialogue he argues, is very effective if participants are given access to a working prototype of what they will use when the IT system is completed. This is far preferable to descriptions and sketches of an imaginary IT system which only gives a vague and limited understanding and therefore does not elicit useful feedback from them, a situation this researcher believes prevents IT developers from getting the social requirements of developing a socio-technical system. Eason (2008) supports this argument, describing the importance of prototyping a new IT system, saying that it allows system developers to understand its implications on users, work practices and the organisation as a whole. This could lead to the redesigning of the IT system or work practices or both, in cases where these implications are found to be negative. Baxter & Sommerville (2011) also report that human-centred design methods in the human-computer interaction field (HCI) utilise prototyping to avoid developing a system that overlooks social or technical aspects. Conceptual statement number eight summarises this approach of the practical FIT:

CS8: A practical understanding of the STT concept

- Prototyping and piloting are approaches for assisting in understanding the impact of the technical subsystem on the social aspects of the system.

In **CS8,** this researcher suggests that a prototype of the IT tool was needed for this research which the people of the social subsystem were able to use and experience, feeding back from the social perspective before being eventually deployed. This IT tool should also be introduced as a pilot testing in some organisations for experiencing real interactions and uncovering any negative impact of the IT tool on the users. So in other words, these two methods allow the researcher to understand the impact of the technical subsystem on the social subsystem.

Another approach suggested by Klein (2005) as a cheaper alternative to prototyping and piloting approaches is creating 'socio-technical scenarios' through meeting with the prospective users of the new IT system. This approach aims to work out with users a “socio-technical vision” of the situation in the organisation after implementing the new IT system (Eason, 2008). This approach consists of asking users to come up with “narratives” about how the “existing social system” will be affected by the implementation of the new IT system (Eason, 2008).

In this research, the socio-technical scenario approach is used after prototyping to allow the people of the social subsystem to imagine possible socio-technical scenarios for the purpose of improving the workforce's motivation and capabilities, using the proposed IT tool. The advantage of this approach is in its ability to make the transformation process between the two subsystems an easier task. It generates scenarios that include social and technical processes that are already correlated because the people in the social subsystem and the people in the technical subsystem (IT developers) talk to one another and reach a common understanding by being involved in a learning cycle of the SSM approach. Conceptual statement number nine encapsulates this approach:

CS9: A practical understanding of the STT concept

- Socio-technical scenarios can help understand the social dimension of the technical aspects before the actual implementation of the system.

Lastly, the third objective of this research was to assess the impact of the IT tool on the workforce's motivation and capabilities. This objective is similar to the last phase of the CLIC approach (ideas into practice). In this research, the IT tool presented people in the situation with ideas to be put into practise via a number of experimentations to evaluate its effectiveness in improving the workforce's

motivation and capabilities. In this respect, in ETHICS the success of the IT solution is assessed in relation to achieving workforce job satisfaction using the concept of "fit". That is, when there is a fit between the workforce's satisfaction needs and what the workforce actually experience at work (Mumford, 1993, 1995, 1996). ETHICS describes five core areas of needs in which fit is needed which are: the knowledge fit, the psychological fit, the efficiency fit, the task structure fit and the ethical fit (Mumford, 1993, 1995). In ETHICS these core needs are assessed using a questionnaire before the application of the new information system and then after the implementation to assess if these needs have improved or not (Mumford, 1993, 1995). In this PhD research, a questionnaire also will be used before and after the implementation of the new IT tool.

2.5.3.2 Applying the STT in IS for the Purpose of Developing IT Tool for Improving Workforce's Motivation and Capabilities

This section reviews previous studies that have considered STT concepts and principles in the development of organisational systems for the purpose of improving workforce motivation and capabilities. This section aims to specifically understand cases in which STT concepts were operationalised in a real work environment. Operationalisation is a term that indicates making something "easy to examine or measure" (Olsen, 2012, p. 136). This understanding will support our understanding of STT concepts and SSM principles to propose this research's approach.

Applying the STT concepts in two phases

Brynjolfsson & Yang (1996) discuss an STT approach that defines the relation between the social and the technical subsystem as one in which IT plays the role of improving a workforce's capabilities to achieve the goal of the system. This case study appeared in the MIT Sloan Management Review and describes a service-based business that used IT to increase innovation for the purpose of attracting more customers into the business. The study suggests that innovations with the help of IT need to be introduced using four consecutive phases, as part of an organisational work environment that connects culture, people capabilities and IT infrastructure together. The role of IT is to provide functions for measuring, experimenting, sharing and replicating. These four functions are detailed by Brynjolfsson & Yang (1996) as follows: the measuring function allows the human component of the system to measure the importance of the data that they have on their system. Then after identifying the important data, the experimenting function gives the user the functionality to explore the data about customers to understand their behaviour and how it affects

the whole system. Sharing the results of experiments with other people in the organisational system, or what they call the “micro-innovation” practice, is the other IT function that allows this information to be shared by others so they can also experiment with it. Lastly, replication allows new innovations resulting from this process to be used and replicated in other parts of the organisation, maximising its benefits. So, IT from Brynjolfsson & Yang's point of view, is a “catalyst of change” that can bring innovation to organisations.

Brynjolfsson & Yang's (1996) view of the STT concept requires managers to bring in capable people who can do statistics and work with numbers. They argue that managers need to develop a culture that encourages employees to experiment with their ideas using the IT system designed to facilitate the four IT functions mentioned earlier. This means that the task of motivating people to use the IT system is the responsibility of the manager. In other words, the goal of the technical subsystem in this STS is only to boost the innovation capability of the human component. The role of the social subsystem is to create the work culture that motivates the human component to use the IT system to achieve the goals of the organisational system.

I concur with the basis on which the organisational system was developed in the MIT case, in terms of an STT FIT that focuses on human resources while recognising the importance of fulfilling the needs of both social and technical subsystems to focus on the human resources. Brynjolfsson & Yang (1996) view the needs of the social subsystem to achieve the FIT objective as a work culture that only supports the motivation of the human component. On the other hand, they recognise the needs of the technical subsystem to achieve the FIT objective as four IT functions that support the human resources capabilities. I disagree with the case study's approach to operationalising the STT concepts with regards the decision of the organisation in the case study to differentiate between applying the STT FIT concept in the stage of developing the system and the stage of operating the system. I argue that this produces a gap that will negatively affect the STS.

Applying the STT concepts in one phase

Another study that applied the STT concepts for the purpose of improving workforce motivation and capabilities was briefly discussed in the introduction, Section 1.3.2. Bjorn-Andersen & Turner (1995) identify three important points from Oticon's experience of applying the STT FIT concept in developing an STS to achieve organisational goals:

1- A business transformation project needs more than business process re-engineering (BPR), as this focuses only on processes which enhances efficiency “at the expense of innovation and flexibility”.
2- IT is a tool that facilitates and drives changes in the business transformation project in the phase of implementation.
3- The motivation and capabilities of the human component in an organisation are considered as one requirement for successful work transformation.

The decision by the leadership of the Oticon organisation to adopt a socio-technical approach to achieve the goal of the project was made based on these points. This business transformation project began with a new work vision for the organisation as a whole, initiated and supported by its leadership (Bjorn-Andersen & Turner, 1995). The new vision was about a different understanding of who their real customers were. A strategic management approach was adopted to achieve this goal, using the STT concepts that consider the human component of the organisation as the focal point for the success of the project, and the technical component as the supporter. The aim of utilising the STT concepts was to bring the social subsystem and the technical subsystem together, while focusing on the human component to achieve the project's goals. Both subsystems were studied and the socio-technical FIT objective identified, which was the improvement of workforce participation and engagement at work. After studying the needs of both subsystems while focusing on the FIT objective, Oticon found that for the social subsystem, time wasting and effectiveness issues were the main problems facing the organisation that prevented the full exploitation of the workforce's capabilities. A need for changes in the management and supervision approach were identified that would improve the workforce's motivation.
The cause of the first problem was identified as the existing approach used by the workforce for searching and finding information. The solution was to make the process of searching and finding information easier for all employees. In addition, the new management approach proposed for improving motivation was based on a structure, policies and practices that gave the workforce more freedom at work as well as making them feel that they were the centre of the organisation's focus.

These objectives were operationalised through an understanding of the role of the social subsystem and the technical subsystem. Bjorn-Andersen & Turner (1995) found that IT was utilised in Oticon for two main purposes: “enhancing the motivation of each individual employee” and “providing [employees] with advanced productivity enhancement tools” (p.10), whereas the social subsystem was utilised to apply a new management approach to change the organisational culture as well as to

change the management's priorities.

Starting with the changes implemented in the social subsystem, the new culture was called an "egalitarian culture" that made the "distance between the top [of the organisation] and the bottom" short, meaning, equality in work duties and work advantages amongst all the employees of the organisation. This, as Bjorn-Andersen & Turner (1995) indicate, was important, especially when many of the transformation tasks were to be carried out by the employees themselves. Hence, people in top management had to share some of the burden and became a role model in this transformation process by giving up some of their privileges for the sake of the organisation (Bjorn-Andersen & Turner, 1995).

The other change included in the new management approach was in the management's priorities that were changed to focus on the human component of the organisation. This change implied putting the workforce at the heart of this transformation. To implement this change, the leader put into place new managerial policies and practices aimed at improving the workforce's motivation and capabilities, to get employees participating in the transformation process in an effective and efficient manner (Bjorn-Andersen & Turner, 1995).

The new work culture, policies and practices became the first part of a socio-technical FIT relation that interfaced between the social and technical subsystems in Oticon. The other part of this relation were the IT functions which had the role of supporting and driving the changes proposed in the social subsystem into actual implementation. These specific IT functions were mainly designed to FIT with the changes in the social subsystem. Figure 2.4 shows this researcher's understanding of the socio-technical FIT relation described by Bjorn-Andersen & Turner (1995).

This understanding has similar characteristics to the utilisation of system theory, reviewed in the beginning of this chapter. In this figure, the two subsystems are considered equally important in the new organisational system, to achieve the goal of the system. Also, as the figure shows, the output of the social subsystem is transformed to become the input of the technical subsystem where the STT FIT objective is human-focused.

The following two sections describe the application of the STT concepts in Oticon. The first section describes changes in the social subsystem and the second section describes changes in the technical subsystem.

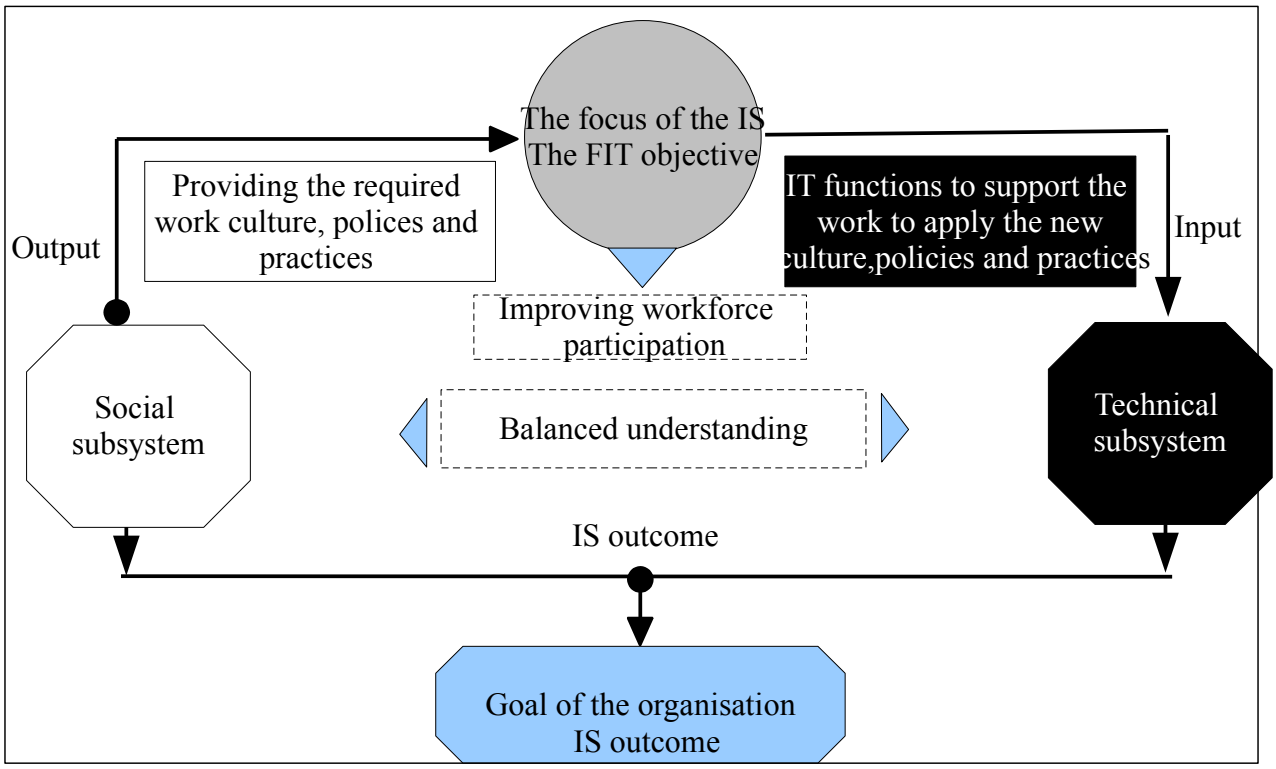


Figure 2.4: The understanding of applying the STT concepts in Oticon case study

2.5.3.2.1 Changes in the Social Subsystem

The changes implemented in the social subsystem reflected the need for a new work culture as well as a new management priority to achieve the FIT objective, which was to improve the workforce's participation and engagement at work through improving their motivation and capabilities. These changes were implemented using new organisational policies and work practices that changed organisational structures as well as individual and group behaviour, as described Bjorn-Andersen & Turner (1995). Starting with structural changes, they reported the following changes:

- No department structure: organising work as projects rather than departments to bring employees' attention to organisational goals rather than departmental goals (Bjorn-Andersen & Turner, 1995). This can be understood as a work structure aiming to focus employees' motivation on achieving the goals of the organisation.

- Work in projects approach: allowing employees to self-select projects they would like to work on. This happened by granting project leaders the authority to advertise available positions in their projects so that employees within the organisation could choose the ones they wanted to work on (Bjorn-Andersen & Turner, 1995). This new management approach aimed to improve motivation by allowing employees to choose the type of projects they were interested in.

- Work on different tasks: allowing employees to work in different projects doing different tasks that they had no experience of before. This management approach aimed to give employees the opportunity to develop new skills at work (Bjorn-Andersen & Turner, 1995) as well as to use their existing ones in different projects, making their job more interesting and challenging (if compared with the old approach of working on similar tasks all the time) (Bjorn-Andersen & Turner, 1995). This approach can improve employees' capabilities at work significantly in parallel with improvement in their motivation.

- Self-control philosophy: according to Bjorn-Andersen & Turner (1995) this management approach was a change that came as a result of the previous two changes in the work structure, namely 'the no department structure' and 'the work in project approach'. These changes allowed employees to choose which project to work on, which in reality meant a work structure that had no direct supervisors or managers or in other words, a self-control management philosophy emerged (Bjorn-Andersen & Turner, 1995). The motivation behind implementing this approach, they suggest, was the absence of the need for managers to follow up already motivated employees to do a job that they themselves had selected. They found that this management approach gave employees trust in themselves, making each employee responsible for what he or she had selected as their job. Also, they suggest, this approach removed any excuse from employees not achieving their assigned work duties, because they had selected them rather than being imposed by others. Lastly, Bjorn-Andersen & Turner (1995) report that these work policies and practices, when implemented in this case study, proved successful, as employees did much better at work. They argue that the project managers in this case performed the role of “innovators and motivators” instead of supervisors.

The second type of management changes directed towards changing 'individuals' behaviours as well as groups' are described by Bjorn-Andersen & Turner (1995) as follows:

- Individual behaviours: the new “egalitarian” work culture, policies and practices changed the behaviours of individuals in the workplace. Employees started to behave as if they owned the organisation. This had been achieved through a number of work practices and policies as follows. First, everybody in the organisation had been given equal access to the organisation's available resources. In addition, 'no border work policy' between employees themselves and between their managers was practised. This was also supported by a new ownership policy that gave all employees and managers a number of shares in the organisation's stocks (Bjorn-Andersen & Turner, 1995).

- Group behaviours: group behaviours became the default work practice in which all employees were working in teams, a practice supported by the new work culture, practices and policies (Bjorn-Andersen & Turner, 1995).

These changes in the social subsystem represent the needs of the social subsystem to achieve Oticon's FIT objective. The next part discusses, Oticon's technical changes.

2.5.3.2.2 Changes in the Technical Subsystem

These changes in the organisational culture and the management approach to represent the needs of the social subsystem, were transformed into a study for understanding the technical subsystem's needs, to support the social subsystem role of achieving the FIT objective, focusing on the human component as described by Bjorn-Andersen & Turner (1995):

1- Changes in the physical work environment: the work environment is described as an "open space" work layout that allowed employees to work wherever they wanted, in teams. This implied that employees did not have the need for a "private desk".

2- Changes in the IT utilisation approach: this approach allowed open information channels as well as access and use of the required software being available to all employees working on a specific project. It allowed employees to access office electronic applications, information and work files wherever they worked in the organisation (Bjorn-Andersen & Turner, 1995). To achieve these changes, the organisation developed the following two IT tools to perform the functions required to ensure the interface between the social subsystem and the technical subsystem needs to FIT together to achieve the STT FIT objective:

- IT Function (1): allowed the elimination of paperwork. This function created a paperless work environment that allowed employees to have access from everywhere in the organisation to their files and to information they needed .

- IT Function (2): **a**llowed the elimination of private desks. This IT function gave every employee the freedom to work with any team without any location constraints.

Table 2.4 represents the application of the STT FIT concept at Oticon in three stages, based on the theoretical understanding of the STT FIT concepts for establishing an STS presented in Section 2.4.3. Starting from the top of the table, the STS was established by bringing the social and technical subsystems together to achieve organisational goals using a STT FIT objective,

represented by the symbol **(↔)**. Then, after this clear determination of the FIT objective, Oticon started the process of understanding what each subsystem needed to achieve it. The result of this study showed that the needs of the social subsystem were about focusing on the psychological and professional workforce needs, while the needs of the technical subsystem were about focusing on technology that allowed anywhere, anytime information and software access. Once the need for the two subsystems to jointly work together was identified, the correlated functions of each subsystem were identified. These correlated functions were predicated on a view of management as providing for the needs of the workforce, satisfying the workforce's psychological and professional needs through changes in work culture, policy and practices. On the other hand, technology's role was to support the management functions, in the form of software, hardware and computer networks that supported a new management approach that encouraged working in teams and a culture that recognised each member of the workforce as equally important to the organisation. IT tools were used to provide the functions that allowed the offices to be paperless, facilitating freedom of movement between different parts of the organisation as well as eliminating the need for fixed private desks for each employee. These IT tools also allowed the data, information and work applications to be electronic which meant that everybody in the organisation could have access to them as soon as they enrolled on any related work project.

				Social subsystem	↔	Technical subsystem
1	The joint optimisation	STT FIT objective	↔	Improving the workforce's participation and engagement		
2		Balanced study	=	Needs of the social subsystem to achieve the FIT objective	↔	Needs of the technical subsystem to achieve the FIT objective
				Output	→	Input
		Results of the balanced study of needs		Egalitarian work culture and focus on human psychological and professional needs.		Technical solution to allow anywhere, anytime information and applications access.
3	The Correlated functions		=	Provider	↔	Supporter
	The Correlated functions		=	New management approach: change in work culture, policy and practices.		IT tools providing paperless office and no private desk functions.

Table 2.4: The application of the STT concepts in Oticon case study

Lastly, it is important to say that the study carried out by Bjorn-Andersen & Turner (1995) did not specifically mention how Oticon studied the two subsystems to identify their needs, which is essential to establish whether their approach was similar to the one proposed in this thesis.

To conclude this section, it needs to be mentioned that the above discussion of STT application supports the theoretical understanding gained in Section 2.5.3.1. Moreover, it brought in-depth practical understanding of how concepts of STT concepts of joint optimisation and the correlated functions could be used in the proposed approach, which is the focus of the next section.

2.5.4 The Proposed Approach

The previous discussions shed light on the application of the STT concepts in an actual work environment. In this research, the information system that was effectively established in the Oticon organisation was understood as a result of the STT FIT objective which focused on the workforce's motivation and capabilities. As Bjorn-Andersen & Turner (1995) explain, “the emphasis [was] to such extent on motivating employees by enhancing the skills and capabilities” (p.11). They argue that this objective would make employees “perform better as individuals [and] perform in a manner more consistent with the interest of the company” (p.10). However, in Oticon, as in the ETHICS approach, the transformation process of the social subsystem functions into IT functions happened only partially. That means that the IT solutions in the case of Oticon and in the case of ETHICS (as discussed in Section 2.3.1) were only utilised to perform a supporting role in the information system to satisfy the workforce's humanistic needs. This understanding suggests that for this research to prove that an IT tool can improve a workforce's motivation and capabilities in an organisation, it firstly needs to assess IT ability to enable the social subsystem's functions to perform its role to satisfy the workforce's humanistic needs. Then, it needs to assess IT ability to support the social subsystem's functions in the same way as occurred in Oticon or as understood by ETHICS.

The above understanding about STT concepts in theory and in practise, supported by learning from ETHICS as well as SSM principles, constitutes the foundation of the proposed approach illustrated in Figure 2.5 for developing the IT tool to answer the research question. The approach in Figure 2.5 can be considered the design version of the general understanding illustrated in Figure 2.3 in Section 2.4. Figure 2.5 presents the three main phases of the approach and also refers to the conceptual statements (CS) related to each of the phases. A summary of these CSs are provided in Table 2.5.

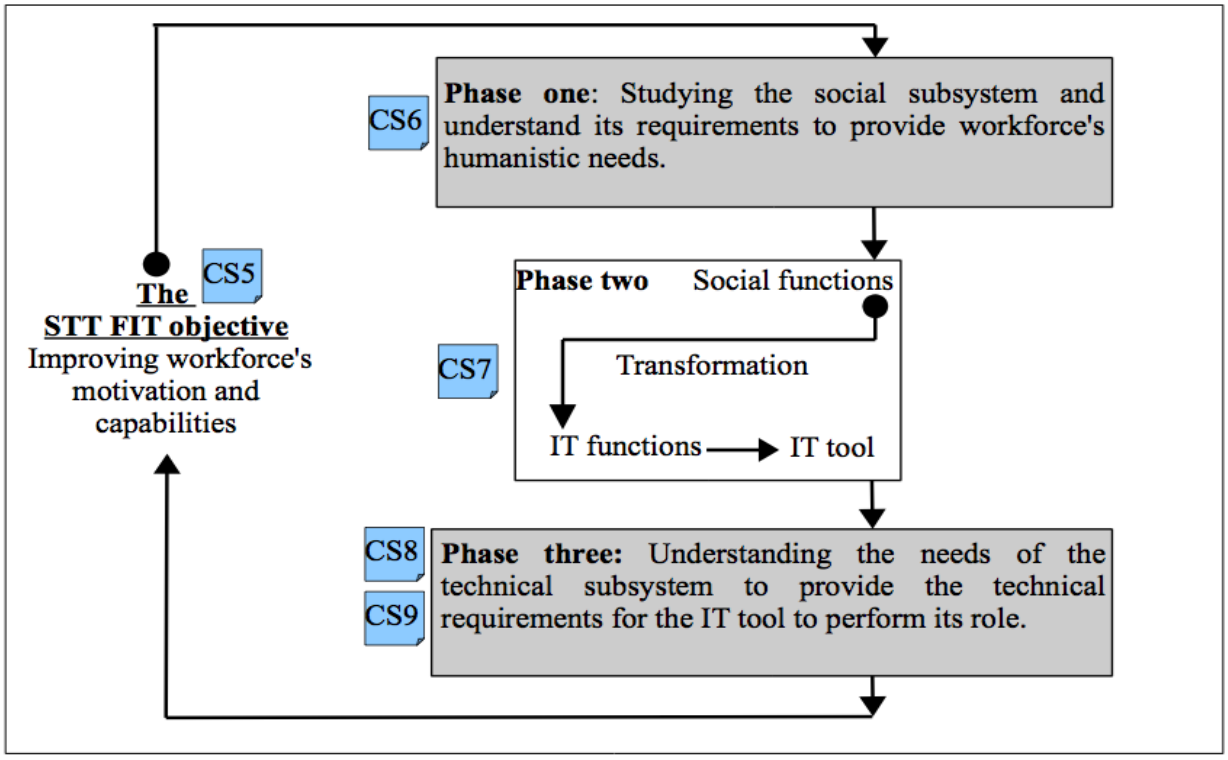


Figure 2.5: A design understanding of the research approach

The approach in Figure 2.5 will guide the researcher in the process of developing an IT tool that could improve workforce motivation and capabilities. This figure shows that this approach has three main phases. The first phase aims to study the structure of the social subsystem to identify the fit relation that will achieve joint optimisation with the technical subsystem. The result (output) of this phase will be the functions of the social subsystem required to improve the workforce's motivation and capabilities (the FIT objective). Then, the second phase aims to transform the social functions into IT functions. Lastly, the third phase aims to understand the needs of the technical subsystem to provide the technical requirements for the IT functions to perform their role.

CS5: A theoretical understanding of STT concepts **1-** Determining the goal of that system. • The socio-technical FIT objective focuses on the human resources of organisations.
CS6: A theoretical understanding of STT concepts **2-** Understand the subsystems' structures to identify the fit relation between the two subsystems. **3-** Determine the correlated functions based on the fit relation for transforming inputs of one subsystem into outputs for the other subsystem to achieve the goal of the system. • Organisational components are connected through processes. • The processes of both subsystems are studied to find the correlated processes that achieve the FIT objective.
CS7: A theoretical understanding of STT concepts **3-** Determining the correlated functions based on the fit relation for transforming inputs of one subsystem into outputs for the other subsystem to achieve the goal of the system. • Organisational components are connected through processes. • Processes of both subsystems are studied to find the correlated processes that achieve the FIT objective. • IT can become the **mediator** between the social and technical subsystems. • The role of the social subsystem is to **provide** the workforce's humanistic needs. • The role of the technical subsystem is to **support** the social subsystem functions.
CS8: A practical understanding of STT concepts • Prototyping and piloting are approaches for assisting in the understanding of the impact of the technical subsystem on the social aspects of the system.
CS9: A practical understanding of STT concepts • Socio-technical scenarios can help understand the social dimension of the technical aspects before the actual implementation of the system.

Table 2.5: Summary of the conceptual statements

In these phases, learning from the CLIC approach of using SSM principles is applied, as discussed in Section 2.5.3.1. A summary of this application is described in the following:

Phase One and Phase Two aim to study the social subsystem and understand the needs of the people of the situation, then transforming this understanding into solutions. This phase is supported by understanding from CLIC (phase one) and CLIC (phase two):

CLIC phase one, the appreciation phase: this will be reflected in the exploratory phase of this research to identify the situation of utilising IT for the purpose of improving motivation and capabilities in Qatari governmental organisations.

CLIC phase two, 'designing the system to be served' phase: the principles of this phase support understanding employees real problems in the workplace. This understanding will be demonstrated using conceptual models that present different people's views about the existing problems they face that prevent them from being motivated and capable. It will also provide ideas and solutions on how to overcome these issues from the perspectives of the people of the situation using conceptual models.

Phase Three aims to understand the needs of the technical subsystem to provide the technical requirements for the IT tool to perform its role from the perspective of people of the situation which is supported by CLIC (phase three):

CLIC phase three, designing the 'serving system' phase: the principles of this phase support the design of the serving system. In this phase, the process that represents people's proposed actions using technology to solve the problems, as the served system, is conceptualised. the researcher supports participants to communicate their evolving understanding about the technical solution using prototyping, socio-technical scenario and pilot study. Other methods such as piloting and prototyping are also used in this research to get the participants to compare what they propose in the conceptual models with what the researcher would develop as a technical solution. These methods draw on the CLIC approach that emphasises using methods to keep the client in the leading role of development and to maintain logical coherence with the other methods (Champion et al., 2005).

2.6 Chapter Summary

In this chapter, the proposed approach for developing the IT tool was introduced, based on a study that included STT concepts, supported by learning from ETHICS and SSM principles. We can now present the research design in Figure 2.6. The research design shows that for the researcher to accomplish his aim, it needed to go through three main stages, each representing one of the research

objectives. **The first objective,** already accomplished in this chapter, was to identify a theoretical foundation and a practical approach for developing the IT tool. It concluded with the proposed approach as illustrated in Figure 2.5. Then **objective two** is to go through the three phases identified in the proposed approach to develop the IT tool. Lastly, the **third objective** of the design is to experiment with the developed IT tool in actual work environments to assess its ability to perform this role in an STS to improve workforce motivation and capabilities.

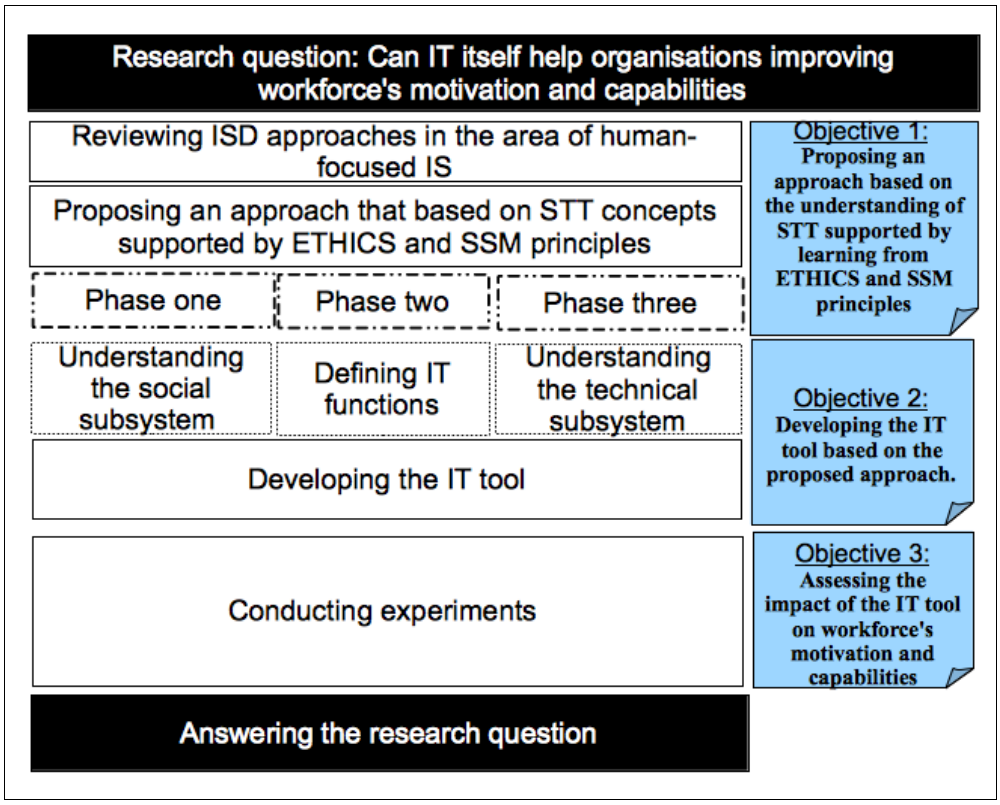


Figure 2.6: Research design

3.Research Methodology

3.1 Introduction

This chapter presents the methodological approach that was chosen for developing the IT tool based on the framework of ideas presented in Section 2.4. It will describe the research strategies that were chosen for the three phases of the proposed research's approach illustrated in Figure 2.5.

This chapter is divided into four sections. The first section looks at research paradigms. It is followed by a discussion about the appropriate research approach that conforms to the selected research paradigms. In the third section, the research strategies are described for the research's three main phases. Lastly, data collection and analysis methods are presented.

3.2 Research Paradigms

This section provides a brief background about the main research paradigms. These paradigms are general upper-level considerations and understandings. They have implications for research activities when their four philosophical assumptions are understood and practised, which are: ethics, epistemology, ontology and methodology (Denzin & Lincoln, 2011a). The three main research paradigms are positivism (realist), constructivism (interpretivist) and pragmatic (postpositivim)

(Creswell, 2009; Gray, 2009). Lincoln et al. (2011) also add two others which are the critical and the participatory paradigms.

These research paradigms are discussed with the intention of identifying the one appropriate for this research, based on the framework of ideas declared in the Literature Chapter for developing the IT tool. This discussion begins with a basic definition of each paradigm, then identifies its characteristics and examines each one in relation to their appropriateness with this research.

3.2.1 The Positivist Paradigm

This paradigm sees the social world as an object that can be studied by observing it or by measuring it (Creswell, 2009; Gray, 2009). The main philosophical argument of this paradigm is that "the social world exists externally to the researcher" (Gray, 2009). In other words, it considers "reality out there to be studied, captured and understood" (Denzin & Lincoln, 2011b, p. 8). The main characteristics of this perspective are in its approach to knowledge, that is both deterministic and reductionist as explained by Creswell (2009):

- Deterministic: this means that the problem under study is considered as being a result of something that causes it. Therefore, to study the problem, it is necessary to identify the cause (Creswell, 2009).
- Reductionist: this means that the process of the research is to divide the research problem into smaller ideas in the form of variables that can be tested (Creswell, 2009).

This paradigm's philosophical assumptions were described in the Literature Review Chapter Section 2.2.1 when the ISD approaches were examined. However, it is necessary here to revisit these assumptions briefly to make a link between the researcher's framework of ideas identified in the previous phase and the research methodologies of this chapter. In this respect, from an ontological perspective the positivist paradigm as described by (Guba, 1990, p. 20) (the nature of reality) is realist, driven by "natural laws and mechanisms". The positivist paradigm from an epistemological perspective (nature of knowledge) is objectivist in which the researcher takes on a "noninteractive" stance with the situation. Lastly, the methodological perspective (the approach to inquire about knowledge) of the positivist paradigm is mainly experiential.

3.2.2 The Constructivist/Interpretivist Paradigm

This paradigm sees the social world through the eyes of individuals themselves (participants in the situation under study) and their interactions with others (Creswell, 2009). The constructivist perspective holds an approach which is characterised as both broad and social-oriented as explained by Creswell (2009):

- **Broad**: this perspective depends on acquiring a general broad view from participants, who, by giving this broad view help in constructing the meaning that the researcher needs in order to understand the situation under study Creswell (2009):
- **Social-Oriented:** researchers understand the situation under study on the basis of their mutual interactions with participants who are living and experiencing the situation under study. Then, they try to "interpret" their views with regards to the specific context of the environment they are in (Creswell, 2009).

With regards to this paradigm's philosophical assumptions as described by Guba (1990, p. 27), from an ontological perspective the constructivist paradigm is relativist, which means that reality in this paradigm exists in "mental" social settings. On the other hand, the constructivist paradigm from an epistemological perspective is subjective, requiring the researcher to be involved in the social situation and "interact" with its entities. Lastly, the methodological perspective is hermeneutics in which "individual constructions" are hermeneutically analysed to discover "substantial consensus".

3.2.3 The Pragmatic/Postpositivisim Paradigm

This is a paradigm that gives researchers the ability to use all available research approaches to understand the situation under study (Creswell, 2009). That is because in this paradigm "reality can never be fully apprehended, only approximated" (Guba, 1990, p. 22). This means that the pragmatic perspective has the flexibility of using research methods from both positivist and constructivist perspectives (Creswell, 2009). It therefore depends on using different methods to "capture as much of reality as possible" (Denzin & Lincoln, 2011b, p. 8).

With regards to this paradigm's philosophical assumptions as described by Guba (1990, p. 23), from the ontological perspective the postpositivist paradigm is critical realist which means that reality in this paradigm is determined by "natural laws" but is "incompletely understood". On the other hand, from an epistemological perspective this paradigm is modified objectivism, which requires the

researcher to recognise that in the social situation, “regularities” do not perfectly exist and thus researcher needs to interact with its entities, while remaining as “neutral” as possible. Lastly, the methodological perspective is a modified experimental methodology which allows understanding not only based on the “human sensory” abilities but also by using many “sources of data, investigators, theories and methods” so as to avoid misinterpretation of the situation (p.21). Methodologically a postpositivist paradigm deals with objectivist “imbalances” in studying social situation by applying the methods in more “natural settings, using more qualitative methods, depending more on Grounded Theory (p.23).

3.2.4 Research's Paradigm and Researcher's Framework of Ideas

Based on the discussion, summarised in Section 2.2, in this thesis, the researcher adopts a sense-making orientation in which understanding of the situation is achieved through the people in it (Hirschheim et al., 1996). This researcher also understands that for developing an information system, accurate specifications of technical aspects are also required. In other words, both social and technical subsystems and their “interaction” need to be studied and understood for the purposes of this research.

Thus, based on the discussion summarised in Section 2.4, this researcher's framework of ideas adopts socio-technical theory (STT) concepts supported by soft system ideas of SSM principles. Both STT and SSM adopt dualistic epistemological and ontological stances and are ethically focused on humans (Burrell & Morgan, 1979; Livari et al., 1998). In addition, they both use constructive methods, primarily concerned with the design of artefacts (Iivari et al., 1998). STT concepts are mainly functionalist and positivist (Burrell & Morgan, 1979) and the SSM principles are mainly anti-functionalist and interpretivist (Hirschheim et al., 1997).

In other words, the framework of ideas in this PhD research places the process of information system development between functionalist ideas, linked to realism and objectivism and interpretivist ideas, linked to idealism and subjectivism. Thus the research is positioned in the area of the pragmatic/postpositivim paradigm. This paradigm allows this researcher to use subjective methods to experience the situation to understand what motivates people and makes them capable. The researcher needed to study people’s humanistic needs through their different perspective (values, behaviours, experiences etc....). In other words, a constructivist/interpretive paradigm was needed to understand the social subsystem of the organisations rather than the positivist reductionist

"universal law" view of organisations that dictates that the human-situated situations need to be objectively understood (Stowell & Welch, 2012). At the same time, because the system being studied in this research is not purely social but also includes the development of an IT tool, positivist paradigm methods also are needed to study the technical specifications of the IT tool as well as to assess its effectiveness.

The postpositivist paradigm to study organisations for system development is supported by Checkland and Holwell (1998) who argue that because of their "goal seeking" objectives, organisations require information systems that support "decisions making" and hence "systematic" and reductionist research methods are needed. But he also emphasises that organisations includes people who should not be considered as "servants of a rational machine" as they are participating in a "social process" in which "social reality is constantly constructed and reconstructed" (p.40). This argument is also supported from the perspective of IS research in which Mingers (2001) suggests that using different paradigms in conducting an IS research will "bring in a richer and more reliable" result (p.240)

3.3 Research Approaches

As discussed in the previous section, the pragmatic/postpositivist paradigm was chosen as the most appropriate for this research. Having chosen that research paradigm for answering the research question, the mixed methods approach was chosen for carrying out the research activities for reasons that will be discussed in this section under the following points:

- Basic definition of the mixed methods research.
- The importance of the mixed methods generally and in IS discipline specifically.
- The purpose of mixing and mixed methods strategies.
- The limitations of mixed methods.
- How this research addressed these limitations.

3.3.1 Basic Definition of Mixed Methods Research

The mixed method research approach enables researchers to make use of the strengths of the two traditional paradigms and at the same time to reduce the weaknesses that may result when using only one of them (Johnson & Onwuegbuzie, 2004). The mixed methods approach is relatively new, first described in 1959 by Campbell and Fiske (1959) as an approach that can benefit from the two

other research paradigms for the purpose of improving validation (cited in Johnson, Onwuegbuzie, & Turner, 2007). Since then this paradigm has evolved through different historical stages as described by Johnson et al. (2007) who reported the beginning of this paradigm as being when the term “triangulation” was defined by Webb et al. (1966), and when Denzin (1978) suggested the four types of triangulation. Then Sieber (1973) suggested that mixing can occur effectively in all phases of the research: design, data collection and analysis of the research process.

A general definition for mixed methods research is “a design for collecting, analysing, and mixing both quantitative and qualitative data in a study in order to understand research problems” (Clark, Creswell, GREEN, & Shope, 2013, p. 364). Therefore, mixed methods follows the pragmatic paradigm with a different emphasis on using qualitative and quantitate methods based on the nature of the study (Creswell, 2011). Creswell (2011) argues that qualitative methods “whatever their roles in traditional quantitative experiments elevates qualitative research to a new status” (p.277).

In this research, based upon this researcher's framework of ideas, mixed methods will be applied with more emphasis on using qualitative methods. It is a mixed design that Creswell (2011) found in many mixed methods studies which give “priority to qualitative methods”. Both qualitative and quantitative methods will be used throughout the research process for achieving a comprehensive understanding of the situation under study (Creswell, 2009; Johnson et al., 2007).

3.3.2 Advantages and Limitations of Mixed Methods

The mixed research paradigm has been discussed in the literature from different angles, aiming to understand its strengths, weaknesses, procedures and validity (Bergman, 2008). In this section, the purpose of mixing in this research will be discussed by identifying the advantages and disadvantages of using a quantitative paradigm alone, a qualitative paradigm alone and then explaining the necessity of employing mixed methods in this research.

3.3.2.1 Using Quantitative Research Only

A quantitative study on its own lacks the ability to understand the exact meaning of what participants in a research think about a subject of a study if the subject is very relative and not deterministic, such as the subject of human motivation. In this situation, the words that participants use may have different meanings which cannot be fully understood if the participants' thoughts are conveyed quantitatively. A quantitative study does not allow participants' information to be studied

in depth and does not allow its meaning to be comprehensively understood. This argument is made by many researchers. For example Bartunek & Seo (2002) argue that quantitative study has the weakness of using pre-defined variables, with the assumption that they have the same meaning for both the researcher and the respondent. Quantitative research has two other main weaknesses, as summarised by Gray (2009) citing Guba and Lincoln (1994) and Silverman's (2000), that quantitative research lacks the means to understand participants' own views on a subject under study because it does not allow the researcher to have the direct collaborative contact with participants necessary to appreciate what they really understand about the subject.

A quantitative approach in this research might have developed a survey based on independent variables that have theoretical meanings that are understood differently by different people. The analysis of this survey might have forced the researcher to use a “common sense reasoning” or in some cases to use his/her “personal point of view” to interpret the meaning, which would then produce inaccurate results (Gray, 2009, p. 165). That is, using a quantitative approach alone would mean adopting a functionalist paradigm and hence, would not have been sufficient to understand the needs of the social subsystem of organisations, in order to improve a workforce's motivation and capabilities.

3.3.2.2 Using Qualitative Research Only

This research's philosophical stance as discussed above in Section 3.2.4 tends towards the interpretive paradigm. The interpretive paradigm is usually associated with using qualitative methods (Bryman, 2016). In this section, the main advantages of using a qualitative approach to help understand social subsystems of organisations are listed:

1- It is used when a situation under study has not been studied before (Strauss & Corbin, 1990).

2- It is a strategy that allows researchers to “directly” collect the data required for understanding the situation at sites where the people who are “experiencing” what the researchers are studying, are available to give their own account (Creswell, 2009, p. 175). This gives the researcher the advantage of not only collecting abstract data but also getting a contextual understanding and meaning via the dialogues that take place with the informant in his/her work place, which consequently improves the quality of analysis and the interpretation of the data.

3- The qualitative approach has four important elements that helped achieve the aim of this research.

A- The research design: in the qualitative approach, the design is flexible; it can be adapted to the pace of carrying out the research. In other words, it does not require a strict research plan that decides from the very beginning everything related to the research process. Rather, it allows changes at different levels of the research process, including data collection methods and the sample of the study (Creswell, 2009).

B- The data collection: the qualitative approach accepts several sources of data, whether interviews, observations or documents (Creswell, 2009), making the understanding of the situation more comprehensive than studying it through one data collection method.

C- The data analysis: the way data is analysed in this approach is based on the 'bottom up' 'inductive' process that involves participants in the process of analysis, to help produce comprehensive understanding (Creswell, 2009). Also, this approach is based on the idea of building upon multiple source of data in a step-by-step process to create concepts and then themes that represent participants' accounts of the situation under study.

D- The relation with respondents: this paradigm allows researchers to establish a strong and interactive relationship with respondents which helps improve the quality and accuracy of answers (Creswell, 2009).

All of these advantages serve the purpose of an inductive reasoning which allows the understanding “to move from particular to general” to “discover a pattern” in the situation under study (Babbie, 2014, p. 22). This type of approach was essential in this research in developing its theoretical model, one that describes the needs of the social subsystem to help improve workforce motivation and capabilities. But this research also required deductive reasoning to extract specifications that have “casual factors” that affect the motivation and capability of the workforce in the situation (Babbie, 2014). These details were important to complement the meaning of the qualitative approach required for defining the technical specifications.

The methodological need in this research as described in Section 3.2.4 is to use a combination of research methods, as one data source alone cannot answer this research question. In other words, as explained by Creswell and Clark (2011) qualitative and quantitative methods provide different types of data “each has its limitations”. Thus, a mixed methods approach brings together the data of both methods for a better and complete understanding and the understanding from one research data instrument of one research approach with the other one of the other research approach, to create a clearer picture of the situation (Gray, 2009). Hence, the mixed paradigm was the appropriated

choice for carrying out the research's activities to answer its question.

3.3.2.3 Limitation of the Mixed Methods Research

The mixed method research approach is still controversial in terms of defining and describing it (Creswell, 2011) and hence some researchers think that it still needs to be defined in terms of design, analysis, validity and mixing procedures (Bryman, 2007b). The main weakness of this approach is in its undefined way of integrating and mixing the data from the two different paradigms. This weakness can be added to the lack of existing research that presents possible approaches to writing about the two methods in a way that makes the connection between them clear and related (Bryman, 2007b). This researcher addresses these weaknesses by explaining clearly and in detail in terms of aim, strategy and collection and analysis, the way mixed methods were used. This research drew extensively on Creswell (2009, pp. 216–218) in applying this approach, as described in the following sections.

3.3.3 Understanding the Mixed Methods Research

The weaknesses of the mixed methods as discussed above, were addressed by considering: the timing of mixing, the stages of mixing, the strategy of mixing and the objective of mixing. These are going to be described briefly and then later in this chapter are discussed in relation to the research activities described in Chapters Four and Five as well as Chapter Seven.

3.3.3.1 Timing and Stage of Mixing Methods

There are two types of mixing, concurrent or sequential. As described by Bergman (2008), the concurrent design integrates both data (qualitative and quantitative) for better understanding, whereas in the sequential design, qualitative data helps to expand the understanding generated by the quantitative data (or vice versa). Mixing can happen at the stage of data collection, data analysis or interpretation (Creswell, 2009).

3.3.3.2 Strategy of Mixing Methods

As described by Creswell (2009) there are three types of mixing strategies:

- Connected: in which one method, qualitative or quantitative, gives information that helps the other method in its research procedures.

- Integrating: for using data collected from both methods as one data by "merging" them together as one set of data.
- Embedding: a strategy that considers information resulting from a qualitative or a quantitative method as "supporting" information from the "primary" method of the study.

3.3.3.3 Mixing Method Objectives

Gray (2009) lists four main mixing objectives:

- **Triangulation:** the objective here is to use the two methods to understand the same aspect of the situation under study, one from the qualitative perspective and the other from the quantitative perspective. The data from each of them is separated but compared so as the weaknesses of one method is "compensated" by the strength of the other, for example, when the same participant is both interviewed and then completes a questionnaire (Gray, 2009). Mingers (2001) argues that using "sequential triangulation" (qualitative → quantitative) "is both possible and useful […] to evaluate, extend and refine inductively generated theory" (p.245).
- **Complementary:** the mixing objective here requires using both methods to give understanding of the different aspects of the situation under study. The data that results from one method gives more meaning to the data that results from the other. For example, participants are first interviewed, then based on the results, a quantitative questionnaire is used to understand more specific measurable aspects of their answers (Gray, 2009).
- **Development:** this involves using one method to understand some aspect of the study, then based on this understanding, the other method will be developed to study the situation (Gray, 2009). One example would be where a sample of participants are identified who answered a quantitative questionnaire differently than the majority of participants. An interview is then carried out with this sample to understand the reasons for these differences (Gray, 2009).
- **Expansion:** the objective is to use the two methods to expand understanding of the situation under study, by giving the study new perspectives based on using a more open research method (Gray, 2009). Then the expansion objective of mixing is utilised. An example is where one quantitative method is used to assess the results of a program, while a qualitative method is used to inquire about other issues related to that program (Gray, 2009).

The way in which mixed methods was applied in this research is described in section 3.5.

3.4 Research Strategy

This section describes and discusses the strategies for the following research objectives:

- Understanding the needs of the social subsystem to improve the workforce's motivation and capabilities. This includes determining the social subsystem functions based on this understanding.
- Transforming the functions of the social subsystem into functions that can be performed by the IT tool.
- Assessing the impact of the developed IT tool on workforce motivation and capabilities.

3.4.1 Research Strategy for Understanding the Social subsystem Needs and Identifying its Functions

Referring back to Figure 2.5 in the Literature Review chapter where the proposed approach was discussed, in this section the first phase in the approach is described, which aimed to identify the needs of the social subsystem to improve workforce motivation and capabilities. It involves understanding the social subsystem structure in order to identify the main factors that affect motivation and capabilities and understanding the relation between them. Following on from this was the task of identifying the functions of the social subsystem that would improve workforce motivation and capabilities.

The objective in this phase was to carry out an explanatory study, one that explains the situation under study and describes the relation between its elements (Dawson, 2005). In this section, the researcher will identify the research strategy that was thought to be most appropriate to carry out this study.

3.4.1.1 Understanding the Social Subsystem of Qatari Organisations

When the literature was reviewed to understand the needs of the social subsystem for the Qatar case study, no prior studies that specifically investigated this issue were found. The researcher carried out an exploratory study, which will be discussed in detail in Chapter Four Section 4.2, to find out what prior understanding managers in Qatari organisations had about the subject of this research. In other words, whether managers in organisations have strategies, plans or even ideas for utilising technology for the aim of improving their workforce's motivation and capabilities. The results of

this exploratory study showed how very little information organisations had concerning the research question. This meant a research strategy was needed that had the ability to enable the researcher to gain understanding of the situation from its ground up to the whole. In addition, Grounded Theory methodology share the same philosophical paradigm of interpretivism, while adopting a realist epistemological stance with soft system methodology (SSM) (Durant-Law, 2015). Durant-Law (2015) argues that they also differ in that the SSM approach focuses more on the data that comes from the people of the situation, while Grounded Theory develops the researcher's understanding through the interpretation of people data. This argumentation is taken further by them to suggest that the integration of the principles of both methodologies will provide "more holistic" understanding of the situation under study because as Durant-Law (2015) argues, this combination of points of view of the people of the situation and that of the researcher will offer "deep understanding". Also Mingers (2001) reports a study by Ormerod (1995) who used SSM with different data collection methods such interviews and questionnaires.

Consequently, the research strategy chosen for understanding the social subsystem was Grounded Theory research methodology with case study for the following reasons:

1- Grounded Theory methodology is particularly useful for research that needs an understanding of a situation that has not been studied before (Martin & Turner, 1986), because it permits in-depth understanding and produces theoretical models that describe this understanding (Martin & Turner, 1986). The Grounded Theory methodology can discover theories (Martin and Turner, 1986) and, as Glaser and Strauss (1967, p. 114) state, it allows "the generation of theories of process, sequence, and change pertaining to organisations, positions, and social interaction". This was an essential characteristic which made Grounded Theory so suitable for understanding factors in the social subsystem that affect workforce motivation and capabilities.

2- Grounded Theory guidelines promote the "researcher to become active and engaged" (Charmaz, 2011, p. 361). This is a very important aspect that both SSM principles and an ETHICS application of STT demand.

3- This methodology also takes into account the researcher's work experience and considers it as data in the case study (Fernandez, 2004). This is a very important characteristic which prevent researcher's experience to influence the study because it becomes data that gets compared with the other data that comes from the study.

4- Grounded Theory methodology allows the researcher to establish a good relation with participants and helps in getting the necessary cooperation of participants, because it allows participants to talk about important aspects that affect them in the situation under study (Glaser, 1998).

5- Fernandez (2004) argues that Grounded Theory is a methodology that can be used for IS research due to its ability to combine technical understandings with social understandings when its needs and risks are dealt with correctly. Supporting this point is Orlikowski (1993) who argues that Grounded Theory methodology has been used successfully in many studies about in organisations.

6- Finally, this methodology has been found to be empirically valid (Glaser and Strauss 1967). In the next section, this methodology is described in more detail.

3.4.1.2 Grounded Research Methodology With Case Study

Grounded Theory is a methodology that can be used with different data collection methods (Glaser, 1978) and case study is one method that has been tested and used in combination with Grounded Theory. Indeed, according to Fernandez (2004) using case study with Grounded Theory is "the preferred ways of doing Grounded Theory in IS research" (p.47). This is due to several essential characteristics case study method has that match this research's needs. Firstly, case study methodology has the ability to allow theory generation from practice; it makes it easier to understand processes in the situation under study; and lastly it is usually used to study situations that have not been studied before. In addition an important advantage of using case study with Grounded Theory is that its results are "empirically valid" (Benbasat et al., 1987 cited in Fernandez, 2004), when using both methodologies, one of them should lead the research activity of studying the situation so that no conflict happens between their respective principles (Fernandez, 2004). In this research, Grounded Theory was the methodology chosen to drive the process of studying the social subsystem in the organisations of the case study.

3.4.1.3 Case Study Research Strategy

Case study is a research strategy that has an essential function required in this research to accomplish its aim which as described by Yin (1994) allows the situation to be studied "in depth and within its real-life context" (p.18). The importance of case study lies in its capacity to generate understanding of the situation even "when the boundaries between phenomenon and context" are

not obvious (Yin, 1994). In this research, the first phase required a strategy that could provide an in-depth understanding of what the social aspects of the case that had an impact on the workforce's motivation and capabilities. This understanding needed to be free from interference of other elements such as what objectives the organisations set for employees to achieve or the resources available for employees to achieve these objectives. Hence, a case study strategy assisted in distinguishing between the needs of the employees to achieve the objectives of their organisations and their own need to become better motivated and more capable at work.

Lastly, in a case study the data collection sources are either from individuals or from organisations as indicated by Yin (1994), which, combined with the subject of the data collection, constitutes the unit of analysis, as illustrated in Table 3.1.

Unit of analysis	Design	Data collection source	
		From an individual	From an organisation
Individual	About the individual	Individual behaviour, attitude, perception.	Employee records, interview with supervisors, interview with other employees.
Organisation	Abut the organisation	How the organisation works, why the organisation works.	Policies, organisation outcomes.

Table 3.1: Units of analysis (Yin, 1994)

In the research conducted in this thesis, because it studies individuals only (Qatari workforce) then the unit of analysis is individual people who work at Qatari organisations. Research instruments for collecting data about individual's needs will discussed in Chapter Four, while the instrument to assess the improvement in their motivation and capabilities will discussed in Chapter Seven.

3.4.1.4 Grounded Research Methodology Process of Data Collection

To ensure that this research adhered to the guidelines and principles of this research methodology throughout its data collection and data analysis process, Fernandez's (2004) process of Grounded Theory was applied as illustrated in Figure 3.1, which modified by Eisenhardt’s (1989) and expanded from Lehmann (2001) model.

The process of Grounded Theory assisted in understanding what main activities would generate a theory. This understanding was used to bring about a simpler design of this process, as shown in Figure 3.2. It shows the activities of generating a theory in a clearer way for a better realisation and a more accurate implementation.

In the following section, each activity of the process is described, drawing on Dick (2005) and Fernandez (2004) who describe the steps of conducting Grounded Theory in a study by applying the Glaserian approach and utilising the case study strategy. These two papers are recommended references for researchers who are new to using both of these research strategies together in their studies.

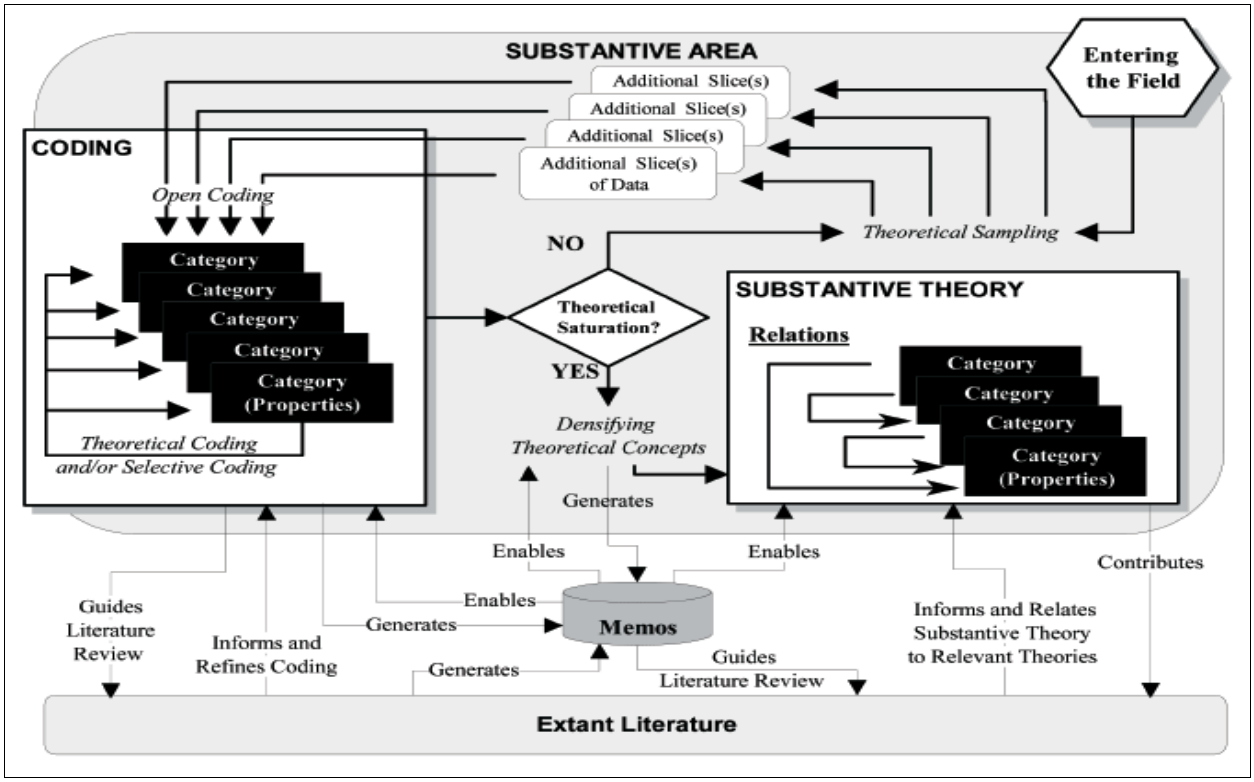


Figure 3.1: The process of Grounded Theory (Fernandez, 2004)

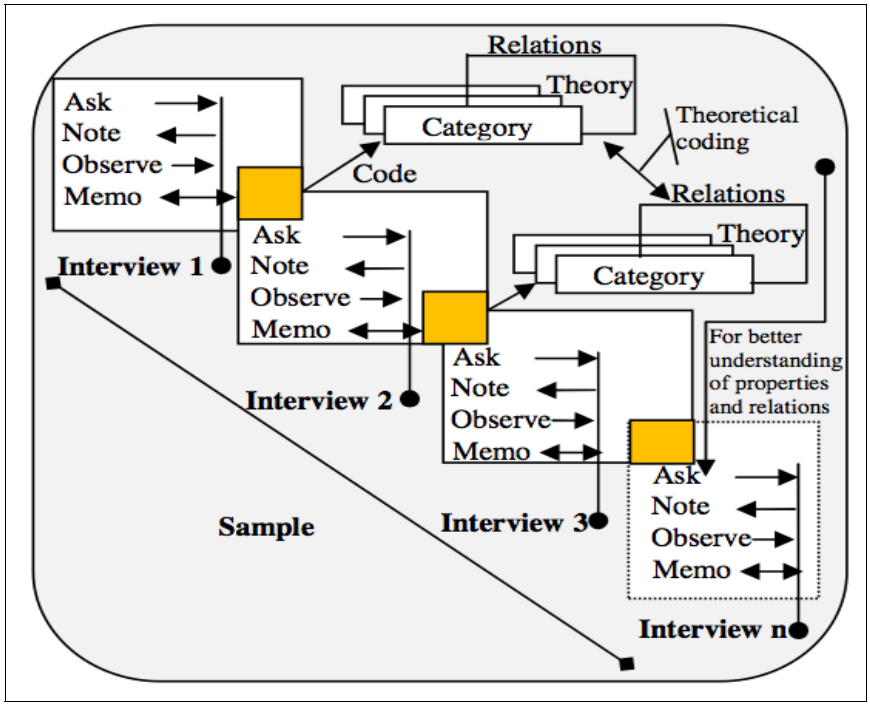


Figure 3.2: Grounded theory generating process as understood (adapted from Fernandez, 2004)

Theoretical Sampling

When a case study strategy is selected to study a situation with Grounded Theory, the number of cases does not have to be decided at the beginning of the study instead is guided by the theory emerging (Fernandez, 2004). Eisenhardt (1989) on the other hand, suggests that a limited number of cases is enough for building theory. He specifically states a "number between 4 and 10 cases usually works well" (p.545).

In order to get a better understanding of the situation, the sample should include varieties so that the process of comparing emerging data enriches the theoretical understanding (Dick, 2005) without neglecting the importance of keeping similarities in the sample according to the substantive area of the research (Glaser & Strauss, 1967). In this research, the sample included organisations that are all within the substantive area of the research but working in different areas.

Noting Taking

Note-taking is the preferred data collection method for Glaser (1998) rather than the recording of interviews. This is due to what Glaser (1998) sees as important in collecting data in Grounded Theory which are the concepts rather than the exact details that come from the recording of interviews, as these details are not suitable for the conceptualisation objective required in Grounded

Theory. In this research the main method for data collection was note taking done by the researcher himself during interviews followed by writing memos.

Coding

The main goal of coding is to discover categories. A category is the main idea in the context of the overall understanding as it occurs in the study and is conveyed by participants (Dick, 2005). Figure 3.3 conceptualises what the coding process in the Grounded Theory is as described by Fernandez (2004) to guide its process.

This process includes two main processes, the coding process and the comparison process (Fernandez, 2004). The coding process involves collecting 'qualitative datum' from people, observations, document or literature about an 'incident' which relates to an instance of something or an 'instance of concept' which is coded and then categorised (Fernandez, 2004). This categorisation of the concepts needs to go through a more in depth understanding to become of better benefit for developing a theory. This happens in Grounded Theory through two activities, namely the 'theoretically coding' and the 'selective coding'. Theoretical coding is an activity that brings a whole understanding to a higher level by analysing the interrelation between identified categories and their properties, grounded in the substantive data with the help of memos (Fernandez, 2004). Selective coding is an activity that directs the process of data collection and analysis for the purpose of a better understanding of some categories (Glaser, 1978). In this research, both theoretical and selective coding were utilised through its process of inquiry that involved three rounds of data collection and analysis. Finally, when the study reaches a situation where the theoretical sampling ceases to generate new categories, or a new understanding, it indicates that the study has achieved a 'theoretical saturation' (Fernandez, 2004). This situation means that a theory that can explain the situation under study has been established (Fernandez, 2004).

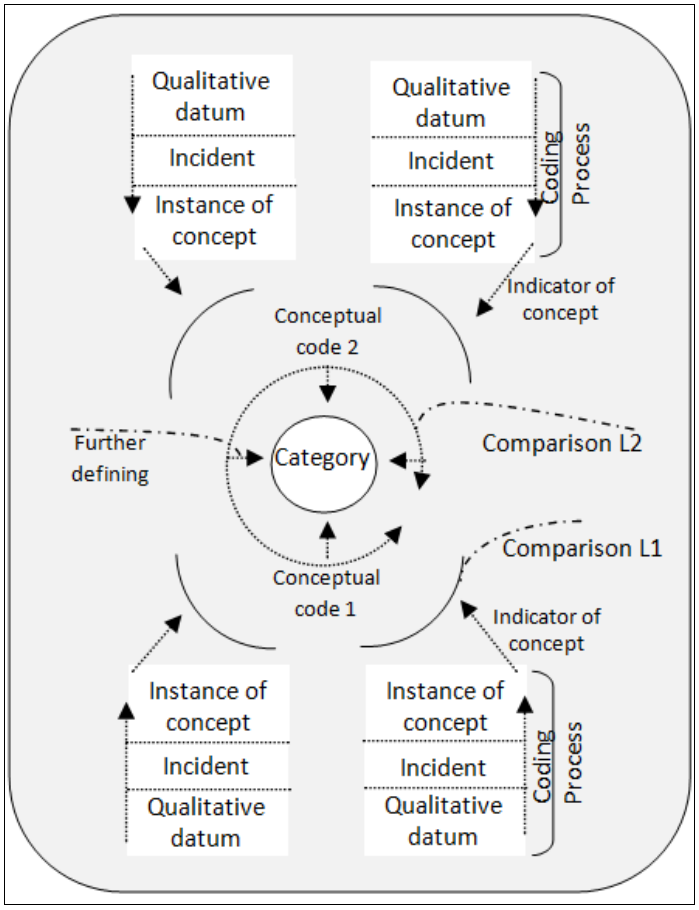


Figure 3.3: Coding process's presentation

Literature Review

The Grounded Theory methodology demands a different approach to the literature review than other research methodologies because it is an emergent-theory based methodology. That is, reviewing the literature about the categories and the theoretical discoveries can not be done early in the study; rather, the literature is treated as another source of data collection (Dick, 2005). In addition, Glaser (1978) advises that the reading of the literature should avoid any interference that might negatively affect the coding process and therefore the discovery of the theory.

3.4.2 Research Strategy for Transforming Social Subsystem Functions into IT Functions

This section identifies the research approach adopted for the transformation process required in phase two of the proposed approach illustrated in Figure 2.5.

As discussed in the literature review chapter in Section 2.5.2 in conceptual statement number two (**CS2**), for the transformation to happen, the output of studying the needs of the social subsystem is transformed into functions that can be performed by the IT tool. This section explains how this objective can be achieved methodologically.

3.4.2.1 Reviewing Socio-Technical Theory and System Theory for Understanding the Transformation Process

In the transformation process, the social subsystem starts the process by producing results (output) obtained using Grounded Theory. These results are the input for the technical subsystem study which develops the IT tool. The research strategy had to accommodate both types of data in order for the transformation to happen as discussed in Section 3.2.4. This means the need for a research strategy that recognises the output of Grounded Theory, the 'instances of concepts', 'categories' and their relations and allows them to become output as an IT tool.

One research strategy known in IS that can achieve the above requirement is called Design Science Research (DSR) in Information System. This strategy, described in more detail in the next section, brings into existence IT artefacts that are either unknown or have not been used before.

3.4.2.2 Understanding Design Science Research (DSR)

Design Science Research (DSR) is an 'analytical technique' used in Information Systems to design new objects to better understand behavioural characteristics of IS (Vaishnavi & Carroll, 2009). DSR involves the creation of objects to get planned outcomes (Simon, 1996 cited in Vaishnavi & Carroll, 2009). The main concepts in DSR are as follows:

1- According to Owen (1998) “Knowledge is generated and accumulated through actions” (cited in Vaishnavi & Carroll, 2009). This is described by a cycle shown in Figure 3.4 where knowledge is used to generate 'works' and “works are evaluated to build knowledge”. This concept matches with the proposed approach for applying STT, in which the first two phases acquire knowledge about the workforce's motivation and capabilities, then based on this knowledge, the third phase consists of developing the IT tool. Then the IT tool is evaluated based on its effectiveness in impacting the workforce's motivation and capabilities to produce new knowledge.

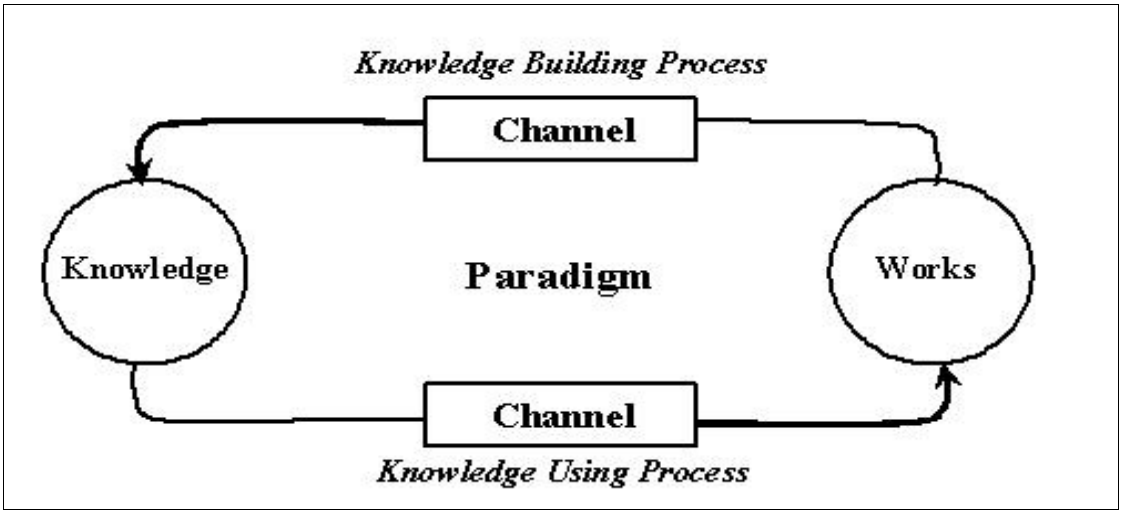


Figure 3.4: General model for generating knowledge (Owen, 1998)

2- "Learning through building" is a concept that involves the researcher learning from failures (Vaishnavi & Carroll, 2009). This researcher implemented this when developing and testing the IT tool in several rounds of experimentation in the case study.

3- DSR as a process has four main outcomes: constructs, models, methods and instantiations ((March & Smith, 1995). Constructs are the basic building blocks of the understanding required to know the problem or to find out the solution. These are conceptual understandings in the form of vocabularies that collectively present entities which help in the designing of objects. Models, on the other hand, bring the constructs together in "statements or propositions" to exhibit relationships between constructs to present the "problem or solution". The method is the interpretation of a model in terms of actions or "set of steps" to achieve a goal. Instantiation is the ultimate outcome of the DSR as it symbolises the "operationalisation of constructs, models and methods" in a real environment (March & Smith, 1995).

4- From a philosophical perspective, the DSR allows the researcher to change his philosophical stance throughout research's phases (Vaishnavi & Carroll, 2009). In other words, researcher can begin understanding the situations by applying interpretive paradigm, then develop this understanding as a "positivist observer" (Vaishnavi & Carroll, 2009). This dualistic paradigmatic thinking is in line with this researcher's framework of ideas and its proposed approach.

3.4.2.3 The Transformation Process Using the Design Science Research

DSR has four stages as described above. Each stage produces one type of data which together produce an IT tool. These four types of data are described in detail in this section to explain how they are going to be used in the transformation:

1- The IT tool is an instantiation that performs determined functions to interact with, and cause impact on, the environment in which it is deployed .
2- Functions in DSR are called methods. Method is produced as a result of the understanding of the relations between different objects interacting to achieve a specific goal.
3- In DSR, the understanding of the objects and their relations is a process of developing a model.
4- To identify objects in DSR we need to identify and define constructs.

This understanding of DSR can be integrated with the process of understanding the social subsystem using Grounded Theory, as well as the process of understanding the technical subsystem to produce the IT tool, in the following way:

In the first phase, the researcher identifies constructs (factors affecting motivation and capabilities) and comes up with a model that describes the social subsystem's needs for the workforce to become better motivated and capable at work. Then, in the next phase, the understanding which comes from the model in terms of relations between the factors becomes the methods (social subsystem's functions). These functions represent the social subsystem's needs to improve workforce motivation and capabilities. These social functions then become the input for the process of identifying IT functions. Lastly, these IT functions are developed into instantiation (IT tool) during the process of understanding the technical subsystem. Table 3.2, presents the understanding of how DSR's four data types were used in the transformation process.

DSR's data	Application in the transformation process
Construct	Recognising and defining factors in terms of what each factor is affecting and why.
Model	Reasoning the relations between the identified factors affecting the workforce's motivation and capabilities.
Methods	Identifying the methods that describe IT functions
Instantiation	Designing the IT tool to perform these functions

Table 3.2: DSR's data and its application in the transformation process

3.4.3 Research Strategy for Assessing the Impact of the IT Tool on Workforce Motivation and Capabilities

Phase three consisted of a 'causal study' within an experimental research strategy to assess the impact of the developed IT tool on the workforce's motivation and capabilities. A causal study assesses the impact of one variable on the other (Dawson, 2005). In these experiments, a control group design was used to create an intervention with the purpose of affecting employee's motivation and capabilities using the IT tool. Assessing this effect was essential to understand how effective the tool would be in performing its functions.

Also it was decided to adopt a longitudinal study design to experiment with the IT tool, in which the researcher visited the site of experiment regularly in order to be able to measure the impact of the tool and the pattern of changes over time (Kumar, 2010) on the workforce.

In order to measure the IT tool impact on workforce motivation and capabilities, dependent and independent variables needed to be specified and these are presented in Table 3.3, with the independent variable (I.V.) in this study being the employee's motivation and capabilities and the dependent variable (D.V.) being the developed IT tool .

(I.V.)	(D.V.)	Experimental Group		Control Group		Remarks
		Pre-test	Post-test	Pre-test	Post-test	
IT tool	Motivation Capabilities	(T)	(T)	(T)	(T)	(T): Test is administrated

Table 3.3: The experimental study design

In this experimental design, before the IT tool intervention, tests were administrated using two different questionnaires, one for managers and one for employees, in the two groups (control and experimental). Ethical issues and confidentiality were discussed with both managers and employees, based on the ethical approval terms granted by the university and agreed with the organisation. Training on how to use the IT tool was provided for both the managers and the employees.

There are three possible outcomes for an intervention in any experiment which are: changing direction, changing the magnitude and the ease of this change (Rosenthal & Rosnow, 1991). The main objective in this research was to identify the direction of the change. In other words, the researcher's main concern was to find out whether any change that happened that led to an improvement in the workforce's motivation and capabilities could be linked to the IT tool's intervention or not. This is the aim of this experimental study to give the researcher the ability to tell if the developed IT tool is able to perform its functions to improve motivation and capabilities of the Qatari workforce. The magnitude of change is not considered necessary as it requires specific and specialised data collection instruments to measure specifically how much improvement there is in the motivation and capabilities of the workforce, which is outside the scope of this PhD research.

Lastly at the end of the experimental study, a survey method was used to test the findings of the experiments in specific and the research in general, with a larger sample of the case study. The survey method is recommended for testing “emergent theory” and generalising findings (Babbie, 2014).

3.5 Data Collection and Data Analysis

As discussed earlier, this researcher employed mixed methods research, an approach that was chosen based upon the framework of ideas that involves studying different subsystems. Each study involved collecting different types of data which were then collated for the purposes of analysis to get the required understanding. This section describes the data collection methods in each phase and how the data was mixed together for the analysis.

3.5.1 Data Collection Methods and Mixing in Phase One

Phase one aimed to understand and describe the situation under study by answering the question “what”; what are the main factors that are affecting the motivation and capability of Qatari workforce. The Grounded Theory research methodology (qualitative data) was used to generate a theory that answers this question. This research methodology is inductive in its nature and systematic in its processes as described by Gray (2009) which makes it a good qualitative research methodology to understand unknown situations. Also in this phase, the understanding acquired from the Grounded Theory was mixed sequentially with quantitative data using a questionnaire, for the purpose of complementing the general understanding with a more specific one, in order to identify

the social subsystem's functions. Table 3.4 summarises phase one data collection methods and mixing approach.

Mixing Objective	Mixing Strategy	Procedures
Complementary	Embedded	Participants first interviewed (semi-structure) then based on the results, a quantitative questionnaire is used to understand more specific aspects of their answers (Gray, 2009, p. 213).
Timing of Mixing	Mixing design	
Sequential	Qualitative (Gth & Case Study) → Quantitative (Questionnaire) (Data collection + Analysis)→ Results → (Data collection + Analysis)→ Results	

Table 3.4: Mixed method in phase one

As noted in the table above, in this phase the main data collection method was a qualitative one, as it studies the subject of motivation and capabilities for the purpose of discovering all the social factors that have an impact on them. Choosing a qualitative approach rather than a quantitative one was the main strategy because some researchers indicated that motivation cannot be understood through one type of questioning, as people think differently about it. Trist (1981), for example, found differences with regards to what motivates a workforce, and points to an earlier study by Hackman and Lawler (1971) which found different “patterns” of motivation. Trist (1981) also disagreed with the way most research studied job satisfaction, arguing that they put too much emphasis on collecting data using questionnaires that takes “one point in time” responses from the workforce and builds their research on these results (Trist, 1981). He argued that this quantitative data collection method does not give the complete image of the workforce's feelings as these feelings change over time. This point was taken into consideration when the researcher conducted its study to measure and evaluate workforce motivation.

3.5.2 Data Collection Methods and Mixing in Phase Two

The main objective of phase two was the identification of the IT functions. This phase transformed the social subsystem functions into IT functions, based on the conceptual statement number seven (**CS7**), by studying the processes of the identified social subsystem functions that IT functions needed to perform so they do not negatively affect each other and together can achieve the FIT objective, which is to improve the workforce's motivation and capabilities.

In this phase, a data collection instrument that had two groups of questions was used. The qualitative part was used to discover the social subsystem's processes and the quantitative part was used to figure out how IT could perform these processes. Then, the data was mixed concurrently and the analysis of both groups integrated to answer phase two's question which is, how can IT support workforce motivation and capabilities. Table 3.5 summarises this phase's data collection methods and mixing approach.

Mixing Objective	**Mixing strategy**	**Procedures**
Complementary	Integrated	Participants interviewed using a questionnaire that asked first open responses questions then closed answer questions were asked to get specific information about the first group of questions
Timing of Mixing	**Mixing design**	
Concurrent	Qualitative (Questionnaire) → (Data collection) + Quantitative (Questionnaire) → (Data collection) → Analysis → Results	

Table 3.5: Mixed method in phase two

3.5.3 Data Collection Methods and Mixing in the Experimental Study

The objective of this study was to experiment with the developed IT tool in an actual work environment to assess its impacts. Quantitative as well qualitative data was collected using a pre-test and post-test instrument. The instrument asked scaled-response questions (quantitative data) to detect any change in the workforce's motivation and capabilities because of the intervention of the IT tool (treatment). The instrument also asked open-response questions (qualitative data) to understand what participants experienced when using the IT tool (Creswell, 2009). The data was

collected and analysed together in order to understand the impacts of the IT tool as well as to get additional understanding about its effectiveness. Table 3.6 summarises phase three data collection methods and its mixing approach.

Mixing Objective	**Mixing Strategy**	**Procedures**
Triangulation	Integrated	Participants interviewed before the treatment and after the end of the treatment using a questionnaire that asked closed responses questions as well as open-responses questions.
Timing of Mixing	**Mixing design**	
Concurrent	Qualitative (Questionnaire) → (Data collection) + Quantitative (Questionnaire) → (Data collection) → Analysis → Results	

Table 3.6: Mixed method in the Experimental Study

More descriptions, discussions and details with regards to each of the above research's activities will be given in Chapters Four (phase one), Chapter Five (phase two) and Chapter Seven (the experimental study).

3.6 Chapter Summary

To conclude this chapter, Table 3.7 summarises all the methodological decisions discussed in this chapter. It shows the research question and the three main phases that the researcher undertook to answer it. It also shows the research approach for each phase and its outcomes.

Research Aim: Can IT itself help organisations improve their workforce's motivation and capabilities.			
Phase one objective	Phase two objective	Phase three objective	The experimental study
Understanding the needs of the social subsystem and identifying its functions.	Transforming the social subsystem functions into IT functions.	Understanding the needs of the technical subsystem and developing the IT tool	Assessing the impact of the IT tool , validating and generalising research's results.
Approach	Approach	Approach	Approach
Explanatory study This study answers the question: What are the main factors that affecting Qatari workforce motivation and capability?	**DSR** This study answers the question: How IT can support human workforce's motivation and capabilities?	**Prototyping, Socio-technical and pilot study** This study answers the question: What are the technical requirements for developing the IT tool to perform its functions?	**Causal study and Survey method** This study answers the question: What is the impact of using the IT tools on the workforce's motivation and capabilities?
Outcomes	Outcomes	Outcomes	Outcomes
Model: Social subsystem Theoretical model.	**Methods (functions):** IT functions.	**Instantiation:** IT tool	**Answering research question.**

Table 3.7: Overview of the research aim, objectives and approaches

4.Understanding the Social Subsystem Needs and Identifying its Functions

4.1 Introduction

This chapter starts to address **objective two of the research's design** by presenting the work of the **first phase** of the proposed approach illustrated in Figure 2.5. This phase aimed to understand the needs of the social subsystem to improve the Qatari workforce's motivation and capabilities. This chapter describes the research process undertaken for this phase of the study, including data collection, data analysis and data validation. The chapter concludes with a presentation of the results and a discussion of a theoretical model that represents the needs of the social subsystem to improve Qatari workforce motivation and capabilities. Table 4.1 summarises this phase's objective, method and process which is comprised of three different studies as follows:

The Exploratory Study

This first study aimed to explore the research problem in the Qatar case study in order to better understand specific aspects related to it.

The Explanatory Study

Following the exploratory study, the researcher carried out an explanatory study. A research strategy was chosen of qualitative open-ended questions conducted in semi-structured interviews within the framework of Grounded Theory research methodology. Results acquired from the analysis assisted in developing a theoretical model that described the needs of the social subsystem so as to achieve the objective of improving the workforce's motivation and capabilities. This theoretical model focuses on what motivates the Qatari workforce and what make them capable at work, and assisted in specifically identifying the social subsystem functions for these improvements to occur.

The Validity Study

This was the last study in this phase in which findings regarding factors that would make the Qatari workforce motivated and capable were tested for validity.

<table>
<tr><td colspan="2">Research Aim: Can IT itself help organisations improve their workforce's motivation and capabilities?</td></tr>
<tr><td>Phase one objective</td><td>Phase one process of the study</td></tr>
<tr><td>Understanding the needs of social subsystem.</td><td rowspan="6">Explanatory study- this study answers the question: what are the main factors affecting Qatari workforce motivation and capability?
1-Exploring the case under study
2-Understanding the needs of the social subsystem by discovering the main factors in the social subsystem which affect the Qatari workforce's motivation and capabilities, then describing the relations between these factors in a theoretical model.
3-Identifying the social functions required to be performed by the social subsystem functions an STS, in order to improve the Qatari workforce's motivation and capabilities
4-Validating the results of this phase.</td></tr>
<tr><td>Method</td></tr>
<tr><td>Grounded Theory and case study</td></tr>
<tr><td>Outcome</td></tr>
<tr><td>Model (Theoretical model)</td></tr>
</table>

Table 4.1: Overview of phase one, method and process

4.2 The Exploratory Study

4.2.1 Study Objective

This study aimed to explore the social subsystems of a number of organisations in Qatar. This case study corresponds to what this research approach learnt from the CLIC (phase one) appreciation phase, discussed in Section 2.5.3.1. The specific objective was to identify important aspects in the case study that would help describe the current situation in Qatari organisations related to the research's question. These aspects were twofold:

1- Current practices in the social subsystems of Qatari governmental organisations that aim to improve the workforce's motivation and capabilities.

2- Existing IT systems or tools in Qatari governmental organisations, developed to improve the workforce's motivation and capabilities.

The following section describes how the exploratory study was carried out to explore these two aspects.

4.2.2 Study Methodology

Primary and secondary data collection methods were used for exploring the Qatar case study, starting with reviewing related documents about Qatar's national vision, structured interviews were conducted and an expert was interviewed. Table 4.2 gives an overview of the methodology.

Exploratory study		
This study answers the question: What are current practices in the social and technical subsystems in Qatari organisations for motivating and improving Qatari workforce capability.	Approach	Qualitative
	Population	Qatari HR and training managers
	Data collection methods	-Documents review -Semi-structured interviews -Interview with an expert

Table 4.2: Exploratory study, overview of the strategy of inquiry

4.2.2.1 Document Review

As discussed in the first chapter, the research question arose from a work experience that coincided with the launch of Qatar's National Vision for 2030, one of its objectives being the improvement of

the workforce's motivation and capability (GSDP, 2008). Any published documents related to this vision generally and to its human objective in particular were reviewed. Because this vision was new (one year old), the researcher found only one document that described the vision. This document describes a set of strategic goals for all organisations to work towards but does not give any specific guidelines on how these goals should be achieved, which is to be expected since this document was only a vision. The researcher subsequently learnt that the intention was to develop it into implementation plans by several governmental organisations under the coordination of the General Secretary for Developing Planning (GSDP). The researcher therefore turned to primary data sources to explore the initiative further, as will be described in the next two sections.

4.2.2.2 Semi-Structured Interviews with HR and Training Managers

The first primary sources of data were the HR and training managers of a number of governmental organisations in Qatar. Semi-structured interviews were conducted with them at a convention centre where many organisations were participating in a public career event. A survey questionnaire was also used by utilising an interviewer-administrated data collection method. This method was chosen as it allows asking specific questions as well as probing questions (Gray, 2009). This method was useful to explore the case in details. Table 4.3 presents the details of this study in which ten managers representing ten different organisations were interviewed. For confidentially reasons, organisations' names will not be revealed.

Process of Inquiry				
Data Collection Method	Approach		Type	
Interviewer-administrated	Survey questionnaire		One-to-one interview	
Data Collection Procedures				
Gaining entry	Sample (Sites-People)	Researcher Role	Instrument	Protocol
Open to public event	Site: 1 Organisations: 10 People: 10	Personal / direct interaction	Questionnaire	Note taking

Table 4.3: Exploratory study, overview of process of inquiry

The study sample consisted of managers who head Human Resources (HR) departments or Training and Development departments. This sample was selected due to the fact that these departments

were responsible for improving and developing human resources in Qatari governmental organisations. Hence, they were responsible for developing strategies and tools to achieve the goal of improving the workforce's motivation and capabilities, as set out in the vision.

This public event was therefore a good opportunity to find this sample as it was about careers and hiring, where HR managers were available to answer applicants' questions about available positions and salaries and were interviewing candidates. Training and development managers were also available at the event, which informed prospective applicants about career paths and development opportunities in the organisations. The ten managers who were available for the interview were asked two questions related to the two case study's aspects mentioned earlier. The first was about any management practices that were in place in their organisations to improve their workforce's motivation and capabilities (representing the role of the social subsystem in improving the workforce's motivation and capabilities). The second question was about any existing IT systems or tools they had to support them in this task (representing the role of the technical subsystem in improving the workforce's motivation and capabilities).

This exploratory study's usefulness was limited due to the vision being a new initiative, as discussed earlier. In talking about their organisation's practices for improving their workforce's motivation and capabilities, managers were very general and their answers were limited to the importance of training. They suggested that training was the approach they used to equip their employees with the required personal and professional skills for motivating them and improving their capabilities. On the other hand, when asked about technology as a tool they might use in their organisations for improving motivation and capabilities, they expressed uncertainty as to what using technology for that purpose might mean. These results did not give insights into the case study, except that it became apparent that this topic was new and required a different approach to study and understand it. The results also directed the researcher towards '**Training**' as a theme that has an effect on the Qatari workforce's motivation and capabilities. This understanding of the essential role training plays in achieving Qatar's vision of the workforce's development objective was also noticed in the introduction of a document published by the statistics department body, which emphasised the importance of this role (Qatar Statistics Department, 2009). Because of its importance, the training plan of the Institute of Administrative Development (IAD) was examined. IAD is the Qatari government's main body that provides training to all governmental staff. Analysis of the training plan (IAD, 2009) revealed four major training domains as follows:

- Planning: Training courses that develop the abilities of staff to set goals for their work, align them with the organisational vision and identify strategies for implementation.
- Knowledge: Training courses that provide the technical and managerial skills essential for staff to carry out their jobs.
- Innovation: Training courses that develop abilities of thinking, problem solving, and skills for developing their organisations.
- Teamwork: Training courses that provide staff with the skills necessary for them to work as teams in their organisations.

So for this researcher to conclude its exploratory study, it was necessary to take these results to the people who knew more about the Qatari vision than anyone else and ask them to assist with the research by confirming its preliminary understandings about the case. This was done through a one-to-one meeting with an expert working in the governmental body that participated in the development of this vision, which was the GSDP. The next section elaborates on this interview in more details.

4.2.2.3 Meeting with an Expert

The expert, who works in human resources management working in GSDP, agreed on the importance of the four domains identified, describing them as essential for developing a 'capacity building and institutional culture' in organisations. He also supported the exploratory study's results which indicated that no more information was available at that time regarding how the objective of improving Qatari workforce's motivation and capabilities was to be achieved.

4.2.3 Discussion

The exploratory study provided a preliminary understanding of the case under study, which can be summarised in the following points:

1- Understanding the needs of the social subsystem to improve the Qatari workforce's motivation and capabilities requires an in-depth study, as information about this topic is almost non-existent.
2- Understanding the needs of the technical subsystem to improve the Qatari workforce's motivation and capabilities cannot be done through a number of questions in a survey or even through direct questions in one-to-one interviews due to the difficulty participants face in understanding these

questions, consequently producing answers that are of very little use.

3- The theme of training that emerged from this exploratory study was useful as a basis for understanding the social subsystem of the Qatari organisations, the focus of the explanatory study.

4.3 The Explanatory Study

4.3.1 Study Objectives

This study aimed to enable understanding of the needs of the social subsystem of Qatari governmental organisations required to improve the workforce's motivation and capabilities. This study corresponds to what this research approach learnt from the CLIC (phase two) the designing of the system to be served phase in Section 2.5.3.1. The outcome of this study was a theoretical model that describes the factors affecting Qatari's employees' motivation and capabilities at a workplace. This process was underpinned by the theoretical understanding of the STT FIT concept presented in Figure 2.1.

4.3.2 Study Methodology

Based on the discussion in the research methodology chapter in section 3.3, a mixed research paradigm was adopted. The mixing objective in this phase was complementary which means that the results of the qualitative study complemented the results of the quantitative study for a better understanding (Gray, 2009). As presented in the research methodology chapter in Table 3.3, this study is divided into two parts. The first part (the qualitative part) aimed to get a general understanding whereas the second part (the quantitative part) aimed to develop the understanding of the first part further into more specific social subsystem functions. Table 4.4 shows an overview of the strategy of inquiry. Section 4.4 presents the qualitative part of the study whereas section 4.5 presents the quantitative part of the study.

Explanatory Study		
Study objective: **This study answers the question:** What makes the Qatari workforce motivated and capable at work?	Paradigm	Mixed method
	Unit of analysis	People (individual)
	Research strategy	-Part one: Grounded theory with case study -Part two: Quantitative questionnaire
	Population	Qatari managers and employees in governmental organisations
	Mixing design	Part one: (Data collection + Analysis)→ Results → Part two: (Data collection + Analysis)→ Results

Table 4.4: Explanatory study, overview of the strategy of inquiry

4.4 Qualitative Part of the Explanatory Study

4.4.1 Process of Inquiry

In section 3.4.1 the research strategy for the qualitative part is discussed, a discussion that ended with a decision to study the Qatari organisational social subsystem using Grounded Theory Research Methodology with Case Study. This strategy was discussed in terms of its strengths, process of data collection and process of data analysis. Hence, the main instrument in this part of the study consisted of qualitative open-ended questions used in semi-structured interviews. The collection of data was carried out under the procedures of Grounded Theory methodology, to collect in-depth data from participants so as to fully understand the situation.

To start this process, some practical issues had to be dealt with first, such as deciding on sites, contacting managers of organisations, giving presentations to explain the research objectives to them, acquiring access approvals and contacting participants and scheduling meetings with them. The researcher's academic supervisor was asked to write a letter supporting the researcher and asking organisations for access to their premises. A copy of this letter is in Appendix (A). Also, regarding the ethical side of the research, it was made clear to all organisations that neither their organisations' names nor their employees' names would be disclosed in the research. These privacy considerations as well as other ethical issues were part of an ethical approval document submitted to

the university's ethical committee. Table 4.5 summarises this part of the study. More details with explanations will be given in the following sections.

Strategy of Inquiry: Grounded theory with Case study					
Data Collection Method		Approach		Type	
Interviewing		Semi-structured		One-to-one interview	
Data Collection Procedures					
Ethical issues	Gaining entry	Sample (Sites-People)	Researcher Role	Instrument	Interview Protocol
University Ethical approval	Official permission	Case organisations: 2 Other organisations:11 No. Participants : 47	Personal / direct interaction	Qualitative Question-naire	-Note taking - Memo

Table 4.5: Explanatory study, overview of process of inquiry

4.4.1.1 Sampling and Population

Sampling is an important part of any research as it is vital for ensuring external validity that allows the researcher to generalise its findings (Trochim, 2006). Sampling involves determining the population, setting a sampling frame and finally selecting the sample (Trochim, 2006). In this research we refers to the Qatar National Vision, as a case to study; hence the population of this research included Qatari organisations that are wholly or partially owned by the government. The decision to only include governmental organisations was taken because this type of organisation is officially obliged to work towards the Qatar Vision which includes as one of its objectives the improvement of its workforce's motivation and capabilities. In addition, these organisations are not driven to achieve profits, a factor that makes them more concerned about their workforce's motivation and capability. This is in contrast to private sector in Qatari case study that are usually driven by profits, and therefore only attract and recruit employees who are better capable and motivated to work as the national development strategy of Qatar states based on statistics in 2009 that (0%) unskilled employees work in the private sector comparable to (15%) in the public sector (GSDP, 2011).

4.4.1.2 Sampling Frame

The sampling frame as defined by Trochim (2006) is a list of entities from the "accessible population" which the sample will be derived from. A sample frame was created from the list of governmental organisations participating in an annual career fair in April 2009 of which thirty four were governmental organisations. The reason for choosing this event as a sampling frame tool was the advertised theme of this event which was to support the achievement of the human development pillar of the vision (Gulf Times Newspaper, 2009; Raya Newspaper, 2009).

4.4.1.3 Sample

The selection of organisations for the case study was based on the purposive and convenience sampling approach, because it is known that sampling in qualitative studies needs to be purposeful (Creswell, 2009). In that career fair event, twenty participating organisations were introduced to the research's aim and objectives. Only ten organisations showed an interest in the research of which only two accepted to give the researcher full access to their premises to carry out the research. Therefore, the researcher selected these two organisations based on the purpose of this research and their willingness to allow access (Trochim, 2006). Hence, these two organisations became the two main sites of the research case study. Also throughout this research, every organisation selected in the sample was checked to ensure that similarities between them were kept to the limit of the substantive area while allowing for the differences that enrich the theoretical output of the methodology (Barney G. Glaser & Strauss, 1967). Therefore, one of the selected organisations had all of its staff working in the area of "administration and management" whereas, the other selected organisation had its staff working in both administration as well as technical areas. Both organisations had kept the same substantive research area (i.e Qatari employees working in governmental organisations). Also, other organisations were added to the sample afterwards, as will be discussed later in this chapter.

4.4.2 Data Collection Method

As the subject being investigated was a new one, a data collection method and data collection procedures were undertaken to assist in filling this information gap. The data collection method of choice for this phase was a qualitative questionnaire used in semi-structured one-to-one interviews. This method was chosen as it allows the researcher to ask open-questions as well as probing

questions (Gray, 2009). It also elicits a high amount of information from people that was needed in order to achieve the objective of this phase, that of understanding the issue properly. Open and probing questions are two very effective methods to understand an issue in detail (Gray, 2009). On the other hand, this researcher decided to conduct the research in a way that minimises the disadvantages and maximises the advantages of this type of research method. The main disadvantage is that this approach is very time consuming (contacting organisations, getting approvals, contacting participants, arranging time and place for the interview and finally going to participants to conduct the interview).

Another point about this qualitative part of the study was that it was inductive, in other words it started with some kind of "structure" in terms of the "focus" of the research, the "questions" to be asked and the "sites" of the case study but, at the same time was open to changes, as new results or information emerged during the research process (Creswell, 2009).

One issue to arise in data collection was that informants did not have very much information about the research problem. Hence, the following data collection procedures were utilised to ensure maximum exploitation of time and efforts:

1- A one-to-one interview method was utilised that not only asked questions but also engaged participants in a process of thinking about this research problem. Such engagement is learnt from the SSM principles which emphasises that people in the situation think about the existing problem. So, in the process of data collection and after explaining the participants' rights and privacy issues, a brief description of the aim of this research was given to participants to engage them in the research not only as informants but also as contributors to one of the four pillars of the Qatar vision. It was a short introduction that presented the idea of an IT tool that could make them better rather than an IT tool that only makes work better.

This researcher believes that this approach can overcome a challenge some survey questionnaires might encounter, regardless of how clear and simple they are, to effectively obtain accurate and valid data. It is an approach that emphasises the point that unless participants are fully concerned or interested in what they are answering, they are not always obliged to take the time to think properly before answering the questions. Therefore, this approach was vital to ensure that participants gave valid answers that enriched the insights in this part of the study.

2- The semi-structured interview method employed in this research for collecting data was a necessary approach to help understand, not only 'what' makes Qatari employees motivated and capable but also 'why' it is so. This was important because this phase involved constructing a theoretical model that could give a comprehensive understanding of these factors. So, the researcher used probing questions in the semi-structured interviews and asked further clarifying questions based on the answers received as will be described in Section 4.4.3.

3- At the start of each interview, interviewees were told they had the right to decline answering any question and could even withdraw from the interview if they wished. Interviewees were also assured that their personal details, as well as critical information they might reveal about their organisations, would be kept private and would not be disseminated in the thesis. Appendix (B) shows the research's guidelines in conducting the interviews.

4- The average duration for an interview was about 45 minutes. Answers were recorded by the researcher himself using note taking. Tape recording was an option available but was not used due to the negative reaction of participants during early interviews: it was clear that participants were very wary about recording their answers. In addition, Glaser (1998) has stated that in Grounded Theory methodology, concepts are more important than the exact detail that comes from the recording which does not serve the objective of the method (cited in Fernandez, 2004).

5- “Memoing”, the activity of taking memos, was another way of recording participants' accounts of the situation under study. This activity was undertaken sometimes immediately after the end of interviews and sometimes later, after finishing a number of interviews. This activity was helpful for comprehending thoughts and understandings regarding factors and their relations (Dick, 2005). Memoing as an activity was carried out using a 12.5x20 cm squared paper, A4, A3 or sometimes a whiteboard to construct models that described the current understanding of the situation. Then these memos were regularly updated with new thoughts and ideas coming from the interviews.

6- Ethical issues in the research were dealt with in accordance with the university ethical guidelines. Ethical approval was granted by the School of Computing Science’s ethical approval committee.

7- Data for this part of the study was conducted in three rounds, each round concerned with a specific group of the sample but collectively consisted of a mix that made the sample representative of the population under study, for better external validity. **The first round** of data collection was from the '**managers group**' of the Qatari workforce. This round involved interviewing nine

managers in the main two organisations of the case study as well as another three organisations. Table 4.6 gives an overview of this round of data collection.

Data Collection Procedures (Round One)			
Sample (Organisations-People)	Researcher Role	Instrument	Interview Protocol
Case organisations: 2 Other organisations: 3 Group: Manager -Number of participants: 9	Personal / Direct interaction	Qualitative questionnaire	-Note taking -Memo

Table 4.6: Explanatory study round one, overview of data collection procedures

The three new organisations in this round were also conveniently selected based on a networking approach in which some people in the main two organisations who were interested in the objective of this research, assisted the researcher by contacting other managers in other organisations and introduced them to the researcher.

Table 4.7 shows detail of **round two** of data collection. It involved interviewing thirteen participants who were from the '**employees group**' working at the same organisations as round one. In addition, another three managers from two new organisations were interviewed in this round, as they became available at that time.

Data Collection Procedures: (Round Two)			
Sample (Organisations-People)	Researcher Role	Instrument	Protocol
Case organisations: 2 Other organisations: 5 Group: Employees -Number of employees:13 -Number of managers: 3	Personal / Direct interaction	Qualitative questionnaire	Note taking Memo

Table 4.7: Explanatory study round two, overview of data collection procedures

Finally, in the last round (**round three**) of data collection, and in order to make the sample more general as well as to improve data validity, data collection activities were carried out with a new and different set of organisations. In the previous rounds, data was collected from participants who were

working in two types of organisations (administrative and engineering); this round on the other hand, as Table 4.8 shows, interviewed another twenty one participants (**managers and employees**) working in other organisations in different work specialisations.

Data Collection Procedures: Round three			
Sample (Organisations-People)	Researcher Role	Instrument	Interview Protocol
Other organisations: 6 Total No. of participants:21 -Number of managers: 12 -Number of employees: 9	Personal / Direct interaction	Questionnaire	Note taking Memo

Table 4.8: Explanatory study round three, overview of data collection procedures

4.4.2.1 Improving External Validity

In order to address the external validity of the study, a range of people were interviewed in terms of work experience, qualification, positions and specialisations and data was collected in different organisations of different work areas, although all were governmental. This sampling approach improves external validity as advised by Trochim (2006). Selecting people to be in the sample with these different characteristics could not be planned in advance as discussed earlier. Hence, these different people and organisations were identified through the help of participants with contacts in other organisations. The result of this approach was that contact was made with eleven new organisations and interviews were conducted with a variety of people, as Table 4.9 shows.

Work experience	Qualifications	Positions	Specialisations	Organisation work area
From 1 year up to 25 years.	-Secondary school, -Diploma, -Bachelor, -Master.	-Employee, -Head of Department, -Director of an organisation.	-Administration, -Engineering, -Finance, -Marketing, -HR, -Creativity & Design.	-Public Services, -Construction, -Media, -Oil and Gas, -Ministries, -Training , -Finance, -Education, -Business, -Health

Table 4.9: Participants' characteristics in the sample

4.4.2.2 Design Science Research and Grounded Theory Research Methodology

This section describes how the data collection and data analysis of this qualitative study was guided by Design Science Research (DSR) and the Grounded Theory research methodology.

As discussed in the research methodology chapter section 3.4.2.2, DSR is a research strategy known in IS for the production of IT artefacts. It was decided to use DSR in conjunction with Grounded Theory research methodology to start the process of transforming the understanding of the social subsystem's needs to improve the workforce's motivation and capabilities, into IT functions. Section 3.4.2.3 described in detail how the two research strategies can be used together to allow this transformation to happen. This description was summarised in Table 3.2 which showed how the DSR's data can be applied in the transformation process.

The matching and transformation process, discussed in the literature chapter by conceptual statement Number Six **(CS6)**, has been used in this chapter to understand how to jointly optimise dissimilarities between the two subsystems. Then, conceptual statement Number Seven (**CS7**) was used in the next chapter (Chapter Five) to understand how to identify the correlated IT functions. Together both allowed the researcher to understand the STT theoretical fit relation between the two-subsystems required for the establishment of an STS.

So, based on conceptual statement **(CS6)** that says 'The result of studying the needs of the social subsystem allow the identification of the socio-technical fit relation which will create joint optimisation'. Grounded Theory research methodology was used to understand the social subsystem's needs on the one hand and to allow the transformation into correlated IT functions in the next chapter on the other. For this transformation to happen, the results from using Grounded Theory needed to match with the DSR, the research's methodology for transformation, as shown in Table 4.10, in which the Grounded Theory data is on the left and its matching DSR data on the right.

Grounded theory's data	Applying data in the transformation process	DSR's data
Memos	Recognising relations between identified factors and how they are affecting the workforce's motivation and capabilities.	Model
Instances of Concept		
Categories	Identifying and defining factors affecting workforce motivation and capabilities.	Construct

Table 4.10: Using Grounded Theory and DSR in the study of the social subsystem

In this study, the data collection instrument as well as the data analysis approach is focused on facilitating the above understanding. The next section discusses how this understanding was applied in selecting the instrument's questions and in analysing the answers.

4.4.2.3 Data Collection Instrument

The data collection instrument used in this part of the study comprised three open-ended questions (see Appendix C) which were as follows:

(Q1): What do you think are the main factors that make [Qatari] employees capable and motivated at work?
(Q2): Do you think that knowledge, innovation, planning and teamwork are factors? Why? Example? How?.
(Q3): What is the main motivator that makes you capable and motivated at work? Why? Example? How?

These questions were asked for specific purposes. question one (Q1), which was an open question, aimed at giving participants the opportunity to talk about what he or she thought were the factors affecting Qatari employees' motivation and capabilities. Answers to this question were essential for helping in defining factors and their relations (instances of concept), required to understand the main factors (categories) that question three (Q3) of this instrument would specifically identify. Question two (Q2) was added to find out the extent to which the training domains (themes) identified in the exploratory study in section 4.2.2.2 were possible factors affecting the workforce's motivation and capabilities. If participants answered 'yes' to the question, they were then invited to say 'why' and give an example of how an organisation implementing this theme could achieve better workforce motivation and capability. Such detailed information was considered necessary to get real ideas and experiences to get a clearer understanding of the situation. Lastly, question three (Q3) aimed to specifically identify the main factors (categories) that had the most impact on Qatari workforce's motivation and capabilities.

Table 4.11 presents how these questions were applied using the approach presented in Table 4.10.

Model	<------- Constructs			Analysis approach
DSR's data	Grounded Theory's data	Categories	Q3 Identifying Factors	To direct the research to focus on main factor(s) affecting motivation and capabilities
		(IC) (M)	Q1 Defining Properties of factors	Helping in defining factors and relations between them required to develop the theoretical model.
		(IC) (M)	Q2 Bridging with available information	Bridging information with the published documentation in the case study.
	(IC) Instance of concept (M): Memos			

Table 4.11: Applying Grounded Theory and DSR in the study of the social subsystem

In Table 4.11, the grey area represents the data generated by Grounded Theory research methodology whereas the black area represents the DSR's data. It starts from the bottom of the table with (Q2), asking about the only information this researcher had about the research problem, which were the training domains (themes). The reason this question was not asked first is because of not wanting to influence participants' answers to (Q1) and (Q3).

In this table, (Q1) comes second and (Q3) comes last. These two questions ask almost the same question but in different ways for a specify reason. So, while (Q3) asks participants to talk about one factor or more which has the most impact on their motivation and capabilities, (Q1) asks more generally about what motivates workforce and makes them more capable. Also, while (Q3) uses the 'you' pronoun, (Q1) uses the word 'employees'. This is to allow the understanding to develop gradually and qualitatively. So (Q1) invites general understanding through general answers about factors affecting motivation and capabilities, (Q3) on the other hand allows specific understanding through specific answers about the main motivation and capabilities factors. In other words, (Q1) asks participants to talk about everything that comes to their minds related to motivation and capabilities. Then after this process of refreshing the memory, (Q3) asks a specific question directed to him or her to relate this discussion to themselves. So with a fresh memory and full awareness of what they said in (Q1), the participants can give direct and clear answer to what makes them

motivated and capable at work.

This part of the research is qualitative, which means that the researcher seeks to understand reality from the perspective of the people in the case, an approach that this researcher aims to make the most of by enabling participants to answer the questions deeply and not superficially. For this to happen, answers from one question were used as a probe for the other question, to understand its importance and to develop relations which were documented in the memos. This happened when (Q1) was completely answered and the participant started to answer (Q2). If the respondent agreed about the importance of one of the four themes, the researcher then asked why he or she did not mention it as one of the factors in (Q1). In this situation, some participants linked their answers to other factors mentioned in (Q1) which assisted in explaining the importance of that factor. In other cases, participants said that these themes functioned as supporters for the factors mentioned in (Q1). These explanations became memos that created a wealth of insights that helped in enriching the understanding required for developing the theoretical model. Therefore, answers to (Q1) and (Q2) were considered as properties or descriptions in the form of 'instances of concepts' or 'memos' used to better identify and define the factors from (Q3) in the form of 'categories'. Taken together and analysed using Grounded Theory procedures, these contributed to the development of the theoretical model, as the next section will describe.

4.4.3 Qualitative Data Analysis

This section will describe the analytic approach and procedures used to study the social subsystem in order to then develop the theoretical model which would describe the factors in that subsystem which affect the motivation and the capabilities of the Qatari workforce.

The analysis in this study was guided by the qualitative analytic process of Grounded Theory methodology, which involves organising data in tables, then applying a systematic process of 'open coding', 'selective coding' , 'theoretical coding' and then linking up the resultant themes to produce descriptions and meanings (Creswell, 2009). This process was described in the research methodology chapter (see Section 3.4.1) and hence this section will simply describe how it was applied.

After reviewing the Grounded Theory approach to data analysis, the data analysis for each of the three rounds of data collection is described and the results discussed.

4.4.3.1 Organising Data for Analysis

Answers to each of the three questions were organised in tables. For **question one (Q1)**, data was organised in different tables throughout the analysis process. The first table included all the qualitative data (keywords or datum) as received from participants regarding the factors affecting the workforce's motivation and capabilities, shown in Table 4.12.

Qualitative data
Data 1
Data 2
Data 3
.
.
.
Data n

Table 4.12: Qualitative data table

Then all these keywords that related to one specific instance of a concept were categorised under one ‘instance of concept’ as shown in Table 4.13.

categorized	
Instance of concept 1	Data 1, Data 4, Data 5
Instance of concept 2	Data 2, Data 6, Data 8
Instance of concept n	Data 3, Data 7

Table 4.13: Instances of concepts table

After that, all the identified instances of concepts were continuously compared to each other in a process aimed at discovering ‘conceptual codes’ or ‘candidate categories’. This is presented in Table 4.14.

Instance of concept 1	Candidate category 1
Instance of concept 3	
Instance of concept 2	Candidate category 2
Instance of concept 4	

Table 4.14: Candidate categories table

Candidate categories then entered a new level of comparison with the newly emerged instances of concepts, which helped in better identifying the categories, their properties and the relationships between them. Table 4.15 shows the final table that includes all previous tables with information about where a specific data comes from (Interview ID) to help in the process of re-visiting and re-coding. Also, the number of occurrences of each instance of concept was calculated.

			No. Occ.	Interview No.	Total No. of Occurrence
Candidate category 1	Instance of concept 1	Data 1, Data 4, Data 5	3	I1, I3, I4	10
	Instance of concept 2	Data 2, Data 6, Data 8	3	I3, I4, I4	
	Instance of concept n	Data 3, Data 7	4	I2, I3, I4, I5	

Table 4.15: Explanatory qualitative study- question one, data collection table

For **question two (Q2)**, the table that collected its answers is shown in Table 4.16.

Domain	Is it a 'Factor'	Is 'Why' Known	Is 'How' Known	Details (example)	Int. No.

Table 4.16: Explanatory qualitative study-question two, data collection table

For **question three (Q3)**, the data collected was organised in Table 4.17. The data collection instrument did not ask about some of the details shown in Table 4.17 such as the description of the factors or examples about them; this was due to the nature of the qualitative semi-structured interviews which sometimes included additional questions for the sake of clarification, which then elicited further answers from interviewees, using these details. Some interviewees were comfortable answering them while others were not. As the researcher was able to build mutual trust with interviewees, it became easier to move the conversation towards getting more details from them. These details elaborated on the importance of these factors and how they affected the interviewees themselves, accompanied by real life examples.

Int. No.	Code	Factor	Description	Example

Table 4.17: Explanatory qualitative study-question three, data collection table

The following section describes and then analyses the three rounds of data collection, carried out sequentially as they appear in this section.

4.4.3.2 Round One of Data Collection and Analysis

Details of sampling and the process of inquiry of this round were discussed in section 3.4.1. In this section, each question is analysed separately, then at the end of each round, all the results are discussed together.

Round one - Question Three

Question three (Q3) aimed to identify the main factors (categories) affecting a workforce's motivation and capabilities. As Figure 4.1 illustrates, managers' answers were all coded under two main codes, 'self-esteem' and 'working with professional people'. Each circle in the Figure represents an interviewee. The circle's number indicates the interviewee's number. A yellow circle means the interviewee talked about a concept during the interview that was then coded to represent one of the codes in the Figure. A grey circle indicates that the interviewee did not mention a coded concept.

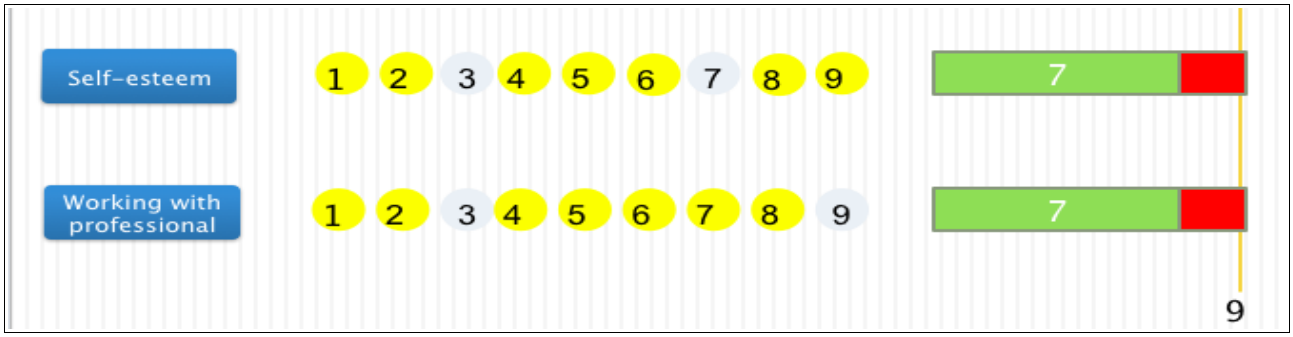


Figure 4.1: Explanatory qualitative study, round one- question three analysis results

The green box represents the total number of managers whose answers were coded under one of these codes. Appendix (F) shows the answers of (Q3).

In this round, managers focused their answers on the goals they set in order to achieve self-esteem, goals that keep them motivated as well as push them to continue to improve their capabilities so as to be up to the challenge. Most of the managers linked self-esteem with working with professional people. They talked about their experience of working with professional people who made them think differently about their objectives in their life and work. For example (Case M1) said "I want to achieve things to feel good about myself" and linked that objective with six months training and working at the World Bank. He mentioned people who he described with several characteristics: "Look for knowledge, think innovatively, active participation in organisation, positive attitude towards teamwork". Another example, showing how working with professional people can change Qatari workforce's work objective, was given by (Case M5) who said "I want to be different in my job". In other words, his objective was not to be like any other employee in the organisation, a goal that he set after working closely with his uncle, a successful businessman who holds an MBA, a role model for him that changed his way of thinking about his life. Hence, these interviews revealed the impact of achieving self-esteem and working with professional people on the Qatari workforce and therefore these two codes became the **main factors** in this round of data collection.

Round one - Question One

Figure 4.2 shows the codes resulted from the analysis of the answers of question one. These codes were based on an open coding process: the analysis was done without predetermined set of codes with the aim of identifying as many codes as possible codes (Fernandez, 2004).

Figure 4.2: Explanatory qualitative study, round one- question one analysis results

Figure 4.2 shows all the factors that participants identified as affecting their motivation and capabilities. Nine managers out of nine mentioned the 'leadership' code as an important factor affecting Qatari workforce's motivation and capabilities. Therefore, a study on the properties of this code was carried out for the purpose of understanding any possible link between it and the "self-esteem" and "working with professional people" factors in question three (Q3).

The analysis showed that the 'leadership' code was associated with the main factors of (Q3) through two instances of concepts: 'personal leadership skills' and 'experienced leader'. In other words, all managers linked the improvement of the Qatari workforce's motivation and capabilities either with the 'leadership work experience' and/or with 'his personal skills'. For example, (Case M1) linked his motivation at work with a leader who understands the importance of recognising that "work achievements [should be] in the name of employees who achieve them". (Case M5) also linked his motivation and capabilities with leader's personal skills of "Taking care of his/her employees" and his work experience with allowing him to understand the importance of "Giving the employee a chance to be in charge of a certain work or to implement his ideas", "Sharing decision taking with employees". This interviewee expressed his belief that "No barriers between manager and his employees" allows him to understand his employees' needs better. In turn, he can fulfil those needs

and consequently, this type of leader can make an employee “proud that he is working with his manager” (Case M5), making him loyal and determined to do his best at work, to show his leader that he deserves his trust and support. Appendix (D) shows the answers of (Q2).

Therefore, 'leadership' was identified as an important instance of concept for achieving the 'self-esteem' of a workforce; 'leadership' can also signify the opportunity to 'work with professional people'. Other instances of concepts were understood in this round as either aspects in the work environment for leaders to change for a better work environment which are essential for Qatari workforce's motivation and capabilities. So each of these aspects became an instance of a concept and was given a definition based on the answers of (Q1). Table 4.18 shows these definitions with examples.

Table 4.18 shows that 'resources', 'management' and 'evaluation system' as instances of concepts were all aspects in organisations that could be controlled by leadership to manage the workforce. This is illustrated in participants' answers such as (Case M4), (Case M8) and (Case M9) who all talked about the importance of a management system on their motivation and capability. They described this system as one that makes clear “Structure, procedures and work plan” for employees, a system that was described by (Case M7) as one that allows “An employee to know his work duties”. This management system was also described specifically as an “evaluation system” by the other six participants, two of them, (Case M2) and (Case M5) presented its value for motivation and capability in two ways respectively: “Treat me in a different way than others” and “Appreciation based on excellence and work achievement”

On the other hand, the instances of concepts 'work culture' and 'employee work's culture and practices' derived their importance for motivation and capabilities from the application of a management system that takes into account the workforce's needs. For example the 'work culture' concept was raised by (Case M1) (Case M2) (Case M3) who mentioned 'work environment” that allows “Collaboration, team work, respect” between employees. (Case M2) and (Case M10) referred to a work environment that allows “Communication between staff and management” and (Case M7) and (Case M9) mentioned, respectively, “Work environment: taking care of employees” and “Flexibility: work from home, no restricted work hours”. Although **work environment** in these answers was the keyword, the researcher coded it as a 'work culture', as it better represented the meaning in this context. On the other hand, the 'employee's work culture and practices' code, was in the answers of (Case M1) (Case M3) (Case M5) who talked about it as another outcome of the

management approach that takes care of employees. This outcome affects their motivation and capabilities because it makes “Employees: love work, respect work, innovative at work” and improves their “Personal relationship with other employees” (Case M5) (Case M6) (Case M7), as well as their work skills, as mentioned by (Case M6) (Case M7) (Case M8) who said it improves “The way employee thinks”.

Instance of concept	Meaning	
Leadership	Definition	Leadership actions aiming towards a workforce's motivation
	Examples	Leadership skills, taking care of his/her employees
Resources	Definition	Monetary resources and work facilities required by the workforce to carry out their work
	Examples	Offices, equipment and salary
Management	Definition	Organisation's management systems aiming towards creating suitable work environment for the workforce creating a sense that organisation is caring about their workforce.
	Examples	Structure, procedures, work plan, job description
Evaluation system	Definition	A system that assesses employee's works and rewards accordingly.
	Examples	Evaluation system, rewards and punishments
Work culture	Definition	The outcome of adopting a management approach on the way the organisation does its work.
	Examples	Teamwork, respect, flexibility, professional
Employee's work culture & practices	Definition	The outcome of adopting the management approach on the workforce.
	Examples	Love work, respect work, innovative at work and not arrogant

Table 4.18: Explanatory qualitative study, round one - instance of concepts definitions

Round One - Question Two

Question two (Q2) asked about the four training domains (themes) discussed in section 4.2 to bridge data from the exploratory study with this study. Results of analysing the answers of this question descriptively is shown in Figure 4.3. This Figure shows that most managers agreed on the importance of these themes on the improvement of the workforce's motivation and capabilities. On the other hand, only half of them explained why or described how these themes can positively affect Qatari workforce's motivation and capabilities. Appendix (E) includes all the answers for this question.

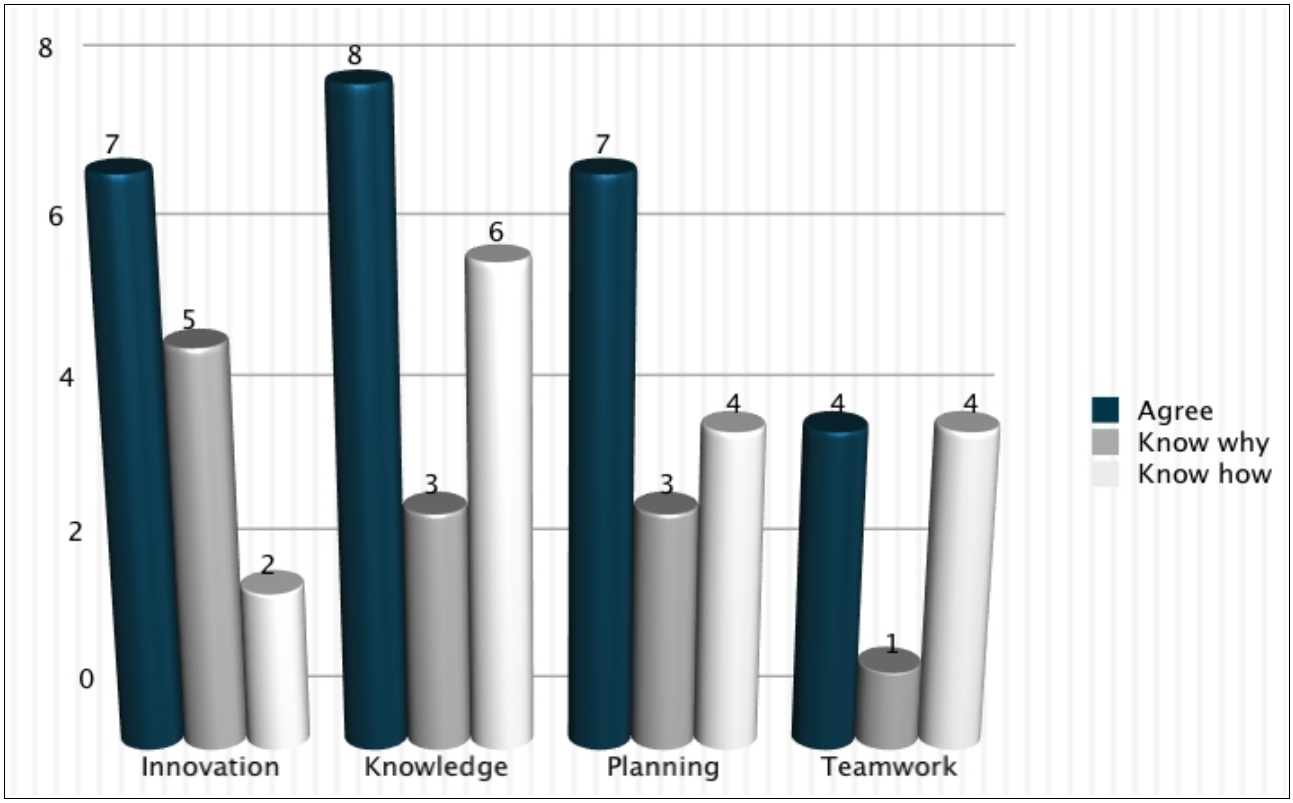


Figure 4.3: Explanatory qualitative study, round one- question two analysis results

The analysis of this question in this round did not give deep insight as the answers of this question were general and the researcher was still in the process of understanding the situation under study, so it was difficult in this stage to ask probing questions. Therefore the answers were not very directed on the specific factor. The analysis of the answers of this question aimed to qualitatively bridge participants' understanding of these themes with the main concepts identified in question three and one. The analysis was focusing on the 'why' and 'how' answers which showed how these themes were important for motivation and capabilities of Qatari workforce. These answers further assisted in understanding the main factors and their properties.

Answers to the question '**why**' these themes are important for motivation and capabilities, were used to explain the positive effect of the main factor (candidate category) whereas, analysis of answers to the question '**how**' these themes could improve motivation and capabilities was used to explain the role of the main factor in delivering a positive effect on Qatari motivation and capabilities.

Thus, the "teamwork' theme linked with the role of leader to make them practical and effective to improve motivation and capabilities of Qatari workforce. Four out of four managers positively linked this theme with the improvement of the workforce's motivation and capabilities by referring

to managers in their answers of the question 'how'. For example, when asked how 'teamwork' can improve motivation and capabilities, (Case M8) said : “It needs at least one who has experience to manage the team”; (Case M9) affirmed this requirement of “Management to endorse it”; and (Case M4) also supported this argument saying: “there should be a good team leader”, then describing this role of manager in more detail saying: “You should give each member a responsibility”. So, this analysis enabled an expansion of the 'leadership' code which included the participants’ understanding.

The other theme in this analysis was the 'planning' theme: seven out of nine managers agreed on the importance of this theme. Four of them believed that “planning” is an activity within organisations that helps to make the work of employees clear, which consequently, they argued, motivates them to work to achieve these goals. For example, (Case M9) said “Clear work goals should be known by everybody in organisation” and (Case M4) explained in more detail why “Goals are an important factor that help an employee to know what he should do”. Supporting this argument, (Case M7) said “Clear goals that are linked to organisational goals will motivate me to work” while (Case M1) linked 'planning' at work with the fulfilment of personal needs, saying: “Because if I have a personal goal (ambition) then I will have the desire and the power to achieve it”.

The “knowledge” theme was also seen as important, and was linked to the role of a professional work environment in making knowledge sharing practically utilised in the workplace for improving workforce's capabilities. With regards to 'why' this theme was seen as important for improving their capabilities, (Case M1) mentioned that “training courses” are a means for improving knowledge linking its importance “To know things that I need in my work”. (Case M2) echoed this answer, saying that he “Frequently used training course materials afterward to remember things he learned to use at work”. (Case M7) emphasised the same point: “Knowledge about the latest advancements in your specialisation is a duty of the organisation by providing training courses and emphasising the importance of this knowledge in employee’s work”. In addition to the 'training' as answer to question of 'how', others suggested that experienced people at work are also a source of knowledge. This was shown in the answers of (case M1), (case M2), (Case M3) and (Case M6) who answered the 'how' question as: “by asking friends”, “Experience exchange with people attending training courses who have long experience in my work”, “Asking a friend in another ministry” and “Exchanging experiences with experienced people” respectively.

In contrast to responses to the themes 'teamwork", 'planning' and 'knowledge', the 'innovation' theme got the most answers to the 'why' it is important for improving Qatari motivation and capabilities and linked to both the role of the leader and the impact it has on the workforce's motivation and capabilities. With regards to the role of the leader, there were two perspectives. The first perspective saw it through the work environment and the second was realised through a leader's personal skills. With regards to the first perspective, it was suggested that leaders needed to utilise this theme for the purpose of improving Qatari workforce's motivation and capabilities through changes in the work environment. This was obvious in the answers of (case M8) who said: "It needs a work environment that accepts new ideas", while others, (case M1) and (Case M5), talked about the role of leader without reference to the work environment, focusing instead on the importance of "Appreciation and incentives from manager" as well as "Management should break the psychological barrier that innovation is a hard task" to encourage innovation. 'Why' innovation was seen as important, was not very clear as only two answered this question. Surprisingly, they linked the positive impact of innovation with the work and not the workforce. (Case M1) said: "To do work better which will encourage working" and "Overcoming work problems" and (Case M5) said "For continuous improvement" of the work. The results of this question in this round explain partially how some of the themes identified in the exploratory study could help in improving Qatari motivation and capabilities.

In the next section, the process of theoretical coding will be presented to connect the understanding of the results of the analysis of the three questions.

Discussion of Round One Data Analysis

This section discusses the initial understanding of the factors, whether candidate's categories or instances of concepts, affecting Qatari workforce's motivation and capabilities, following this round of data analysis.

Theoretical coding and the analysis of the three questions, gave the first version of the theoretical model presented in Figure 4.4.

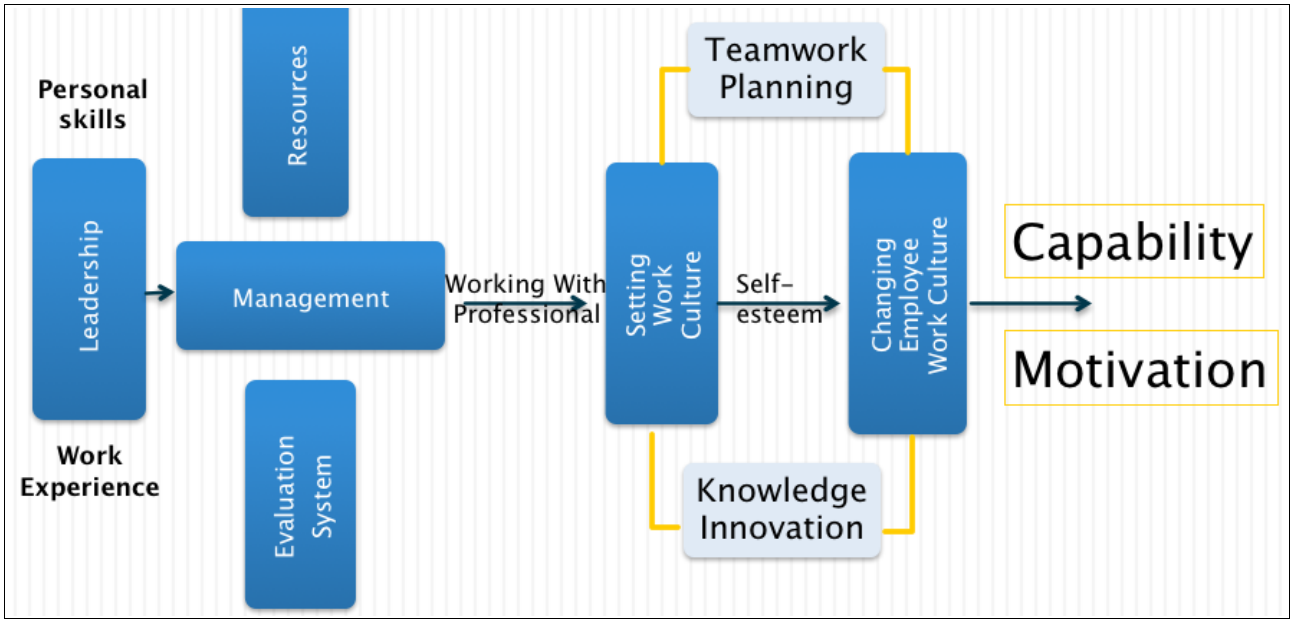


Figure 4.4: Explanatory qualitative study, round one- theoretical coding result

Figure 4.4 shows that there is a link between the candidate categories identified in question three (represented by arrows in the figure), their properties identified in question one (presented as blue boxes) and the analysis of the answers to question two (presented as a grey box). This figure shows that the Qatari workforce's motivation and capabilities are dependent on achieving **'self-esteem'**. In order to allow the workforce to achieve their self-esteem, managers need to have **two 'leadership'** qualities. The first is **'work experience',** to develop a management system based on **'team work', 'planning', 'knowledge sharing' and 'innovation support'**. This management system creates a work culture that encourages professional work practices at the workplace and hence, employees' work culture also changes to aspire to greater professionalism. Secondly, managers need specific **personal skills** that recognise the importance of linking work goals with employees' personal goals to achieve their self-esteem. Altogether, these changes allow the workforce to work in a professional environment to achieve their self-esteem and consequently, their motivation and capabilities at work improve.

Table 4.19 summarises the results of round one. It shows that the first round of interviews, with the help of Grounded Theory, identified two candidate categories and their properties (instances of concepts) which together became this round's initial understanding of what improves Qatari workforce's motivation and capabilities as presented in Figure 4.4.

DSR's data	Grounded theory's data	Results of round one qualitative analysis
Constructs	Candidate categories	1-Self-esteem 2-Working with professional people
Model	Instances of concepts	1-Leadership -Leader's work experience -Leader's personal skills 2-Management 3-Resources 4-Evaluation system 5-Setting work culture and Changing employee's work culture -Teamwork -Knowledge -Innovation -Planning
	Memo	Theoretical coding that assisted in producing the understanding in Figure 4.4

Table 4.19: Explanatory qualitative study, round one overall results

The next section analyses the data from the second round of data collection using selective coding to focus more on the identified candidate categories. The researcher builds upon its understanding of the existing theoretical concepts, “densifying” them to discover the 'substantive theory', as was discussed in the process of using Grounded Theory in section 3.4.1.4.

4.4.3.3 Round Two of Data Collection and Analysis

Grounded Theory emphasises an iterative process of collecting and analysing data that builds on previous results. So this round was about doing the same qualitative study but with a new theoretical sample. This sample included the 'employees group' who worked under the managers who were interviewed in the same organisations for round one. Sampling and data collection procedures were described in section 4.4.1 and section 4.4.2.

In this round, to build upon the previous round's results, the data collection instrument was slightly altered to facilitate this objective (See Appendix G). The new instrument allowed the researcher to directly assign categories and instances of concept to participants' answers based on the results of the previous phase and also to think about new categories and instances of concepts with the participants during the interview itself. An analysis of each of the three questions is presented below.

Round Two - Question Three

Answers to question three were analysed based on the theoretical understanding of round one, through asking probe questions in the interviews. When participants responded to this question with answers similar to candidate categories 'self-esteem' or the 'working with professional people', he or she was asked further questions to understand why these were important to them. This approach was useful as it allowed the researcher through the process of theoretical coding to understand another perspective of 'self-esteem'. This perspective linked 'self-esteem' with a more universal code called '**personal objective',** as the following analysis will show.

Analysis of question three's answers showed that the majority of employees believed that the main motivator was something that can be coded as a personal objective (self-esteem objective or family related objective or professional career objective). Eleven out of the thirteen employees mentioned one goal in their life that made them motivated at work. For example (Case E3), (Case E4), (Case E5) (Case E6), (Case E8) and (Case E9) all clearly identified achieving “self-esteem” as the main motivator at work. Others linked their motivation to other personal goals such as money or family, as in the case of (Case E1) who said “money to live” and another who said: “My personal goal is to live and bring up a family” (Case E13). Professional ambitions at work were also mentioned as a factor as in (Case E7) who said: “My ambition is to make positive change when I become a manager” and (Case E12) who said: “My goal is to gain experience in my field”.

Figure 4.5 presents the analysis of question three's answers. In this figure, eleven out of the thirteen employees mentioned one personal objective as an important factor for them to become motivated and capable at work, with six participants mentioning 'self-esteem', three mentioning 'working with professional people' and only two employees mentioning a goal that related to their life or their family.

This result implies that the candidate categories identified in the first round were not categories in themselves but rather, instances of concepts that describe the category '**personal objective**'. This result will be explored further in the analysis of the two remaining questions.

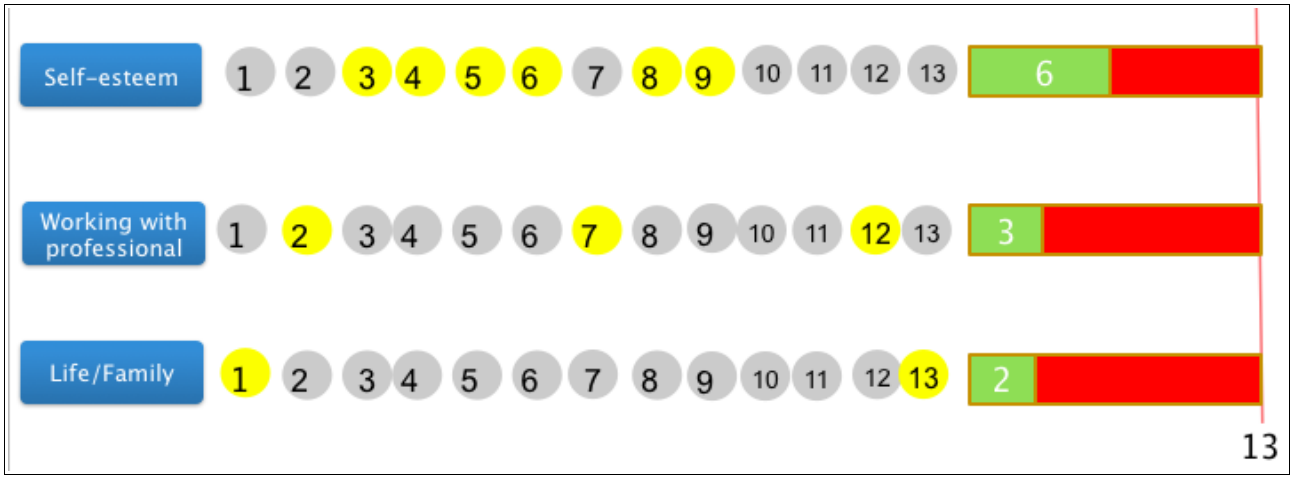


Figure 4.5: Explanatory qualitative study, round two- question three analysis results

Round two - Question One

The answers to this question were coded based on the instance of concepts from round one, for the purpose of better understanding their relation with the candidate categories. Also in this question, participants were asked if the instance of concept that coded their answer could be used to describe one of the identified candidate categories. This did not always give results, as some participants were not interested to go further and think about it.

As a result of this approach, this round confirmed one instance of a concept, produced one new one and dismissed all the others. Figure 4.6 shows this round's analysis in which '**leadership**' remained one of the instances of concept and '**professional work environment**' became the new instance of concept. All the answers to this question are available in Appendix (H).

Figure 4.6 shows that there was some agreement between employees in this round and managers in the previous round with regards to the main factors affecting motivation and capabilities, as they both mentioned factors that were coded using the same codes as in round one analysis. However, in this round, due to the nature of Grounded Theory methodology, a new understanding was developed based on these codes to describe the situation under study. This understanding allowed the researcher to identify the relations between the identified candidate category "personal objective' and these new instances of concepts. The analysis of participants' answers found a connection between '**leadership**' and the ability of an employee to achieve his or her personal goals. This connection existed by means of a manager's personal and professional skills. For example, six employees out of thirteen talked about the leader's style of 'treatment' at work affecting their

motivation and capabilities. They described this type of leader as someone who treats them with "respect" and "cares about them". Some of them added that the manager's professional skills (which was coded in round one as work experience) is also an essential companion to the personal skills, to improve their motivation and capabilities. For example, four employees (Case E3), (Case E4), (Case E8) and (Case E10) believed that a manager who works closely with employees can positively affect their motivation and capabilities. They suggested different approaches to do this through, for example, communication by "allow[ing] open communication with employees to achieve [their] goals", or through guidance at work by "encourag[ing] staff to be positive at work" or by allowing them to "give their opinion frankly" or directly through counselling as in (Case E7) and (Case E8) who said it is the role of the manager to provide "guidance for employees" to develop their own personal goal.

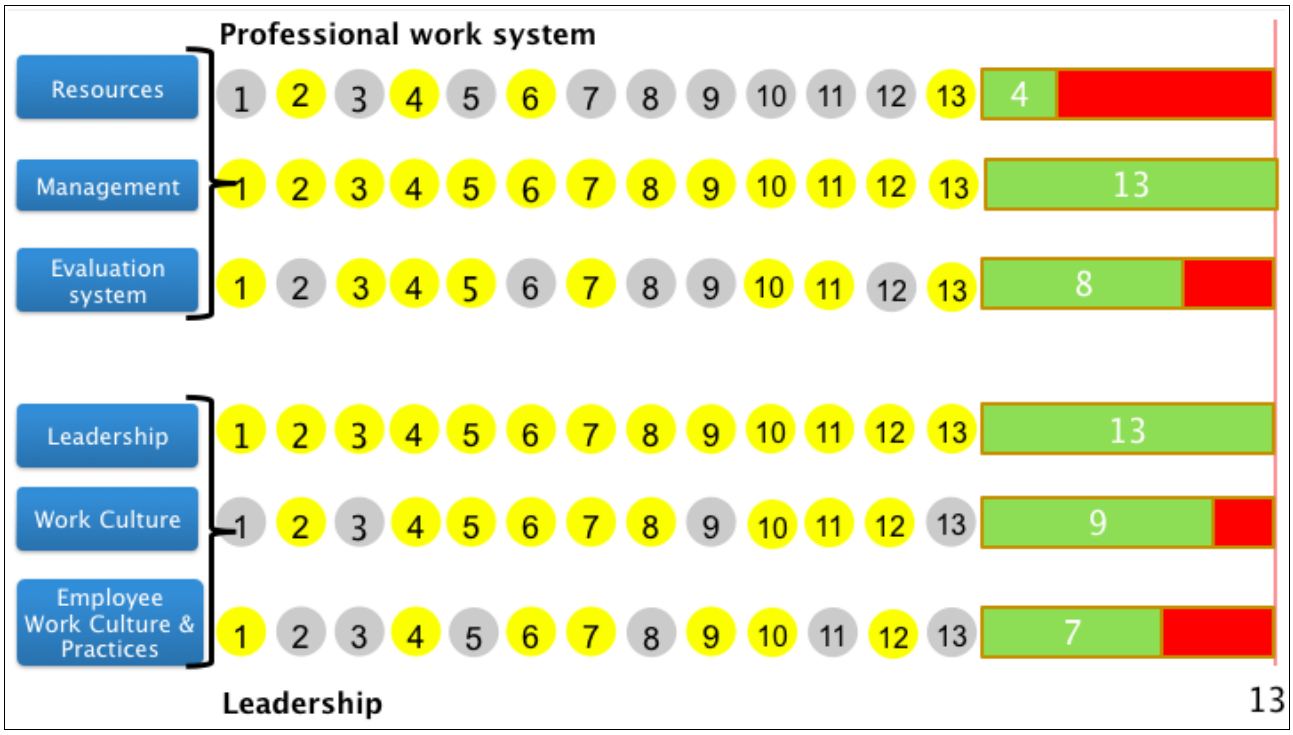


Figure 4.6: Explanatory qualitative study, round two- question one analysis results

The analysis also showed that the manager's role in this case study could be linked directly to the personal objective of achieving '**self-esteem**'. This concept was common between the six employees who talked about the importance of making self-esteem a personal objective. For example, (Case E3), (Case E7) and (Case E13) specifically assigned the role of making employees think about achieving self-esteem to the manager "who makes an employee feels his importance at work and that he is adding value to work". (Case E11) and (Case E12) believed that this can also happen if

the manager makes an effort to “understand employees’ needs by being a “collaborative manager”, which allows him to find out what their personal objectives are and then help them achieve them through the work. The understanding of '**leadership'** as an instance of a concept is summarised in Table 4.20.

Codes	Definition
Leadership personal skills	Skills that have an impact on the people being satisfied by raising the concept of self-esteem.
Leadership professional skills	Skills that have an impact on the work being professional.

Table 4.20: Explanatory qualitative study, round two – leadership instance of concept

This analysis clearly shows the relation between '**leadership**' as an instance of concept and the candidate category '**personal objective**'. However, it does not clearly identify the relation between a '**professional work environment**' and '**personal objective**'. The analysis of the next question will make this relation clearer.

Round two - Question Two (Q2)

Answers to question two were very similar to those given by the 'managers group'. They put further emphasis on these 'training domains' as essential concepts and helped in explaining the relation between the 'professional work environment' as an instance of a concept and the candidate category '**personal objective**'. Figure 4.7 illustrates the result of the descriptive analysis of question two in this round. This result shows that almost all employees agreed on the importance of these themes for improving the Qatari workforce's motivation and capabilities, but very few were able to describe how these themes could be used to improve motivation and capabilities. This result was explained with the help of the results of the previous question which saw these themes as all part of a '**professional work environment**' **required to support the achievement of personal objectives**. This was clearly expressed by some of the participants in the previous round and in this round as well. For example, with regards to planning, (Case M11) linked goals at work with the challenge an employee needs in order to be motivated; he said : “Set small goals to achieve challenging goals”. Participants also shared the view that for these themes to exist within a professional work environment there was a need for '**leadership**'. For example with regards to innovation, participants suggested that the manager needs to apply innovation through a change in the work environment.

This was in the answers of some participants, for example (case M8) who said: “It needs a work environment that accepts new ideas” and (Case M11) who spoke of the “culture of innovation that encourages creativity” and (Case M13) talked about the need to “activate the innovation mechanism at work”. These comments prompted the process of thinking about a new candidate category, which was the **'requirement to support personal objectives'.** It was a category that helped in understanding the connection between the professional work environment, leadership and the personal objective, which appeared in the memos of the theoretical coding but were not understood why.

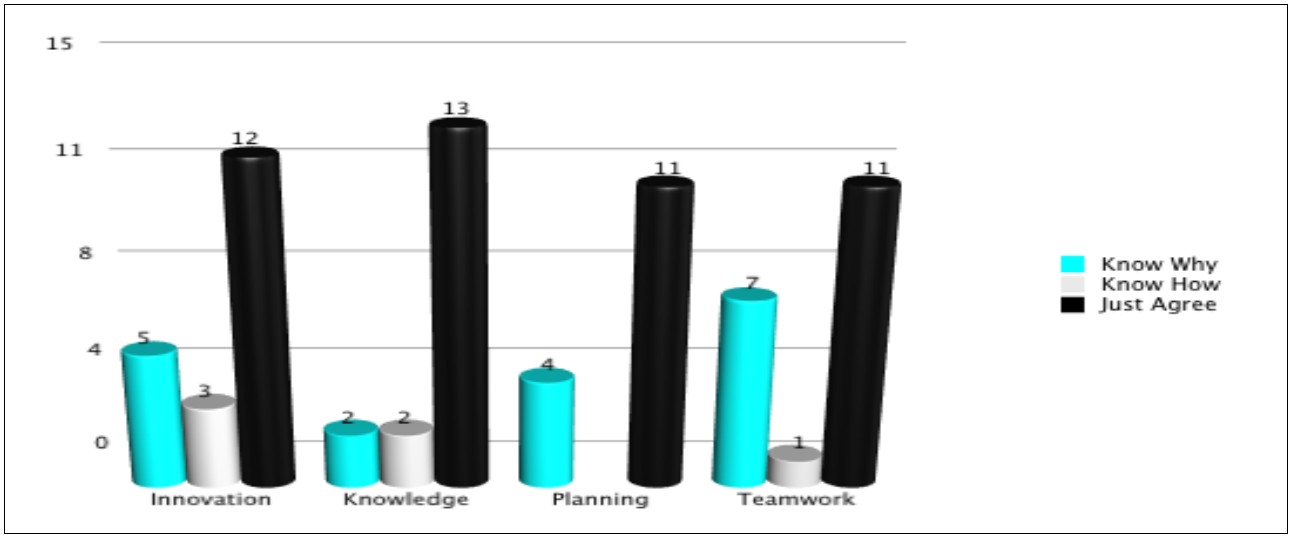


Figure 4.7: Explanatory qualitative study, round two- question two analysis results

Discussion

This round of analysis showed that 'knowledge', 'innovation' 'teamwork' and 'planning' could now be linked with the instance of the concept '**professional work environment**' as a '**requirement to support personal objectives'** of the Qatari workforce to improve motivation and capabilities. Additionally, and in accordance with the analysis of question three, '**self-esteem**' was identified in this round of analysis as an instance of a concept instead of a candidate category, whereas the 'personal objectives' and the 'requirement to achieve personal objectives' were the candidate categories in this round. On the other hand, this round identified '**leadership skills**' and the '**professional work environment**' as the main instances of concepts for the candidate category '**requirements to achieve personal objective**'. This theoretical analysis is illustrated in Table 4.21 and Figure 4.8.

DSR's data	Grounded theory's data	Results of round two qualitative analysis
Constructs	Candidate category	1-Personal objectives 2-Requirements to achieve personal objectives
Model	Instances of concepts	1-Self-esteem 2-Leadership skills -Raise the concept of self-esteem -Establish and support professional work environment 3-Professional work environment
	Memo	Result of the theoretical coding presented in Figure 4.8

Table 4.21: Explanatory qualitative study, round two overall results

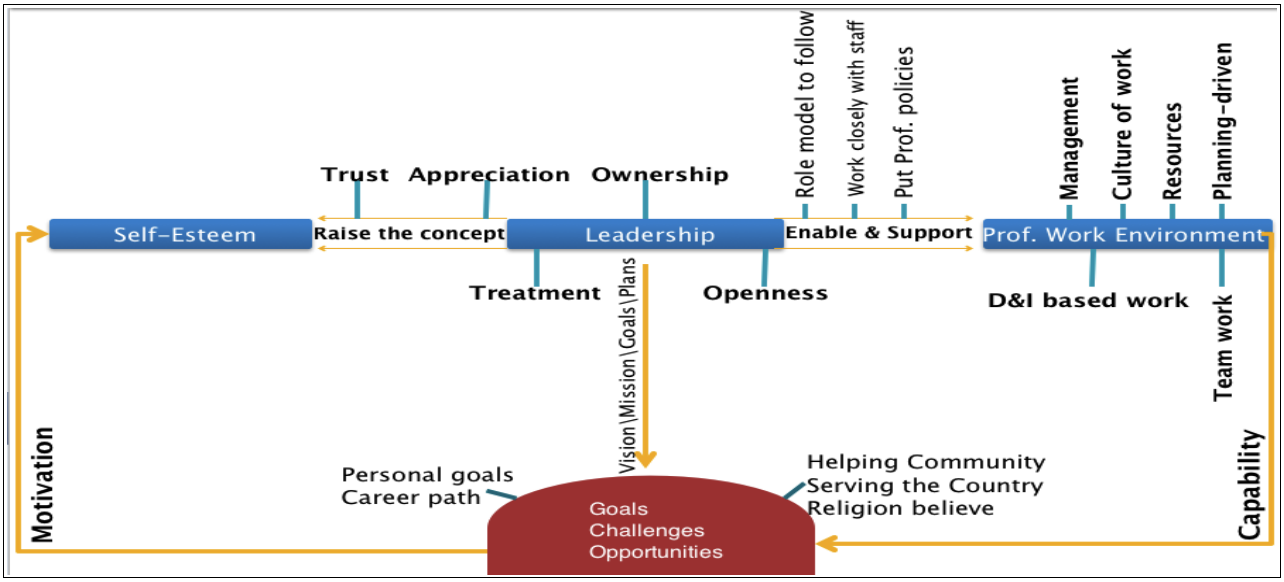


Figure 4.8: Explanatory qualitative study, round two- theoretical coding result

4.4.3.4 Round Three of Data Collection and Analysis

In this round, the theoretical sampling was expanded through conducting interviews with new managers and employees in new organisations. Also, it built its analysis on the existing understanding of the results from the previous two rounds of data collection and analysis. This round was essential in order to achieve two objectives: firstly, to reach 'theoretical saturation' and secondly, to generalise its understanding of the situation with a different sample. In this round, six new organisations were added and new interviews were carried out with nine new employees and twelve new managers.

In round three, we applied a triangulation approach in the analysis. It first analysed participant's answers qualitatively and then analysed them alongside all the answers from previous rounds, using

a descriptive quantitative method. This was necessary to better understand specific aspects of the situation under study. The results for each of the paradigms were separated but compared, so as the weaknesses of one method were "compensated" by the strength of the other (Gray, 2009).

The data collected from round three's answers were qualitatively analysed using the Grounded Theory procedures, using the three main instances of concepts identified from the analysis of the two previous rounds, which were 'self-esteem', 'leadership' and 'professional work environment'. This did not mean that the search for new categories or instances of concepts stopped. However, no new categories or instances of concept were identified in this round. The result of this analysis is described below.

Self-Esteem

Regarding self-esteem, qualitative analysis in this round further described self-esteem as an instance of concept. It showed that participants talked about the importance of self-esteem in relation to improving motivation and capability in two ways. The first way was in the form of factors they wanted others to practise to make them feel satisfied about themselves and achieve their self-esteem. These factors have been called **'self-esteem external factors'**. The second way was in the form of factors which participants linked to themselves. Or in other words, these were achievements of personal goals that made them achieve their self-esteem. These factors have been called **'self-esteem internal factors'**. Table 4.22 and Table 4.23 show the quantitative results of the self-esteem category. They show that (13) out of (23) of the employee group and (14) out of (24) of the manager group referred to internal factors of 'self-esteem' as having an impact on their motivation and capabilities. On the other hand, most employees and managers referred to external factors of 'self-esteem' as having an impact on them. The following tables show participants who mentioned one of the answers categorised under these instances of concept in yellow circles and others who did not, in grey circles.

Instance of concepts	*Employee interviews by numbers*
Self-esteem (external factor)	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 — 22 / 1
Self-esteem (internal factor)	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 — 13 / 10

Table 4.22: Explanatory study, employees' round three 'self-esteem' analysis results

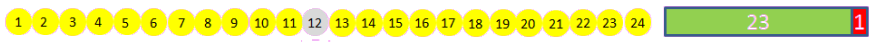
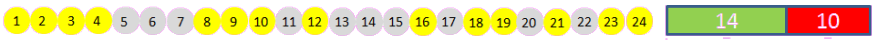
Instance of concepts	*Managers interviews by numbers*
Self-esteem (external factor)	
Self-esteem (internal factor)	

Table 4.23: Explanatory study, managers' round three 'self-esteem' analysis results

Leadership

With regards to 'leadership' instances of concept, this round's qualitative analysis generated a better understanding of how leaders affect self-esteem as personal objective through their '**personal skills**' and also affect it through the professional work environment through their '**professional skills**'. Table 4.24 and Table 4.25 show the leadership quantitative results. The results show that most employees and managers agreed on the importance of the professional and personal skills of managers for improving the motivation and capabilities of the Qatari workforce.

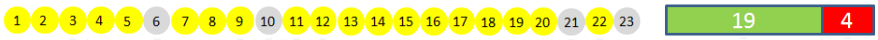
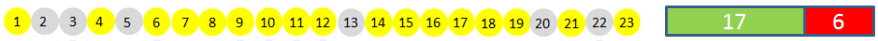
Instance of Concepts	*Employee interviews by numbers*
Professional skills of leadership	
Personal skills/qualities of leadership	

Table 4.24: Explanatory study, employees' round three 'leadership' analysis results

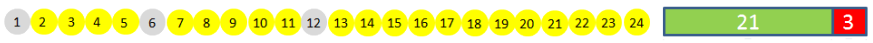
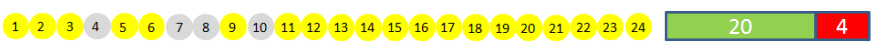
Instance of Concepts	*Managers interviews by numbers*
Professional practices of leadership	
Personal skills/qualities of leadership	

Table 4.25: Explanatory study, managers' round three 'leadership' analysis results

Professional Work Environment

'Professional work environment' in this round was described qualitatively by three characteristics, making a clear connection with the candidate category 'requirements to achieve personal objectives'. These characteristics were first, '**what should I do**', which describes a professional work environment that makes relevant information which workforce need to know about their work and organisation available and easy to access. The second, '**how should I do it**' describes a work

environment that provides necessary tools and resources for the workforce to carry out their work professionally. Lastly, an '**evaluation system**' describes a work environment that uses an evaluation system to professionally assess the work of employees, which then becomes the basis for evaluating achievement, and rewarding accordingly. Table 4.26 and Table 4.27 show that there were agreements between managers and employees with regards to the importance of these three characteristics.

Instance of Concepts	*Employee interviews by numbers*
What should I do?	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 — 17 / 6
How should I do it?	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 — 20 / 3
Evaluation system	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 — 11 / 12

Table 4.26: Explanatory study, employees' round three 'professional work' analysis results

Instance of Concepts	
What should I do?	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 — 20 / 4
How should I do it?	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 — 24
Evaluation system	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 — 13 / 11

Table 4.27: Explanatory study, managers' round three 'professional work' analysis results

4.4.3.5 Results Discussion

The research's preliminary understanding of the situation under study built through the iterative and comparative analysis approach of Grounded Theory concluded that the '**professional work environment**' and the '**leadership**' are '**requirements to achieve a personal objective**' for the Qatari workforce to be motivated and capable at work. This particular part of the research provided insights into what makes the manager's role essential in improving the Qatari workforce's motivation and capabilities. Moreover, the required characteristics of the professional work environment were also identified. In addition, 'self-esteem' was confirmed to be the main 'personal objective' that has two types, '**external**' and '**internal**'. Table 4.28 summarises the explanatory qualitative study results.

DSR's data	Grounded theory's data	Results
Constructs	Category	1-Personal objectives 2-Requirements to achieve objectives
Model	Instances of Concepts	1-Self-esteem - Internal factor influencing self-esteem - External factor influencing self-esteem 2-Leadership skills - Personal skills: affect self-esteem - Professional skills: affect professional work environment 3- Professional work environment - What I should do - How I should do it - Evaluation system
	Memo	Result of the theoretical coding presented in Figure 4.9

Table 4.28: Explanatory qualitative study, round three overall results

This round ended with the last results of the theoretical coding, accommodating all the results of previous rounds, to then become the first version of the theoretical model that describes the factors that make Qatari employees motivated and capable at work. Figure 4.9 shows this theoretical model in which the first factor is a personal objective for employees to achieve. This personal objective, as was identified in the study, was mainly about achieving '**self-esteem**'. The second factor was the requirement to achieve this personal objective, identified as the '**leadership**' and the '**existence of a professional work environment**'. The leader roles in this model are two. The first is raising the concept of self-esteem amongst his/her employees and enabling and supporting the existence of a professional work environment at the workplace. These roles require personal and professional leadership skills to allow managers to understand and communicate their organisation's mission, vision and strategic goals with all employees and to be able to link organisational goals with their personal goals in the form of personal opportunities and challenges to help employees achieve their self-esteem. This theoretical model also shows another requirement for achieving self-esteem, which is the professional work environment. This environment was characterised by some professional elements to transform the workforce's desire for work (motivation) into real contributions and achievements through their (capabilities) being enhanced and evaluated and then rewarded by this professional work environment. This cycle of motivation, then capability and then motivation, demonstrates the essential relationship between motivation and capability to create a sustainable impact on organisations.

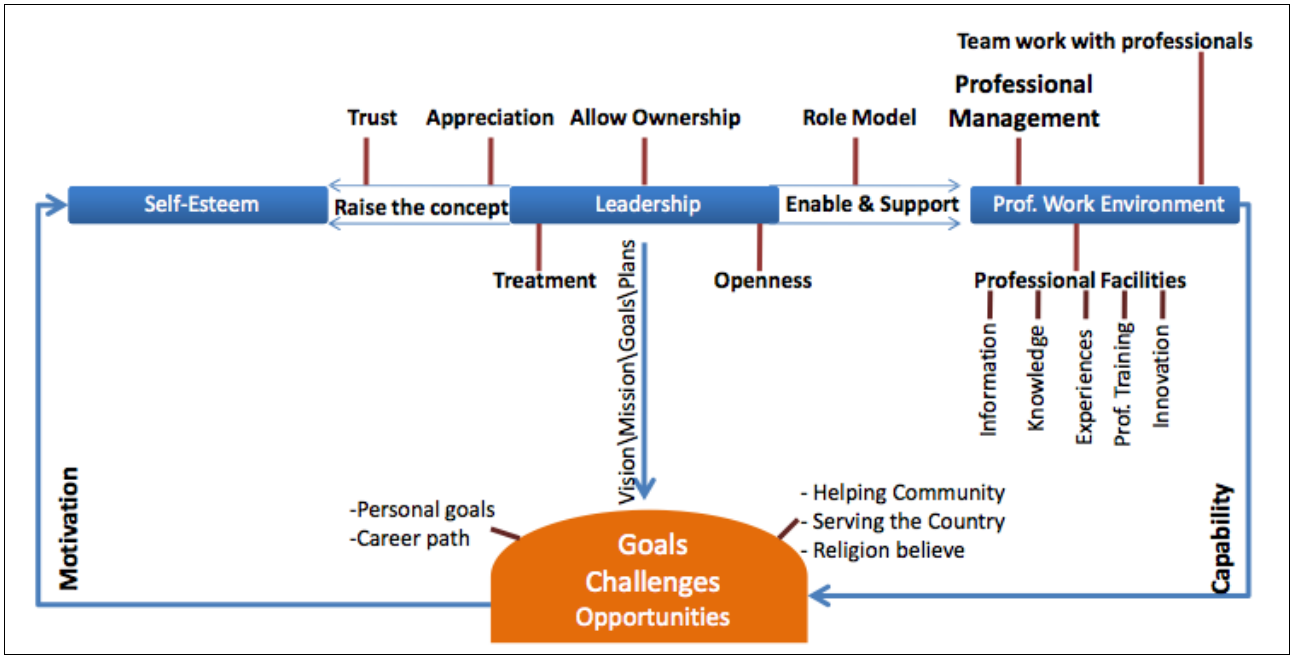


Figure 4.9: Explanatory qualitative study, round three theoretical coding result

4.5 Quantitative Part of the Explanatory Study

This section describes the quantitative part of the explanatory study. It is the quantitative study of the mixed method approach discussed in section 3.5.1 which aimed to generate different aspects of the understanding that complement the qualitative study.

This quantitative study specifically investigated the relations between the discovered instances of concepts and candidate categories in order to identify the social subsystem functions required to improve Qatari workforce's motivation and capabilities. The identification of the social functions was essential for describing the fit relation required for the transformation process in the next phase which aimed to identify the IT functions required for it to perform its role in the STS to improve Qatari workforce's motivation and capabilities. In addition, this study was carried out to attain two aspects of validity, as described in Creswell (2009):

1- The validity of data collected.

2- The accuracy of the analysis.

4.5.1 Process of Inquiry

Two strategies were used in this part for complementing the research's understanding as well as validating its results. These strategies were:

- Respondent validation
- Member checking

Respondent validation is the process of taking back the raw data to the participants to check accuracy (Seale, 1999). This strategy was necessary because in this phase, interviews were not tape recorded for reasons mentioned earlier.

Member checking is the process of taking findings to participants for accuracy check (Creswell, 2009). It also involves asking participants about the themes used to code their answers (Creswell, 2009).

In this round, only twenty three participants (eight employees and fifteen managers) who were interviewed in the previous rounds of data collection were visited again for respondent validation and member checking. Other participants were either contacted but did not reply or contacted and were not available.

In these interviews, all the answers of the participants, including the instances of concepts assigned to them, were presented in one instrument (See Appendix M). Then, participants were asked to check and validate them, assign a letter (M), (C) or (B) for each of their answers in question one (Q1) to indicate its specific impact on motivation (M), capabilities (C) or both (B), and lastly, rank them based on their importance in affecting the Qatari workforce, using numbers in which 'one' (1) represents the highest importance.

4.5.2 Quantitative Data Analysis

In this analysis, the focus was on the answers that were ranked first, second and third in importance to Qatari workforce's motivation and capabilities. Then these answers were categorised based on the instances of concept they represented (self-esteem, leadership, professional work environment). Lastly, they were grouped based on their specific impact on motivation (M) or capabilities (C) or both (B).

The grouping based on (M,C and B) was important to find out if the theoretical coding results in

Figure 4.9 gave an accurate account of the impact of each instance of concept. In Figure 4.9 '**self-esteem**' has its impact on motivation (**M**) because it represents their personal objective, which fuels their motivation to achieve it. The '**professional work environment**' has its impact on capabilities (**C**) because it equips employees with the capabilities needed to achieve their work objective. 'Leadership' has it impact on both (**B**)- motivation through personal skills to raise self-esteem and capabilities through the work environment, to enable and support it to become professional.

Results of the analysis show that (5) out of the total twenty three participants ranked answers that represented '**self-esteem**' instances of concept as the most important factor, in which (4) of them put it in the motivation (M) group. On the other hand, (10) ranked these answers as second or third in importance and all of them put in the both (B) group. This brought the total of participants who ranked self-esteem as first, second and third to (15). Table 4.29 shows this result in which (60%) of the participants selected '**self-esteem**' as the most important factor impacting motivation (M) specifically or both motivation and capability generally.

Instance of concept Self-esteem	Impact	Importance	Total No. of agreements
Rank (First)	→ (M)	4	14 (60%)
Rank (Second or Third)	→ (B)	10	

Table 4.29: Explanatory quantitative study, 'self-esteem' ranking results

This result showed that '**self-esteem**' not only had a relation with the candidate category '**personal objective**' – as was thought before, but also with the candidate category '**requirement to support personal objective**'. This relationship became clearer after this analysis was completed.

The analysis of the other two instances of concepts which were 'leadership' and 'professional work environment', showed that (52%) ranked their answers first, second or third in their importance, only when they put them in the both (B) group. This meant that about half of the participants believed that the 'professional work environment' had a relation with the candidate category '**personal objective**' as well as the candidate category '**requirement to support personal objective**', which was also unexpected. On the other hand, the 'leadership' result supported its relationship with both motivation and capabilities.

Instance of concept			Total No. of agreements
	Impact	Importance (First or Second or Third)	
Leadership	→ (B)	12	12 (52%)
Professional work environment	→ (B)	12	12 (52%)

Table 4.30: Explanatory quantitative study, 'leadership','work environment' ranking results

These results show that these three instances of concepts complemented one another in the **social subsystem functions** to improve the workforce's motivation and capabilities. In the following, these social functions were specifically described with the help of understanding from the round three theoretical coding results in Figure 4.9 and the results of the quantitative analysis. In these functions, the '**personal dimension**' was used to denote the relation between '**self-esteem**' and the '**personal objective**' whereas '**work dimension**' was used to denote the relation between '**self-esteem**' and the '**requirement to support personal objective**'.

Social subsystem function (Number One)

Manager [raises] **personal dimension** (internal motivation) [to] =

Positively affect employee's personal objective (self-esteem)

Social subsystem function (Number Two)

Manager [satisfies] **work dimension** (external motivation) [to]=

Positively affect personal objective (self-esteem)

The above two social subsystem functions (**Number One** and **Number Two**) show the important role of managers as **'leaders'**, whose personal leadership skills affect '**the internal motivation'** by raising employees' own desire to achieve self-esteem. Leadership professional skills also affect '**external motivation**' by satisfying self-esteem through the work.

Social subsystem function (Number three)

Manager [enables and support] the **work dimension** [to]=

Establish a **professional work environment** [that provides]

(What to do) (How to do it) (Evaluation system)

The above social subsystem functions (**Number Three**) shows the important role of both manager as '**leader**' and the '**professional work environment**' on the work dimension, that affects self-esteem.

4.5.3 Discussion

The results of the quantitative study complemented the results of the qualitative study, further explaining the relationship between the two categories and their instances of concepts in the social functions to improve Qatari workforce's motivation and capabilities. However, in order to confirm these relations which were described in the three social functions, participants' answers and analysis from round three of the data collection were qualitatively analysed for a second time, but this time the analysis was based on these new relations. Round three's answers were selected for this analysis because they were collected based on the latest understanding of the case study and represented both groups of participants (employees and managers). Table 4.31 presents the table used to qualitatively analyse round three answers.

Role						
Instance of concept	Dimension		Instance of concept	Dimension	Participants' Answers	Int. No.

Table 4.31: Explanatory study, instances of concept relations analysis table

The results of this analysis (See Appendix N) supported these relations, showing that the personal objective 'self-esteem' was linked with the 'requirements to support personal objective' by the personal dimension through the leader's role of 'raising' internal motivation. For example (Case M26) in answering question one referred to the: "Manager's way of treatment with his/her

employees"; (Case E19) spoke of a "Leader who communicates regularly with his staff"; and (Case E21) said "Leaders know skills to treat employee". On the other hand, 'self-esteem' was linked with the 'requirements to support personal objective' by work dimension through the leader's role of 'satisfying' external motivation. For example (Case M19) said in his answer of question one: "Manager gives employees responsibilities"; (Case E8) said in his answer of question one: "Manager puts trust in me and gives me authority"; (Case M26) said "Managers talk with employees about the work and motivate them".

The results of this analysis also show that 'self-esteem' was linked with the 'professional work environment' by the work dimension. It also identified the role of the leader in 'enabling' and 'supporting' this relationship. For example, (Case M8) emphasised the role of an "Evaluation system (reward and punishment)"; (Case E19) underlined the importance of having: "Plan (career path-challenge)" for every employee; (Case E10) requested an approach to meet employees needs for "how [to] get the experience (I do not know who to ask)". These answers were coded as a work dimension of the instance of concept, 'professional work environment' while, the following cases articulated the role of leader in allowing and supporting these professional work characteristics, such as (Case M2) who called for management to give attention to "training and education" in the workplace. Also, (Case E5) stressed the role of managers with regards "vision, mission and goals and planning" and (Case M10) linked managers with the proper establishment and utilisation of an "evaluation system [which is] credible and its results [are] taken seriously".

4.6 Chapter Summary

This chapter has discussed the ways in which the Qatari social subsystem affected the human workforce; it then identified the social functions of this system. This was achieved by specifically identifying the needs of the social subsystem that the IT tool would be required to fulfil to improve the Qatari workforce's motivation and capabilities. This chapter concludes with perspectives from the people of the situation about the 'served system', as called by CLIC. These perspectives illustrate different people's views about the existing problems they face that prevent them from being motivated and capable, as well as their ideas and solution on how to overcome these issues, as shown in Figure 4.10.

Figure 4.10 is a theoretical representation of the needs of the Qatari social subsystem to improve the workforce's motivation and capabilities. It places the leader at the centre of the model due to his/her role in this model that affects the other two main factors. The leader in this model is an enabler who enables and supports the establishment of a professional work environment in the organisation, as well as raising the concept of achieving self-esteem amongst his/her employees (Alsalemi & Mayhew, 2010). In addition, the leader needs to be able to convey the organisation's mission, vision and strategic goals to employees and also to discuss them with employees so they become part of their personal goals (Alsalemi & Mayhew, 2010). This can be achieved when these work goals become personal goals, career opportunities or life challenges. The importance of a professional work environment is recognised within this model and the understanding that alongside the importance of factors like leadership and achieving self-esteem for achieving motivation and capability, a need for a professional work environment is critical. This professional work environment is characterised by several professional aspects such as information availability and professional guidance and development (Alsalemi & Mayhew, 2010). Also, the professional work environment is very important in transforming the workforce's motivation into real contributions at work and hence achievements which are evaluated and then recognised and rewarded (Alsalemi & Mayhew, 2010). The recognition of employee's achievements fuels employee's self-esteem and empowers them to achieve more at work.

Figure 4.10: The theoretical model (Alsalemi & Mayhew, 2010)

Also in this phase, using a mix methods strategy helped in supporting and further describing the findings. So, while the qualitative study was essential to identify the main factors, describe them and define their relations, the quantitative study helped in discovering what participants thought about these factors from two dimensions: the personal dimension and the work dimension. Both studies emphasised the importance of self-esteem as the personal objective of the workforce and leadership and professional work environment as requirements to achieve this personal objective at work.

The results of this chapter can be summarised in the following three points:

1- The needs of the social subsystem to improve Qatari workforce's motivation and capabilities were understood by:
- Identifying the main factors affecting their motivation and capabilities and classifying them as: self-esteem as a personal objective, professional work environment and leadership as supporting factors, or in other words, requirement for achieving the personal goal.

2- The attainment of joint optimisation was required for the second phase, to identify the IT correlated functions that work with the social subsystem to establish the STS to improve the Qatari workforce's motivation and capabilities. This situation can be described in functions that describe the requirements of the social subsystem to improve motivation and capabilities, which can be classified into two groups, the personal and work dimensions:
A-Personal dimension: in this dimension, the social functions focus on self-esteem and employee's personal objectives. This function was described in social subsystem function **number one**, which includes the following social subsystem requirements to improve motivation and capabilities:

- Self-esteem (internal motivation): personal goals that make employees feels good about themselves as a result of achieving those goals.
- Manager (personal skills): skills that make a manager acting in a way that makes the employees feel good about themselves.

B-Work dimension: in this dimension the social functions focus on self-esteem and the requirements to support personal objectives. This function were described in social subsystem function **number two** and **number three**, which described the following social subsystem requirements to improve motivation and capabilities:

- Self-esteem (external motivation): work goals that make employees feel good about themselves as a result of achieving those goals.
- Manager (professional work skills): skills that make the manager acting in a way that makes the employees feel good about the work environment.
- Professional work environment (what to do): information that employees need to work professionally.
- Professional work environment (how to do): knowledge, experience and ideas that employees carry out work professionally.
- Professional work environment (evaluation system): a system that allows managers to professionally and fairly evaluate, recognise and reward employees' achievements at work.

The next chapter will demonstrate the research approach that was adopted to transform the requirements of the social subsystem functions into IT functions to improve Qatari workforce's motivation and capabilities.

5.Transforming the Social Subsystem Functions into IT Functions

5.1 Introduction

This chapter continues to address **objective two** of the research design; it describes **phase two** of the process of applying the proposed approach, illustrated in Figure 2.5. This phase aimed to transform the identified social subsystem functions into IT functions. This transformation was then the basis for developing the IT tool, which is the focus of the next chapter. Table 5.1 summarises phase two objective and process.

Research Aim: Can IT itself help organisations improve their workforce's motivation and capabilities.	
Phase two objective	Phase two process of the study
Transforming the social subsystem functions into IT functions	This study answers the question: how can IT help improve workforce motivation and capabilities?
Method	1-Finding out about the processes that form the basis for the identified social subsystem functions.
Design Science Research (DSR)	2-Studying how IT can perform these processes.
Outcome	3-Identifying the IT functions.
Methods (IT functions)	

Table 5.1: Overview of phase two objective, method and process

5.2 Study Methodology

This phase aimed to transform the theoretical understanding of the previous phase into IT functions. This matter was studied in the literature review chapter in which it was established that for transformation to occur, the output from studying the needs of the social subsystem becomes the functions that can be performed by the IT tool. This process was guided by the Design Science Research (DSR) described in the Research Methodology chapter in Section 3.4.2.

In the pervious chapter, DSR and Grounded Theory methodology were used to attain the joint optimisation that a social subsystem needs in order to work with the technical subsystem in an optimised way to improve the Qatari workforce's motivation and capabilities. In this phase, DSR and mixed methods were used to identify the correlated IT functions that work with the identified social subsystem's functions in this socio-technical system (STS). To identify the correlated IT functions, two main activities were carried out, based on conceptual statement Number Seven (**CS7**), which were:

1- Studying the processes of both subsystems to find the correlated processes that do not negatively affect each other, and together achieve the FIT objective.

2- Finding out how IT can become a mediator between the social and the technical subsystem.

This chapter just deals with the first activity of the (**CS7**), while the other activity is dealt with in the next chapter when the technical requirements will be outlined along with the study of how IT can become the mediator between the social and technical subsystems. In this chapter the aim is to find out about the social subsystem processes that the IT functions need to perform in order to meet the social subsystem requirements to improve motivation and capabilities. To do so, a qualitative study was used to find out about these processes and the quantitative study was used to figure out how IT can perform these processes.

Table 5.2 shows the research's strategy of inquiry which consisted of a mixed methods using structured interviews for collecting data from participants who were involved in the round three of data collection in phase one. The selection of this sample was due to the diversity of this group, which included managers and employees working in different types of governmental organisations, and also to build on the understanding participants already had about this research's objective. Only fifteen of them accepted to participate in these interviews of which seven were employees and eight were managers.

Objective		Details
Study objective Transforming the social subsystem functions into IT functions.	Sample	Phase one (round three) participants Number of employees: 7 Number of managers: 8
	Methods	Structured interviews
	Mixing design	Qualitative (Questionnaire) → (Data collection) + Quantitative (Questionnaire)→ (Data collection) → Analysis → Results

Table 5.2: Phase two study, overview of the strategy of inquiry

A new data collection instrument was used in this phase which included two sections of questions, the first consisted of qualitative questions (see Appendix (O)) and the second consisted of quantitative questions (see Appendix (P)). The aim of mixing methods in this phase was complementary in which the two methods were used to give more meaning to understand how to transform the social subsystem functions into IT functions. On the other hand, the strategy of mixing methods was to integrate the results of the two methods and interpret them together. These questions and their answers with the analysis are presented in the following two sections.

5.3 Qualitative Analysis

This section describes the analysis of the answers of the first part of the instrument, which consisted of three qualitative questions. These questions aimed to discover the processes in the social subsystem functions identified in the previous phase (Chapter Four).

To discover these processes, the first three questions of the data collection instrument asked participants to describe the social subsystem functions using examples. These social functions were presented to participants in the instrument with three visual relationships, depicting their requirements, with the aim of improving Qatari workforce's motivation and capabilities. Each relation represented one of the three questions: the first illustrated the requirement of self-esteem; the second illustrated the requirement of leadership; the third illustrated the requirement of the professional work environment.

Participants were asked to describe these relations with examples in order to find out about the processes that underpinned these functions. So, the researcher asked participants to give examples of each of these relations that affect the capabilities and motivation of the workforce. These examples were the perceived application of these processes in their workplace. Hence they were used to find out about these processes in terms of what they are doing in the workplace that make a workforce motivated and capable. These examples were first coded in themes, then analysed descriptively, to find out the most frequent themes.

5.3.1 Analysis of Question One

Table 5.3 shows the results of the analysis of question one (the white area of the table). This question depicts the relation between self-esteem and the two requirements to improve Qatari workforce's motivation and capabilities (the black area of the table). Results show that the most frequent example for the internal motivation requirement was the theme of 'achieving personal goal' and 'personal ambition' while, the most frequent examples of the external motivation requirement was the theme of 'appreciation', 'recognition', and 'encouragement' from others.

Internal motivation		->Employee<-	External motivation	
Coded example (Theme)	Count		Coded example (Theme)	Count
Personal goals and personal ambitions	6		Appreciation, recognition, and encouragement	8
Answers in different themes	5		Working with successful people with manager as a role model in professional work environment	5
			Work challenges	3
			Answers in different themes	2

Table 5.3: Phase two qualitative study, question one results

These results were used to incorporate processes to the researcher's understanding of the social requirements of **self-esteem** to improve workforce's motivation and capabilities, as follows:

1-Manager discusses and understands with his/her employees their personal goals and ambitions.
2-Manager recognises, appreciates and makes everybody in the organisation aware of employees' achievements at work.

5.3.2 Analysis of Question Two

Table 5.4 shows the results of the analysis of question two. This question explored the relation between **leadership** and its two requirements to improve Qatari workforce's motivation and capabilities. Results showed that most participants described the relationship between managers and their employees with examples that illustrated the manager's actions as inspiring, encouraging and motivating and at the same time directing, guiding and supporting them to achieve work objectives. On the other hand, the relationship between managers and the work environment was mostly illustrated with examples under the theme that viewed managers as 'driving the work environment towards a competitive one' and 'evaluating employees works and rewarding them based on this evaluation'.

Employees		<-Leader->	Work Environment	
Coded example (Themes)	Count		Coded example (Themes)	Count
Inspiring, encouraging and motivating	4		Competitive and rewarding evaluation-based work environment	6
Directing, guiding and supporting	4		Planning-driven and organised work environment	4
Communicating regularly	3		Answers in different themes	6
Leader as role model	3			
Answers in different themes	4			

Table 5.4: Phase two qualitative study, question two results

These results were used to incorporate processes to the researcher's understanding of the social requirements of **leadership** to improve the workforce's motivation and capabilities as follows:

- Manager inspires and guides employees to work in an environment that has an evaluation system that encourages competition between employees and rewards them when they achieve work goals.

5.3.3 Analysis of Question Three

Table 5.5 shows the results of the analysis of question three. This question focused on the relation between the **professional work environment** and its three requirements to improve Qatari workforce's motivation and capabilities. Results show that the most frequent example for the '**what**

to do' requirement was the theme of making their work's objectives clear through 'job descriptions'. The most frequent example of the '**How to do it'** requirement was the theme of 'providing guidance' to perform the work professionally. Lastly, the most frequent example of the **'evaluation system'** requirement was the theme of 'evaluating work outcomes objectively'.

Professional Work Environment					
What to do		How to do it		Evaluation system	
Coded example (Themes)	Count	Coded example (Themes)	Count	Coded example (Themes)	Count
Job description	10	Guidance	6	Objective evaluation rather than subjective	7
Work goals	5	Procedures of doing work in the right way	3	Clear evaluation criteria	3
		Experience and knowledge sharing	2	Regular	2
				Involving employees	3

Table 5.5: Phase two qualitative study, question three results

These results were used to incorporate processes to the researcher's understanding of the social requirements of the **professional work environment** to improve workforce motivation and capabilities, as follows:

- The work environment allows every employee to know his/her work objectives, receive guidance and his or her work is evaluated objectively.

5.3.4 Discussion

The analysis of the qualitative part of the instrument, suggested that participants, through their examples, linked the manager, the work environment and self-esteem in four main processes which constituted the preliminary transformation of the IT functions. Table 5.6 shows these four processes that the IT functions need to perform in order to meet the social subsystem requirements to improve workforce motivation and capabilities. In the next section the analysis of the quantitative part of this phase continues

Processes	Processes to be performed by IT functions
Self-esteem process	Employees have personal goals and ambitions with the help of their managers.
Information process	Information about the work available to all employees through the work environment.
Professional assistant process	Guidance and support are provided to assist employees through the work environment and the manager.
Evaluation process	Inspirations, recognitions and rewards to employees who achieve work objectives through an applied evaluation system that manager uses at work.

Table 5.6: Phase two qualitative study, the preliminary transformation

5.4 Quantitative Analysis

In this part we analysed the second section of the data collection instrument. They were asked four quantitative questions about the same three social subsystem functions. Each question was asked participants to select one or more requirements from a list of requirements, which had been produced by all the participants who participated in the three rounds of data collection of phase one. The question was: “the following table represents answers from participants explaining how (self-esteem, leadership, and professional work environment) affects employee's capabilities and motivation, choose those that you most agree with”.

This approach of asking participants to select specific requirements from these lists was chosen in order to find out about the specific actions that IT functions need to perform, thereby getting the required understanding of how IT can perform the above social subsystem processes. In this analysis, any requirement that was selected by more than (65%) or ten participants was considered essential. However, if none of the requirements attained this percentage, the one that scored highest was considered essential.

In addition, one last question was asked in this part which was to get their overall agreement or disagreement with the theoretical model that represented the research's results with regards to the needs of the social subsystem to improve Qatari workforce motivation and capability. This question was asked in order to get feedback about the research's theoretical findings. Appendix (P) illustrates the questions in this section in which illustration number (5) in this Appendix shows the instrument used to collect the data for both sections.

5.4.1 Analysis of Question Four

Table 5.7 presents the results of the analysis of question four. It shows that the most popular **external motivation requirement** was a 'successful role model' that makes them motivated to work to achieve their self-esteem. In addition, the most popular **internal motivation requirement** was 'the personal objective to achieve the self-esteem'.

Self-esteem	Requirements to improve Qatari motivation and capabilities	Count
External motivation	I want to be like successful people	12
	I want to feel that I am important and my work is appreciated	9
	Challenging job	10
	Feeling that I have value	9
Internal motivation	I want to achieve my self-esteem	14
	Giving something back to community	9
	To have family and good life	9

Table 5.7: Phase two quantitative study, question four results

5.4.2 Analysis of Question Five

Table 5.8 shows the results of the analysis of question five. It shows that the most selected **leadership personal skill requirement** were the 'communication skill' and 'motivated'. This result supported the theoretical model, which recognised the essential role of the manager as communicating with employees to raise and satisfy their self-esteem. On the other hand, the most selected **professional leadership skill requirements** were allowing 'open communication', 'accepting opinions', 'share decision making' and 'collaborated'.

These results indicate that most participants saw the manager's communicative actions as one of the main requirements to improve the Qatari workforce's motivation and capabilities. Also, participants perceived that the manager's actions to create an open communication environment in which he or she can easily and regularly communicate with employees, hear their opinions and share decision making processes are main requirements to improve Qatari workforce's motivation and capabilities.

Adding the results of this question to the result of question four gave a more descriptive understanding of how IT can perform the process of raising self-esteem through providing an IT function for managers to communicate with their employees, to raise their self-esteem and to give them examples of successful role models who have achieved things in their lives. In addition, this IT function should allow managers to hear employees' opinions and make use of them in their decision making process. This result also resonated with some participants' answers in phase one who wanted their manager to regularly communicate with them, something which did not happen due to the busy schedule managers had at work, preventing them from talking and listening to their employees. Based on this understanding and the previous understanding of the **self-esteem process** in the qualitative part, the first correlated IT function was **the communication IT function.** This IT function allows for open and easy communication between managers and their employees for the purpose of raising and enhancing employees' self-esteem.

Leadership	Requirements to improve Qatari motivation and capabilities	Count
Personal skills	Communication Skills	8
	Motivated	8
Professional skills	Open communication	10
	Accept Opinions	12
	Leadership Skill	9
	Experienced leadership	9
	Sharing decision making	11
	Putting the right person in the right position	11
	Collaborated	10

Table 5.8: Phase two quantitative study, question five results

5.4.3 Analysis of Question Six

Table 5.9 shows the results of the analysis of question six. It shows that the most selected '**what to do'** requirements were making employee's 'work goals' clear, 'knowledge' as a work culture and 'linking training with the career path'.

Professional work environment	Requirements to improve Qatari motivation and capabilities	Count
What to do	Duties of employees	9
	Goals for employees	11
	Goals of Organisation	8
	Organisation structure	8
	Systems	8
	Knowledge	11
	Planning	8
	Innovation	7
	Link training with career path	12
	Training opportunities	10

Table 5.9: Phase two quantitative study, question six results (what to do requirements)

Table 5.10 shows the results of the analysis of '**how to do'** requirements. It shows that the most selected requirements was a tool to enhance 'knowledge' and a work culture where 'collaboration between employees' would be enabled.

Professional work environment	Requirements to improve Qatari motivation and capabilities	Count
How to do	Experience Exchange	7
	Learning by doing	7
	On job training	7
	Collaboration between employees	10
	Periodical meetings	7
	Knowledge	11
	Consultation service	8
	Knowledge team	8
	Sharing knowledge	8
	Idea and problem sharing	7

Table 5.10: Phase two quantitative study, question six results (how to do requirements)

Table 5.11 shows the results of the analysis of the '**evaluation'** requirements. It shows that the most selected requirement were a functionality that evaluates employees objectively 'based on their performance' as well as a 'reward system' to honour those who achieve the required performance at work.

Professional work environment	Requirements to improve Qatari motivation and capabilities	Count
Evaluation	Evaluation based on performance	8
	Reward system	9

Table 5.11: Phase two quantitative study, question six results (evaluation requirements)

The analysis of the three professional work environment requirements specifically pointed to the requirements which should be provided by the work environment to improve Qatari workforce's motivation and capabilities. Based on this understanding and the previous understanding of the information process in the qualitative part, the second correlated IT function was identified as **the project management IT function.** This IT function makes information about the organisation and the work available to all employees. It makes them aware of their work objectives so they can think and plan for what they need to know and learn to achieve these objectives. Also, results of this part led to identifying the third correlated IT function based on the **professional assistant process** which was **the guidance IT function.** This IT function allows knowledge sharing and team working so employees can share ideas and experience. This function should help employees to know how to accomplish the work objectives assigned to them professionally in order to be able to achieve them. Lastly, the fourth correlated IT function which was identified based on the results of this quantitative part, and the **evaluation process** identified in the qualitative part, was **the evaluation IT function.** This IT function establishes an evaluation system for assessing employees' works objectively as the basis for recognising employees' work accomplishments and rewarding them in order to make them feel esteemed or honoured when they achieve their goals.

5.4.4 Analysis of Question Seven

Question seven asked the participants to give their view on the effectiveness of the theoretical model which was developed in the previous phase to understand what motivates the Qatari workforce and develops their capabilities. This question was asked in order to get feedback about

the first research's finding. Table 5.12 shows the result of this question which indicates high confidence regarding the effectiveness of this model in improving the Qatari workforce's motivation and capabilities from the participants' point of view.

Question		Managers		Employees		Total	
Effectiveness of the theoretical model in achieving Qatari workforce's motivation and capabilities	Agree		7		7		14
	Disagree		0		1		1

Table 5.12: Phase two quantitative study, question seven results

5.4.5 Summary

To end this section, Table 5.13 presents the four identified IT functions based on the transformation process that occurred in this phase.

IT function	**Function description**
Communication IT function	An IT function that allows an open and easy communication between managers and their employees for the purpose of raising and satisfying employees' self-esteem.
Project management IT function	An IT function that makes information about the organisation and work available to all employees. It makes them aware of their work objectives at work so they can think and plan for what they need to know and learn to achieve these objectives.
Guidance and development IT function	This IT function allows knowledge sharing and team working so employees together share ideas and experience. This function should help employees to know how to accomplish the work objectives assigned to them professionally in order to be able to achieve them.
Evaluation IT function	An IT function that establishes an evaluation system for assessing employees' works objectively as the basis for recognising employees' work accomplishments and rewarding them in order to make them feel the esteem or the honour when they achieve their goals.

Table 5.13: Phase two quantitative study, transformation results

5.5 Chapter Summary

The results of this section completed the transformation of the social subsystem functions into IT functions. The results of question one and two (in the qualitative section) and questions four and five (in the quantitative section) allowed the social subsystem function (number one) and (number two) to be transformed into a **communication IT function**. The result of questions three (in the qualitative section) and question six (in the quantitative section) allowed the social subsystem function (number three) to be transformed into a **project management IT function, guidance and development IT function and evaluation IT function.** The result of this transformation can be summarised as follows, describing the IT tool whose development will be described in the next chapter (the third phase).

1. **IT Tool (personal objective) = requirements to achieve the personal objective**
   1.1 Personal objective = to achieve self-esteem
   1.2 Requirements to achieve the personal objective = manager + functions
      1.2.1 Manager = personal and professional leadership skills
      1.2.2 Functions = IT functions work with social functions to establish an STS

The left side of the expression **(1)** describes the IT tool as focusing on achieving the personal objective of employees, which in this case study is achieving self-esteem. The right side of the expression **(1)** describes the requirement to achieve this personal objective through a manager who utilises IT functions in the workplace. The characteristics or qualities managers need to have and the functions they need to adopt and practise to improve Qatari workforce's motivation and capabilities were studied first in Chapter Four and then their transformation into IT functions were described in this chapter. Hence, the IT tools needed to improve Qatari workforce's motivation and capabilities are:

- IT Tool (raising and satisfying self-esteem) = manager + **communication function**
- IT Tool (to have a goal at work) = manager + **project management function**
- IT Tool (to achieve the goal at work) = manager + **guidance and development function**
- IT Tool (recognition of achievement) = manager + **evaluation function**

At the end of this phase, the socio-technical fit between the social and the technical subsystems to achieve the FIT objective can be clearly articulated and presented in Figure 5.1.

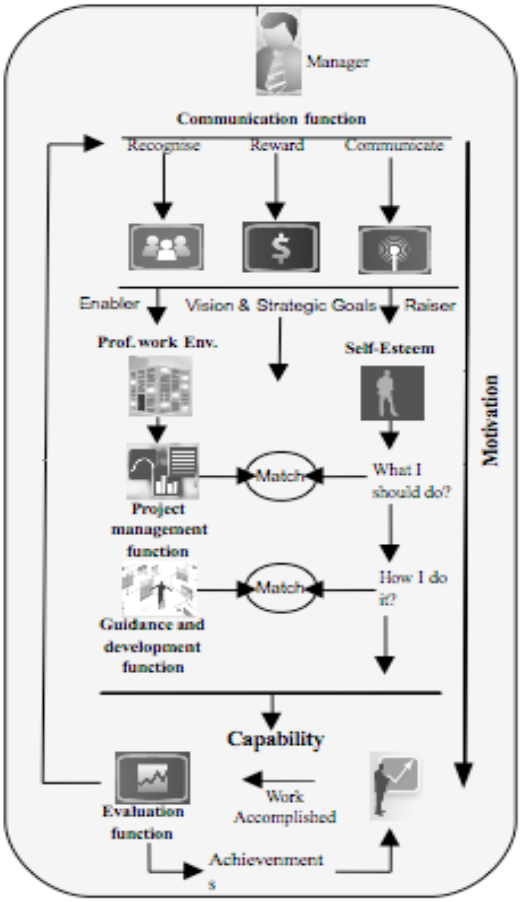


Figure 5.1: The socio-technical fit relation

In this socio-technical fit relation, the manager is the main actor who can affect employees' self-esteem through the IT communication function that allows easy communication with employees in ways that can raise and satisfy their self-esteem (Alsalemi & Mayhew, 2010). This in turn needs a professional work environment that provides information to employees about their work objectives as well as all other information that they need, such as the organisation's vision, mission, strategic goals, policies and procedures, through the project management IT function (Alsalemi & Mayhew, 2010). But because not all the workforce have the capabilities to achieve these work objectives, the work environment, using the guidance and development IT function, provides them with the guidance and professional development, utilising knowledge, ideas and available experienced people in the organisation (Alsalemi & Mayhew, 2010). Then after employees become motivated and capable of working on their objectives, the IT evaluation function is used to allow the manager

to assess their work and recognise their achievements (Alsalemi & Mayhew, 2010). The IT communication function is then used again, this time to acknowledge these achievements and publicly recognise and reward the people who achieved them. These functions consequently will establish a competitive work environment in the organisation, fuelling the desire for self-esteem of all employees and hence making them motivated to work hard in a similar capable manner to achieve their self-esteem through their work.

6.Understanding the Technical Subsystem Requirements for Developing the IT Tool

6.1 Introduction

This chapter concludes the work of addressing **objective two** of the research design by presenting the **third phase** of the proposed approach, illustrated in Figure 2.5. The aim of this phase was to understand the needs of the technical subsystem to incorporate into the development of the IT tool to perform the functions identified in the previous chapter (Chapter Five). Table 6.1 shows an overview of this phase.

The aim of this phase, discussed in the research approach in Section 2.5.4, supported by learning from CLIC (phase three) which is to design the serving system. The process that represents people's proposed actions using technology to solve the problems, as the served system, is conceptualised. In this phase, the researcher supported participants to communicate their understanding about the technical solution using prototyping, socio-technical scenarios and pilot study, as will be described in this chapter

<table>
<tr><td colspan="2">Research Aim: Can IT itself help organisations improve their workforce's motivation and capabilities</td></tr>
<tr><td>Phase three objective</td><td>Phase three process of the study</td></tr>
<tr><td>Understanding the technical requirements for developing the IT tool.</td><td rowspan="5">This study answers the question: What are the technical requirements for developing the IT tool to perform its functions?

1-Developing a prototype of the IT tool.
2-Creating a demonstration video (Demo) of a proposed way for utilising the IT tool to improve the workforce's motivation and capabilities in organisations.
3-Discussing the Demo video with Qatari employees in focus groups and Qatari managers in one-to-one interviews.
4-Piloting the IT tool in actual work environments.
5-Redevelop the IT tool based on the identified technical requirements.</td></tr>
<tr><td>Method</td></tr>
<tr><td>Employees and managers were supported to give the technical specifications on how IT could work to achieve its objective using: prototyping, socio-technical scenarios and pilot study.</td></tr>
<tr><td>Outcome</td></tr>
<tr><td>Instantiation (The IT tool)</td></tr>
</table>

Table 6.1: Overview of phase three objective, method and process

6.2 Process of Study

To understand the technical requirements for developing the IT tool based on the proposed approach, the socio-technical practical approaches studied in Chapter Two (Section 2.5.3) was utilised in this phase. These approaches allowed the researcher to understand the technical requirements from a socio-technical perspective to develop the IT tool. These approaches are prototyping and the socio-technical scenario which will be discussed in section 6.3 and the pilot study approach which will be discussed in section 6.4.

6.3 Prototyping and Using the Socio-Technical Scenario

In this phase of the research, a prototype of the IT tool was developed. Then, two focus groups were conducted with employees and three one-to-one interviews with managers, to demonstrate this prototype using a demonstration video. This demonstration video presents participants with socio-technical scenarios of using the pilot IT tool, which is then followed by a discussion. The following section describes the detail of developing the prototype and then in section 6.3.2, the results of discussing this prototype in the focus groups and the interviews will be described and then discussed in section 6.3.3.

6.3.1: The IT Tool Prototype

The prototype was developed to perform the functions identified in the previous chapter in Table 5.13. It was developed in two versions, as illustrated in Figure 6.1 and Figure 6.2. The first version was developed to be used by managers and the second to be used by employees.

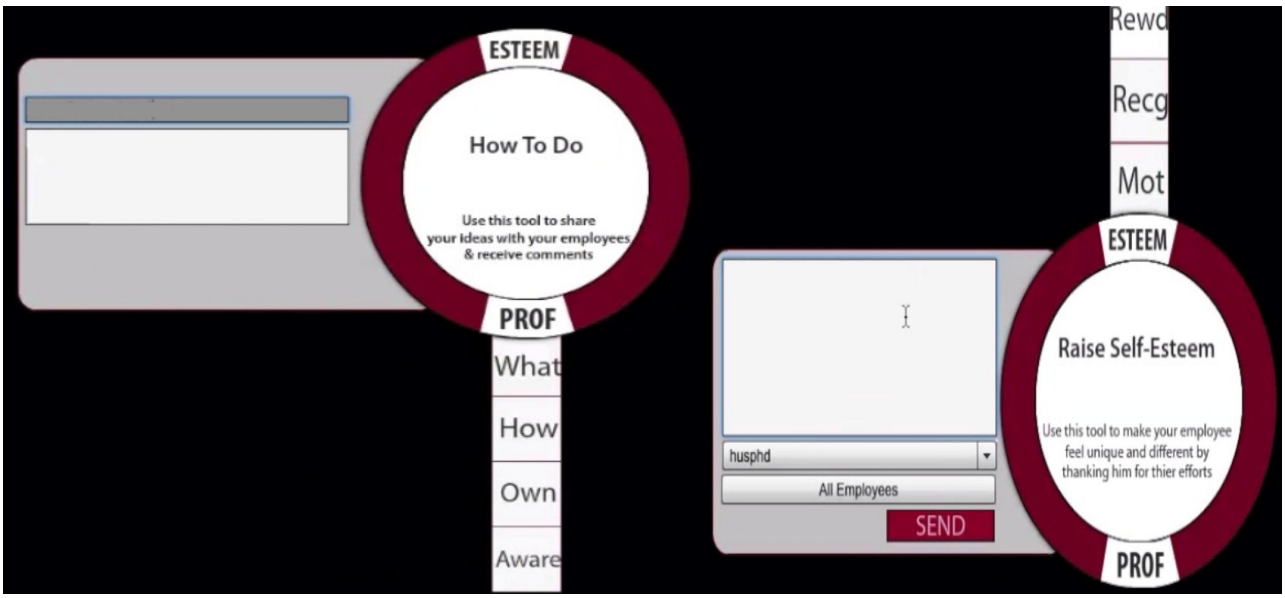


Figure 6.1: Prototype IT tool, the manager's version

The manager version (illustrated in Figure 6.1) has two main menus, each represents one of the leadership role's identified in the theoretical model. The first menu, the '**Esteem menu**', represents the IT functions that aim to support managers in raising the **personal dimension** of 'self-esteem'. Whereas, the second menu, the '**Prof menu**', represents the IT functions that aim to support the manager to adopt and practise the **work dimension** requirement to satisfy 'self-esteem', which is through a professional work environment.

The '**Esteem menu**' has three IT functions. The first aims to raise the concept of self-esteem in employees' mind and heart. This function is called (Mot) -means 'motivation' which represents the '**communication IT function**'. It does this by using an 'external' raiser of self-esteem through the utilisation of the concept of “I want to be like successful people”, described by participants in the analysis of question four in Table 5.7. This function allows a manager to upload videos of successful people who talk about their life or work successes, then send them to their employees (See Appendix U (1) – manager's edition) and (See Appendix V (1) – employee's edition). The other two functions in this menu allow the manager to satisfy employee's self-esteem objective

through the recognition function (Recg) and the reward function (Rewd). The recognition (Recg) function allows the manager to send direct messages to all employees to thank, or appreciate the achievements of a specific employee (See Appendix V (2)). Also, the reward (Rewd) function allows the manager to send a message to all employees with a statement that says that a specific employee has been awarded something for his or her work accomplishment at work (See Appendix V (3)).

Figure 6.2: Prototype IT tool the employee's version

On the other hand, the '**Prof menu**' has four IT functions: the first IT function aims to enable the existence of the social subsystem function of (What) to do to achieve my self-esteem through the work. This represents the '**project management IT function**', which allows the work environment to adopt this required social subsystem function to improve the Qatari workforce's motivation and capabilities by making information about organisation vision, mission, goals, plan, procedures and policy available and easy to access to all employees (See Appendix U (2)). This IT function also

supports the social subsystem operationally by allowing the manager to practise this function in the work environment, because it can be used by the manager to create projects and assign specific tasks to a specific employee, which makes the work objectives of every employee clear to him or her (See manager's version in Appendix U (3)) and (See employee's version in Appendix V (4)). Also this IT function was integrated with another IT function to enable and operationally support the **(**evaluation**)** social subsystem function. This represents the '**evaluation IT function**' which allows the manager to adopt and practise this function by evaluating employee's achievement of tasks immediately after it finishes (See manager's version in Appendix U (4)) and (See employee's version in Appendix V (5)).

The second function of the '**Prof menu**' aims to enable the existence of the social subsystem function of (How) to achieve my work objective professionally to get recognition and reward, to increase my self-esteem. This represents the '**guidance and development IT function**' which allows the work environment to adopt this social function by making the guidance and professional development of less experienced employees actually embedded in everyday work through the IT tool. This happens by providing a list of expert names who are available in the organisation, plans of on the job training courses, information and knowledge resources subscribed by the organisation (such as periodicals, journals, magazines, online self-learning services) easy to find. This information, when it is available and easy to access by all employees, will enable guidance and professional development to be an integral part of the work environment. Also, this IT function supports this social function operationally by allowing managers and other expert people in the organisation to practise this function in the work environment, because it can be used by the manager and the expert people to share ideas (See Appendix U (6)), knowledge (See appendix U (7)) and experience (See Appendix U (8)).

The last two functions of the '**Prof menu**' are the (Own) - meaning ownership and (Aware) – meaning awareness. These two functions aim to support managers to better understand the specific needs of their employees in order to better adopt and practise the social subsystem functions. The ownership function allows the manager to share the decision making process with employees about issues concerning them at work. It can be used by the manager to post decision proposals for employees to vote on and post comments about (See Appendix U (9)). Meanwhile, the awareness function provides managers with online resources he or she may need for using the IT tool, such as self-esteem videos and resources to share with employees (See Appendix U (10)).

6.3.2: The Focus Groups and the Interviews

The researcher conducted two focus groups with employees and three one-to-one interviews with managers in the two organisations of the case study. In these meetings the researcher reminded them about the aim of the research, then explained the theoretical model that this researcher had developed, then showed them a video that demonstrated the prototype IT tool being used to perform the IT functions and lastly discussed with them three points:

1- What do they think about the developed theoretical model of what makes the Qatari workforce motivated and capable at work.
2- What are their ideas with regards to how the researcher had transformed the theoretical understanding into IT functions.
3- How do they see the impact of the proposed IT tool on the Qatari workforce's motivation and capabilities.

These three points were discussed to understand the IT tool's technical requirements from a socio-technical perspective. Therefore, the discussion took participants from the foundation of the IT tool to the applications. The aim was to get their impressions, ideas and issues about this IT tool, its interface, functions and usage. The discussion started by introducing the theoretical model in general, then discussing each of its three main factors that affect the Qatari workforce's motivation and capabilities separately, and relate it to the IT functions in the IT tool using the demonstration video.

Analysis of the discussions showed that there was a general agreement on the effectiveness of the theoretical model in general for improving the Qatari workforce's motivation and capabilities. However, there were differences in participants' views with regards to the IT functions presented in the demo of the prototype IT tool.

Table 6.2 shows the results of discussing the 'leadership' factor and how the prototype IT tool to be used by the leader to raise self-esteem and to support and enable a professional work environment, was perceived by participants. This table shows that there was a common belief that for managers to embrace and then practice the leadership role identified in the theoretical model, the IT tool should raise managers' ‘awareness’ of the personal and professional leadership skills they would need to make the most of the IT tool.

ID	Size of the group	Participants	Leadership is a factor	Personal skills	Professional skills	Can the IT tool perform this function?
Focus group (ID1)	3	Employees	Yes	Agree	Agree	No+ Awareness
Focus group (ID4)	5	Employees	Yes	Agree	Agree	No+ Awareness
Interview (ID2)	1	Manager	Yes	Agree	Agree	No+ Awareness
Interview (ID3)	1	Manager	Yes	Agree	Agree	No+ Supervision Awareness
Interview (ID5)	1	Manager	Yes	Agree	Agree	No+ Awareness

Table 6.2: Phase three, focus groups and interviews about the 'leadership' factor

With regards to the discussion about self-esteem, Table 6.3 shows that they agreed that the tool can help improve employees' self esteem but also proposed different approaches that could assist in raising this objective in employees' minds. They proposed:

Education: employees need to be educated about the concept of developing self-esteem so it becomes part of their culture.
Leadership: a manager who can create a professional work environment where employees are promoted based on their achievements. This an approach that motivates employees to work towards achieving self-esteem.
Guidance: mentors or coaches who guide employees to think about how to decide on their personal goals.

	Size of the group	Participants	Self-esteem is a factor	Internal	External	Can the IT tool perform this function?
Focus group (ID1)	3	Employees	Yes	Agree	Agree	Yes+ Education
Focus group (ID4)	5	Employees	Yes	Agree	Agree	Yes+ Guidance
Interview (ID2)	1	Manager	Yes	Agree	Agree	Yes+ Leadership
Interview (ID3)	1	Manager	Yes	Agree	Agree	Yes+ Education
Interview (ID5)	1	Manager	Yes	Agree	Agree	Yes+ Leadership

Table 6.3: Phase three, focus groups and interviews about the 'self-esteem' factor

Lastly, Table 6.4 shows the result of discussing the professional work environment factor. Results shows that the implementation of the proposed IT functions to enable the existence of social subsystem functions: what to do, how to do it and evaluating works, were all agreed upon.

	Size of the group	Participants	Professional Work Environment is a factor	What to do	How to do it	Evaluat-ing work	Can the IT tool perform this function?
Focus group (ID1)	3	Employees	Yes	Agree	Agree	Agree	Yes
Focus group (ID4)	5	Employees	Yes	Agree	Agree	Agree	Yes
Interview (ID2)	1	Manager	Yes	Agree	Agree	Agree	Yes
Interview (ID3)	1	Manager	Yes	Agree	Agree	Agree	Yes
Interview (ID5)	1	Manager	Yes	Agree	Agree	Agree	Yes

Table 6.4: Phase three, focus groups and interviews about the 'professional work environment'

6.3.3: Discussion

These results are supportive of the researcher's current understanding about what might have an impact on the Qatari workforce's motivation and capabilities and how to use the IT tool to improve their motivation and capabilities. At the same time, it raised the issue of leadership as well as employees' education and guidance about self-esteem. This indicated that more research was needed to understand these two issues in more detail which happened in the pilot study as discussed in the next section.

6.4 Pilot Study

6.4.1 Development of the IT Tool Version One for the Pilot Study

This IT tool was developed using Adobe Flash web technology. This platform was used to develop the IT tool due to its operating systems (OS) independence and web integration compatibility. These two advantages were essential for making sure that the tool was going to be used in any IT infrastructure. Also, because the two versions of the IT tool (manager version and employee version) were required to work together using a computer network in order for the communication function to work, Adobe Flash platform's ability to integrate with internet web servers as well as with online database (DB) servers was an important advantage. It helped overcome one expected major obstacles that would have prevented the IT tool from being used in organisations which was getting the IT department's permissions to use organisations' networks and servers, as well as getting the technical support, could have been very difficult . These two advantages proved very

effective, as it saved time in developing the IT tool and testing it without the need to use the infrastructure of a particular organisation.

The Adobe Flash web technology included two developing tools: the Adobe Flash Catalyst and the Adobe Flash Builder. The Adobe Flash Catalyst was used for developing the interface and the user interactions with the IT tool. Whereas, the Adobe Flash Builder was used for programming the IT functions of the tool as well as being used to create the connection with the Web and Database Servers. The researcher used a paid web service provided by a web hosting company to provide the required services for the IT tool, which were used for the sole usage of the research. Hence, the IT tool was designed based upon the client-server architecture in which the IT tool worked as a client at the organisation and the DB was on the server.

The version one IT tool for the pilot study was the same IT tool which was introduced in the prototyping in section 6.3. Appendix (U) shows screenshots of the manager's version and Appendix (V) shows screenshots of the employee's version.

6.4.2 Conducting the Pilot Study

This study was conducted in 'Organisation One' because it had a manager who was very supportive and excited about the idea of the research. Therefore, the researcher decided to give this manager the first opportunity to test the tool and to give his feedback about it before the actual experiments took place. This study also involved a pre-test and a post-test administrated by the researcher. The objective was to get some preliminary results and to test the questionnaire which was used in the next chapter. Table 6.5 shows an overview of this stage.

Organisation	Organisation One
Description	One manager and two employees in the HR department.
Duration	Four weeks
IT tool	Manager version and employee version

Table 6.5: Phase three study, overview of the pilot study

6.4.3 Results of the Pilot Study

This study aimed primarily to put the IT tool to the test to identify usability and technical issues. Hence, it provided essential feedback as well as it raised some issues that helped in better understanding the requirements for developing the second version of the IT tool. This feedback is summarised in Table 6.6 and explained in the following points:

1-The first feedback was expressed by the manager who, despite his interest in the tool before the testing, did not use it because as he acknowledged he had much work to do using other IT applications that related directly to his job, such as email application and HR ERP system, leaving him with no time to use this IT tool. However, in his feedback he also emphasised the importance of the IT tool, as he said that "the tool is important".

2- The second feedback was that despite the pilot study proving that the technical requirements of both the client and the server sides of the IT tool were working, some aspects of usability were raised by the employees. There were requests for the tool to have a "less complicated design" and there was also the demand that this tool be used by their manager.

3- The third feedback came out when training was given to the manager on how to use the IT tool. He requested that the IT tool has the ability to allow private two way communication. In other words, he requested that the IT tool be designed to enable the employee to communicate privately with the manager in the same way as the manager could communicate privately with the employees. Version one of the IT tool was capable of sending messages only from a manager to employees.

IT Tool	(Manager Version) (Employee Version)	**Results**
	 	**No usage of the tool by the manager** - Lack of time at work to use the tool. - Feedback on the design of the user of interface. -Feedback on the communication function.
Architecture	Client-server web-based architecture (php web server and mysql DB server).	
Interface Design	All IT functions in one tool of two versions (manager's version and employee's version).	

Table 6.6: Phase three study, overview of the pilot study results

The results of this stage were used to understand better the technical requirements of the IT tool to perform its role in improving the Qatari workforce's motivation and capabilities. Hence, three technical changes were considered in version two of the IT tool. The first was to address the non usage of the tool by the manager, which was due to the manager's lack of time at work. The second change was in the design of the user interface. Lastly, a change in the communication function of the tool to allow employees to communicate with managers in the same way that this tool allows managers to communicate with the employees. The next section will describe the development of version two of the IT tool.

6.5 Development of the IT Tool Version Two

Based on the new understanding of the technical requirements identified in the pilot study and discussed in section 6.4, a new version of the IT tool was developed for use in the experimental study, which is discussed in the next chapter. The new version of the IT tool was developed based upon the need to improve the user interface, enhance manager utilisation and to equip the tool with new advanced technology to allow better communication functionalities. These new changes are listed below :

1- The first change was based on the manager's feedback that lack of time prevented him from using the IT tool. This excuse was not very convincing for the researcher because using the tool did not take much time. For example, sending an appreciation message using the 'communication IT function' or setting a task using the 'project management IT function' takes less than a minute. Hence, the supervisory team suggested that the non active use of the tool might be due to reasons related to introducing too many functionalities at one time, which the manager was not familiar with; in other words, that the tool had been introduced too fast with not enough training. This was a proposed explanation of why he mentioned in his feedback the possibility of integrating the IT tool with the 'email' and the 'HR ERP' IT systems, as these were systems he was familiar with. Therefore, the suggestion was to break up the IT tool into a number of IT tools, each tool performing only one IT function. Then these tools could be introduced one by one to managers during the period of the experiment. This would allow better training and introduction to the tool and consequently better utilisation. But, breaking up the IT tool meant also that four different IT tools needed to be developed: the communication tool, the project management tool, the guidance and development tool, and the evaluation tool. The development of these tools will be discussed

later in this section.

2-The situation where the manager in the pilot study did not use the IT tool due to lack of time, triggered another issue. This issue linked us to what was suggested in the focus groups about the importance of managers' awareness about essential leadership skills for better utilisation of the tool. Therefore, it was decided to develop a new IT tool that had the sole function of enhancing managers' awareness of the personal and professional skills required to improve the workforce's motivation and capabilities. This tool was developed to be easy to use, very visual and informative, taking account of managers' lack of time. So, the key leadership skills identified in phase one of this research were summarised in short sentences and then descriptive illustrations were added to make them easier to remember; and lastly they were enhanced with a speaking capability. In other words, this tool was developed to speak to the managers using the computer speakers and remind them to act according to these skills. So, this awareness tool aimed to deal with the issue of utilisation.

3- The third issue regarding the usability of the IT tool was also addressed in the second version of the IT tool by introducing a new, much simpler design. The new design avoided displaying a lot of information to users at one time, which might confuse the users. The new design displayed only one piece of information at a time, making it easier for users to use the tool. Another non user-friendly design feature in version one of the IT tool was the scattered distributions of the control buttons all over the tool, using symbols to indicate functions rather than text. This was addressed in the new version of the tool by placing all control buttons in one place and giving them meaningful titles. The functions of these buttons were changing according to the function chosen by the user. With these two new user interface improvements, the user always knew where to find information as well as where to find buttons to interact with the tool. Lastly, the colour of the interface was also changed from grey and blue to more colourful ones, to attract more interest in the tool.

4- Another issue raised by the manager in the pilot study, was the ability to receive communication from employees as well as to send direct private messages to specific employees. The communication IT function in the pilot study IT tool did not allow these functions. In other words, the manager was only able to communicate with all employees but employees could not communicate with the manager. This issue of one to one private communication was not taken into consideration during the development of version one of the IT tool because the aim was that the manager communicate with all employees raising their self-esteem together. But the manager in the

pilot study suggested that what motivated one employee can be different from what might motivate another. This point of view was logical as what motivates somebody may not motivate someone else, at worst, may even have a negative effect on him or her. Also, he pointed out that sometimes a manager would want to make an employee feel important by sending them a personal message.

Implementing these new changes became an issue in using the same version of the IT tool. Therefore, a new development approach was adopted in the research based on the use of Twitter API's, because it had many advantages. First, it was easy to use with the same Adobe Flash development platform. Second, the API used a powerful existing infrastructure of the twitter service which reduces the risk of slow performance in the case of too much use of the tool by too many people. Third, it allowed the researcher to easily create as many user accounts as were needed to link employees with their managers, in groups in which they followed each other. Fourth, Twitter allows both private and public communications in both directions. This meant that employees could now also send private messages to their managers. These advantages made Twitter a suitable solution for implementing the changes and it also brought more improvements to the existing IT tool's functionalities. In the following section each of the five IT functions of the IT tool will be discussed in terms of design and functionality.

6.5.1 Leadership Awareness IT Function

The leadership awareness IT tool does the job of raising awareness that managers may need in order to remember or/and recognise the importance of motivating employees through raising their self-esteem and supporting a professional work environment. Table 6.7 shows the interface design and the functionalities of the tool.

This tool does its job using two methods to draw the manager's attention to the awareness information. The first method is visual and the second is acoustic. The tool was designed to be very visual, always on the top of the desktop and with no option to close it. In addition, it used very short and informative phrases, ones that were easy to notice and remember. The acoustic method was developed to draw more attention to the tool. This method used pre-recorded short sentences that were then played by the computer. The tool automatically played this recorded voice every hour. These awareness texts to be seen or heard by managers were selected based on the main leadership skills affecting the Qatari workforce's motivation and capabilities, as identified in phase one of the research (see Appendix W).

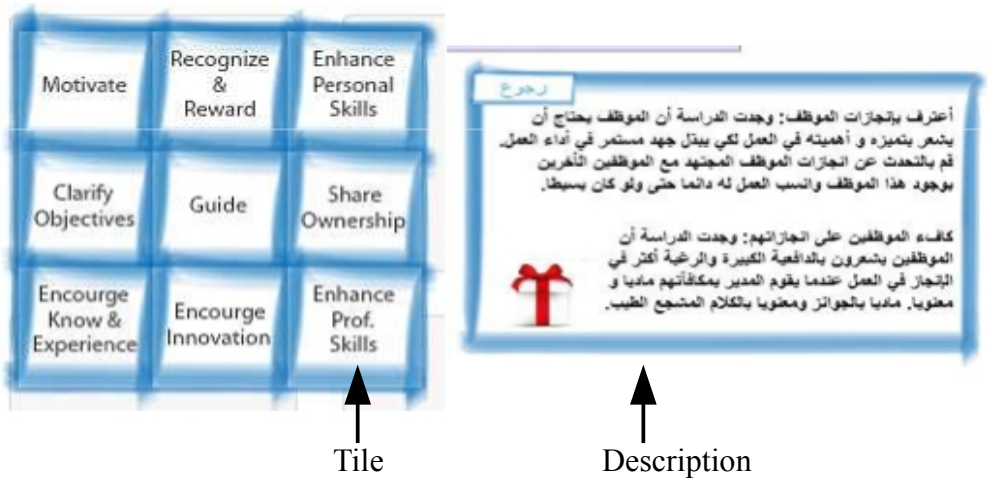
Leadership Awareness IT Function	
User interface design	
Description	The tool contains a group of tiles. Each tale has a name which represents one activity required to be practised by the manager. The tool shows information including the importance of these activities as explained by the participants and suggests an approach for doing them in the workplace.
Functionalities	1- Manager's clicking on a tale triggers it to show detailed information. 2- 'Always on the top of the desktop' function so as to remember and practise. 3- The tool has no 'close' control button so as not to be neglected at any time. 4- The tool plays regularly voice-recorded reminders through speakers.

Table 6.7: Version one IT tool, leadership awareness function

6.5.2 Communication IT Function

This second function of the IT tool is the equivalent to the (Mot) (Recg) (Rewd) functions in the IT tool version one. It allows the manager to send both inspiring videos and messages about their rewards as well as to communicate with employees in a way that motivates them and appreciates their work achievements. Table 6.8 illustrates the tool which has three main parts. The first is the 'display area' in which all messages between the manager and employees in both directions appear. The second part is the 'writing area' for writing the messages. The last part is the 'command area' which includes the 'send' button for sending text messages and the 'add link' button for including a URL link in the text message before sending it.

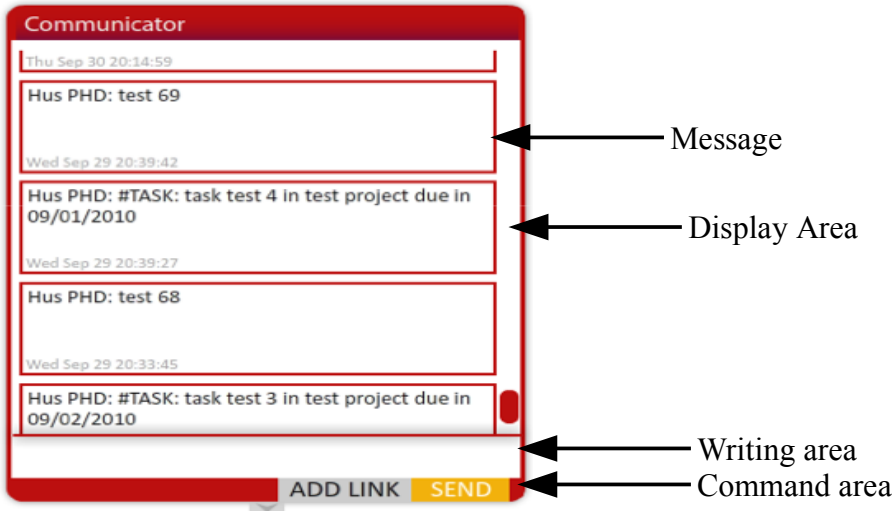
Communication IT Function	
User Interface Design	
Description	This tool represents the function that allows communication to occur between managers and employees in both directions.

Table 6.8: Version two IT tool, communication IT function

6.5.3 Guidance and Development IT Function

This function is the equivalent to the (How) function in the version one of the IT tool. It allows the sharing of knowledge, experiences and ideas. It also allows the manager to share decision making with employees. This function works through the 'upload button', that allows the manager and the employees to upload attachments into their messages. This function can be used to share knowledge in the form of articles, presentations or reports. Also it can be used to upload work-related information such as the organisation's vision, mission, goals, plan, job description and work procedures or even videos and images. Table 6.9 illustrates the 'guidance and development IT function' which includes also the 'communication IT function'. In this function, when the upload button is clicked, a new line in the 'command area' appears with a 'browse button' as well as 'four coloured options' buttons. Each option represents a different 'hash tag' (#) to represent a type of message that users can send. These options are: knowledge (green colour), experiences (blue colour), ideas (gold colour), decision-making (purple colour) information and communication (red colour). When a user sends a message with one of these types, the tool colours the border of the message with the colour of the message type and a hash tag with its type.

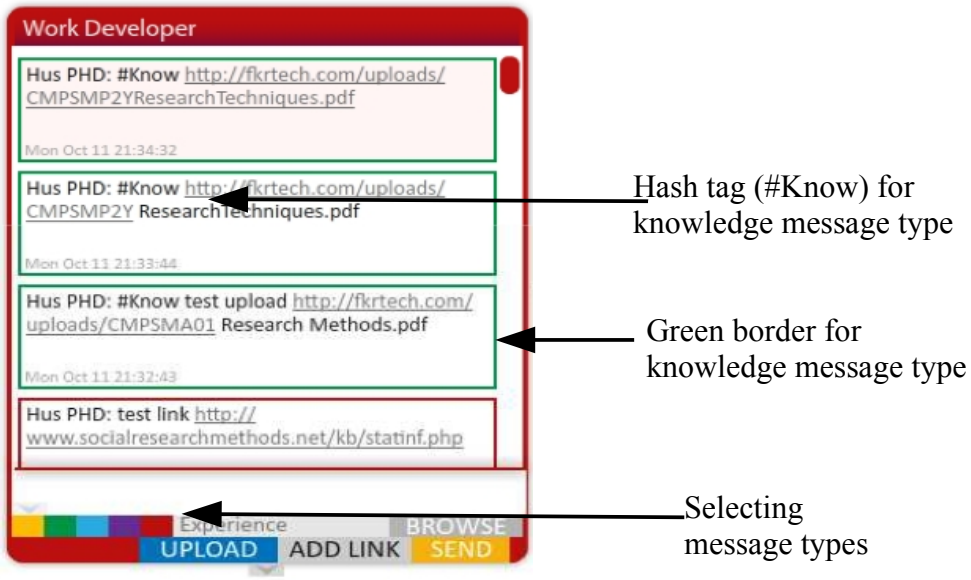
Guidance and Development IT Function	
User Interface Design	
Functionalities	1- Browse: to browse for a file on the computer for upload. 2- Upload: to upload the selected file from the computer. 3- Options selection: to select the type of message.

Table 6.9: Version two IT tool, guidance and development IT function

6.5.4 Project Management IT Function

This function is the equivalent to the (What) function in version one of the IT tool. It allows the manager to create projects, add tasks, assign tasks to individual employees and lastly, to evaluate employees objectively, based on results of doing these tasks. Table 6.10 illustrates version two of the IT tool which not only includes the 'project management IT function' bus also all the previous IT functions. When the manager clicks on the 'project button', a command line of three buttons appears, allowing the manager to send a 'task message' (black coloured) to a specific employee (using the list of names representing the twitter account of each of these employees). This message includes the task, the project title and the due date. It can then be used to send evaluation messages that include a grade representing the manager's evaluation of the employee's work. Also using 'my tasks' button employees can list all of their tasks in the display area.

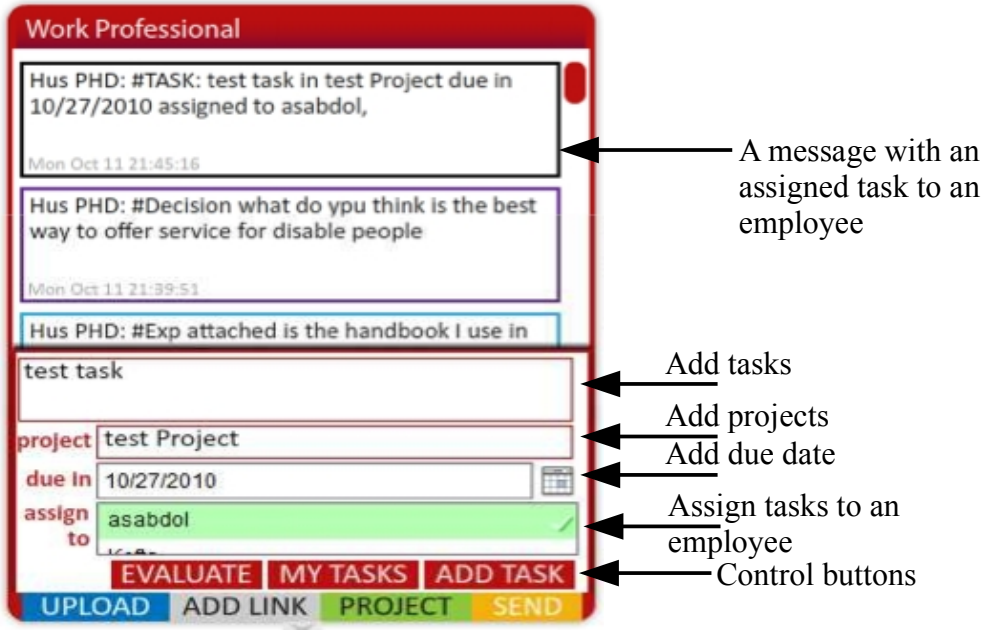
Project Management IT Function	
User Interface Design	
Functionalities	1- Add projects and task: for adding tasks to existing projects, setting due date and assign to employees. 2- My tasks: for showing all tasks assigned by manager to specific employee. 3- Evaluate: for evaluating the work carried out by employees.

Table 6.10: Version two IT tool, project management IT function

6.6 Chapter Summary

This chapter concludes the three phases of applying the research approach for developing the IT tool for improving the Qatari workforce's motivation and capabilities. The phase involved the study of the technical requirements for developing the IT tool, and based on these requirements, the IT tool was developed for use in experiments to assess its impact on the workforce in actual work environments in the case study. The next chapter describes the experimental phase.

7.Experimenting with the IT Tool and Assessing its Impact on the Workforce

7.1 Introduction

This chapter focuses on the third objective in the research design. In this phase of the research, the IT tool described in the previous chapter (Chapter Six) was used experimentally in real Qatari work environments. The impact of the IT tool on the Qatari workforce's motivation and capabilities was then assessed. These experiments were conducted in three rounds. The first round experimented with the IT tool functionalities one by one, so as to assess the individual effect of each on the workforce. The second round adopted another approach in which all the functionalities of the IT tool were tested at one time. In the last round, a new version of the IT tool was developed based on the learning from the previous two rounds. This new IT tool was tested to find out if it would bring about new results. Lastly, the survey method was used to validate and generalise the results of the experiments. Table 7.1 shows an overview of the objectives, method and process discussed in this chapter.

<table>
<tr><td colspan="2">Research Aim: Can IT itself help organisations improve their workforce's motivation and capabilities.</td></tr>
<tr><td>Chapter objective</td><td>Process of the study</td></tr>
<tr><td>Assessing the impact of the IT tool on Qatari workforce's motivation and capabilities.</td><td rowspan="5">Causal study- this study answers the question: can IT tool functions enable the existence of the social subsystem functions and support them to improve Qatari workforce motivation and capabilities?

-Carrying out three rounds of experiments at different organisations to assess the impact of IT functions on Qatari workforce's motivation and capabilities.
-Validating and generalising the results of the experiments using a survey.</td></tr>
<tr><td>Method</td></tr>
<tr><td>Experimental method</td></tr>
<tr><td>Chapter outcomes</td></tr>
<tr><td>Learning about IT ability to affect Qatari workforce's motivation and capabilities.</td></tr>
</table>

Table 7.1: Overview of chapter seven's objective, method and process

7.2 Study Methodology

As discussed in the research methodology (Section 3.4.3), this researcher conducted an experimental study employing a strategy in which a control group design was selected to conduct the experiments. Pre-tests and post-tests were carried out on experimental groups as well as on control groups. Each group represented a department in one of the organisations included in the case study. Each of these groups has one manager and at least two employees. The pre-test involved only closed-response questions which were quantitatively analysed, while the post-test also included other open-response questions which were qualitatively analysed. The pre-test and the post-test were carried out before and after each experiment in one-to-one interviews. Experiments were conducted in five different organisations. In the first two experiments, the IT functionalities were developed to be experimented with one IT function a time, while in the other three experiments, the IT functionalities were experimented with as one IT tool. The total period of all of these experiments was four months. Results of these experiments were collected and analysed using an integrated mixed design in which the data collected from the two questionnaires was brought together and then analysed as presented in Table 7.2.

Experimental study		
Assessing the impacts of the IT tool on Qatari workforce's motivation and capabilities.	Sample	Number of organisations: five.
	Methods	-Part one: pre-test quantitative questionnaire -Part two: post-test qualitative questionnaire
	Mixed study design	Quantitative → Qualitative (Data collection + Analysis) → Results

Table 7.2: Experimental study, overview of the strategy of inquiry

7.2.1 Sampling

Sampling in this study (selecting participants for the experiments) was non-random sampling or what is called "convenience sampling". Hence, in this research a Quasi-Experimental Design was employed as discussed in the Research Methodology chapter in Section 3.4.3. This design was chosen due to the need to utilise the IT tool on a "naturally formed group" such as a department in an organisation (Creswell, 2009). This implied that the researcher did not randomly select participants for the experimental group or the control group (Creswell, 2009), as these departments existed with their managers and employees as groups, which the researcher could not change. Therefore, all the experiments in this research were conducted in departments of the organisations in the case study in which the managers of these departments had no objection to these experiment being carried out in their departments.

7.2.2 Experimental Study Design

In these experiments, a control group design was employed to create an intervention with the purpose of affecting employee's motivation and capabilities using the IT tool. In this experimental study, the experimental group (A) received the treatment and the control group (B) did not. Both groups took pre-test and post-test questionnaires. The participants in these experiments were Qatari employees and managers. Two departments in different organisations of the case study were selected to participate in each round of this study. One department became the experimental group while the other department became the control group. Managers in this experiment had a total work experience of between 9 to 15 years. On the other hand, employees had a total work experience of less than 5 years. As discussed in the Research Methodology chapter, a longitudinal study design

was carried out. The researcher himself was visiting the sites (the departments at each organisation) to collect pre and post test data as well as to set up the IT tool and to give training. Table 7.3 presents an overview of the experimental study. The details presented in the table below will be further explained in the following sections of this chapter. Details of round one will be discussed in section 7.4, round two in section 7.5 and round three in section 7.6.

<table>
<tr><td>Research Strategy</td><td>Research Design</td><td colspan="3">Study Design Based on Number of Contacts</td><td colspan="2">Study Design Based on the Nature of Investigation</td></tr>
<tr><td>Experimental</td><td>Quasi-experimental design</td><td colspan="3">Longitudinal study design</td><td colspan="2">Control group design</td></tr>
<tr><td>Sample</td><td>Instrumentations</td><td>Variable</td><td colspan="2">Experimental</td><td colspan="2">Control</td></tr>
<tr><td rowspan="3">- Five Organisations
- Convenience sampling
<u>Round one</u> (9 weeks)
E(size=3) C(size=3)
E(size=2) C(size=2)
<u>Round two</u> (2 weeks)
E(size=2)
<u>Round three</u> (1 month)
E(size=2)
E(size=3) C(size=2)
E(size=3) C(size=3)</td><td rowspan="3">-Social subsystem and employee's engagement evaluation instrument.
- Self-esteem assessment instrument.
- Manager's criteria of motivation capabilities evaluation instrument.</td><td></td><td>Pre-test</td><td>Post-test</td><td>Pre-test</td><td>Post-test</td></tr>
<tr><td>Motivation Capabilities</td><td>(T)</td><td>(T)</td><td>(T)</td><td>(T)</td></tr>
<tr><td colspan="4">(T): Test was administrated</td></tr>
<tr><td colspan="7">Visual model of the research design notation system adopted from (Campbell & Stanley, 1966).</td></tr>
<tr><td colspan="3">Group (A) O----X---O----X---O---X---O---X--O

Group (B) O---------O----------O--------O-------O</td><td colspan="4">Group (A): Experimental group (E)
Group (B) : Control group (C)
O: Measurement recorded
X: Treatment occurred (IT Tool)
:Groups are not equal</td></tr>
</table>

Table 7.3: Overview of the experimental study

7.2.3 Data Collection Instrument

As discussed in Chapter Three (Section 3.4.3), this researcher aims in this study to observe changes in Qatari employee's motivation and capabilities after the intervention of the IT tool. Hence, in selecting data collection instruments to observe this change, two points needed to be considered. The first related to the case study itself and the second related to the objective of achieving self-esteem, because it is the objective that the IT tool is focusing on, in order to improve the Qatari workforce's motivation and capabilities.

With regards to the first point, the researcher used an instrument that was adopted by the General Secretary for Developing Planning (GSDP) for studying Qatari employees' engagement in governmental organisations. GSDP is the government organisation responsible for coordinating the activities amongst other governmental organisations for implementing the Qatar Vision in which the improvement of the workforce's motivation and capabilities is one of its objectives. This instrument was developed based on an extensive research study carried out by a well-known global consultancy company and has been tested by thousands of employees all over the world. This instrument was slightly modified by GSDP to make it more suitable to be used in Qatari organisations. It was suggested by the expert of the GSDP as being suitable for the purpose of this research.

This instrument was also found to be useful in this research for observing changes in the social subsystem of Qatari organisations from the two perspectives. On the one hand, it evaluates the workplace professional work environment necessary for making employees more engaged at their work. On the other hand, it evaluates managers' personal and professional skills required to keep these employees engaged at work. These two sides of the instrument are listed in thirty five questions divided in five parts. Each part has a specific objective regarding evaluating aspects of one the previous two sides of the instrument. Part one and part two evaluates the workplace professional environment necessary for making employees more engaged in their work by asking about employees' objectives and how the workplace satisfies them in terms of providing aspirations and responsibilities. Part three and part four of the instrument evaluate managers' personal and professional skills required to keep these employees engaged at work by asking employees questions related to their managers' actions that affect the work as well as them. The last part of the instrument asks about employees' overall engagement in the organisation. Hence, this instrument was selected to be used to observe changes in the social subsystem of the organisations in the

experiments as a result of utilising the IT tool. Appendix (Q) shows the questions of this instrument, while Appendix (R) presents the data collection questionnaire used to collect the answers from the employees.

So, this instrument meets the validity and reliability requirements based on the fact that it was used both globally and locally in Qatar to observe changes in organisations' social subsystems and employees' engagements. However, it does not completely indicate a change in workforce motivation and capabilities. Therefore, the researcher proposed two other instruments to observe changes in the Qatari workforce's motivation and capability.

The first instrument was also developed to relate to the case study. It aimed to assess the impact of the IT tool from the point view of the Qatari managers themselves. This decision was based on discussions which took place in the two focus groups of the phase three of the research. In these focus groups, participants were asked about their suggested approaches to observe changes in the Qatari workforce's motivation and capabilities. The groups made two main suggestions. The first was that improvement in employees' ability to achieve work goals would be a good indication of improvement in their motivation and the capabilities. Others suggested that as long as motivation is high, capabilities will be high as well. As a result of these discussions, these ideas were adopted in a way that served the research's objective of getting accurate data about the changes happening to the workforce's motivation and capabilities as a result of utilising the IT tool. Therefore, this instrument was designed to be used with managers alone, by asking them in the pre-test stage to give a number ranging from zero to ten to indicate their employees' current abilities to achieve work objectives. They were informed that the higher the number they gave, the better the employee. The instrument also asked managers about their own criteria that can be used to evaluate employee's motivation and employee's capabilities separately. Then the instrument asked the managers to give a number out of ten to represent their evaluation of employees' current situation with regards to these motivation and capabilities criteria. Appendix (S) shows the data collection instrument used with managers to collect the pre-test and post-test data.

The second instrument was selected to observe changes in employee's self-esteem before and after the IT tool intervention. As self-esteem is the objective the IT tool was developed to raise and satisfy, so as to improve motivation and capabilities, this instrument was designed to assess employee's self-esteem. The researcher reviewed the literature and decided to use an instrument developed by Rosenberg (1965) to assess employees' self-esteem in the pre and post tests. Appendix

(T) presents the questions of this instrument.

These two instruments were used in the pre-test and the post-test so as to identify any change in the number selected to answer the questions, whether there was no change, positive change or possibly a negative change in the employee's motivation and capabilities. Also, the researcher recognised that some confounding variables could affect the evaluation of employees' motivation and capabilities during the experiments. These confounding variables were identified as: employees' personal mood or manner which might change due to events happening in their everyday life or at their workplace. Sad events or circumstances at a personal level such as in the family or at work with colleagues might have a negative impact on employee motivation and capabilities. Conversely, good news or personal success outside work might also have a positive impact on employee motivation and capabilities. Hence, to deal with these possible confounding variables, the researcher used another instrument to control this variable. This instrument was used to collect data in a one-to-one interview with the participants in the experiment. Researcher asked them one question of whether changes to their motivation or capabilities was related to the utilisation of the IT tool or due to any other reasons. Also another question was asked to managers alone for their feedback about using the IT tool for the purpose of the research. This question was important to understand the positive or negative aspects of the IT tool that make it good or bad in performing its role, in enabling the social subsystem functions to exist and supporting them in their role of improving the Qatari workforce's motivation and capabilities.

In the following section, each of the three rounds of the experimental study will be discussed in detail.

7.3 Conducting the Experiment (Round One)

In this round of experiments, two organisations which gave me access to their premises to conduct interviews with their managers and employees in phase one, also allowed me to conduct the experiments in this phase. Due to the agreements with these organisations that identities cannot be revealed, therefore each organisation will be given a number as a representation of its name.

In the first organisation, called 'Organisation One', the experimental group was the department which helped test the IT tool in the pilot study in the previous phase while the other department in this organisation which was selected as the control group was the training and development

department. Its duties included preparing a training plan for the employees and managing all related aspects of the training courses.

In the other organisation, called 'Organisation Two', the same experiment that was conducted in 'Organisation One' was conducted in parallel. The experimental group was represented by a department that worked in the area of 'customer services' where the organisation's clients who needed to inquire, request or apply for this organisation's services had to come to this department. This department included three Qatari employees and one Qatari manager. One of the employees in this department was on annual leave so she was not included in the experiment. The other department that was chosen as the control group specialised in the area of training and development for the staff of this organisation, which had the same duties as the training and development department at 'Organisation One'. This department had two Qatari employees and one Qatari manager.

In these experiments in the two organisations, the approach was to experiment with the IT tool one IT function at a time. This required adopting a longitudinal study design for a period of two months to measure the individual impact of each IT function on the Qatari workforce's motivation and capabilities. Table 7.4 gives an overview of these organisations. Using a pre-test and a post-test experimental design as discussed in the experimental study design in section 7.2.2, the results of each organisation's experiments are presented with analysis in the following two sections.

-Organisation One: one manager and two employees in HR department Manager position: Head of the recruitment section. Manager education: Diploma Manager work experience: (12 years) + (3 years as head of section) = (15 years) Experiment lasted one month.
-Organisation Two: one manager and two employees. Manager position: Head of the customer service section. Manager education: Diploma Manager work experience: (7 years) + (2 years as head of section) = (9 years) Experiment lasted one month and one week

Table 7.4: Experimental study, overview of the organisations in round one

7.3.1 Experimental Study Results (Organisation One)

The result of this experiment was not directly useful for understanding the impact of the IT tool on the Qatari workforce's motivation and capabilities because the manager who as the theoretical model presents as the main actor in improving Qatari workforce motivation and capabilities did not use any of the IT tool's functions. It was unexpected that even though the IT tool had no 'close' control button, the manager was able to close it by using an advanced Windows operation systems control option. This experiment lasted one month instead of only two weeks as was planned. This was because after the two week period when the researcher visited the manager to set up the new IT function on his computer, he discovered that the 'leadership awareness IT function' was closed and was not utilised. Therefore, the researcher gave the manager another two weeks to try it out. Also, in this organisation only one other IT function was experimented with which was the 'communication IT function'. This was because when the researcher visited the manager later, after the end of the month and the two weeks, he found the issue of non utilisation had persisted. Hence, it was better and more useful from the point view of the researcher, to understand what went wrong and why the IT tool was not utilised to solve the problem quicker rather than to continue the experiment with no results. This process of understanding the issue happened in a one-to-one interview with the manager, who gave the following answers to explain what happened:

- **The first question was why the manager did not use the IT tool.** The answer was about time. He said that he did not have the time to use the IT tool because of the high work load he was encountering at work during the experiment. This work load, as he explained, was a result of the non-professional work environment in his organisation. He described this work environment as characterised by unclear and undefined roles of departments in addition to the non existence of a work procedure manual for employees to know how to request for a service correctly. If this non-professional situation had not existed, it would have made his work much easier and less demanding. He further explained that this non-professional situation led to vast amounts of telephone calls and emails he was receiving everyday, asking about work related issues, not of his department's work duties. Also, he was receiving telephone calls which were asking about how to apply or request some department's services. All of these, in addition to meetings that he had with other managers of the organisation discussing different issues every week, meant that utilising the IT tool was not a priority. He emphasised that if a professional work system was in place in the organisation,

he would have allocated much more time for his employees, focusing on their motivation and improving their capabilities.

- **When asked if the problem was in the IT tool's functionalities**, the manager answered "I have no doubt that these IT tool's functions are important for improving motivation and capability" and when asked about any usability issues with the IT tool, he answered "No". No issue in the usability or the design of the user interface of the tool.

- **When asked about suggestions for making the IT tool better utilised by him or other managers who have the same time problem**, the manager gave the following suggestion:

  "I would use the IT tool's functions if they were part of the existent IT system I already use at work such as the email and the HR Enterprise Resource Planning System (ERP)". He elaborated that "IT tool's functions will be more effective if you integrate them within the existing IT systems because I use them frequently at work". He said that this integration would "make the IT functions always in front of me as these two systems are always open on my computer screen and hence I will use them while I am busy dealing with requests and answering emails. In this situation, I can directly assign tasks to my employees based on these requests then evaluate their performance at the completion. Also, I will directly use the IT function of self-esteem through my email rather than using another communication tool".

7.3.2 Experimental Study Results (Organisation Two)

Results of the experimental study in Organisation Two were mixed. On the one hand, the manager in the experimental group used the leadership awareness IT function and succeeded in improving his employees' motivation for the first two weeks. On the other hand, the same manager after this successful utilisation, did not use the other IT functions, which were introduced afterwards, with his employees.

Before presenting the results of this experiment, two important points need to be clarified. The first is that when the post-test data was collected, the employees did not know that the leadership awareness IT function was under experiment and was utilised by their manager. This was to ensure that the answers were not affected by any possible illusion that their manager should become better because of using this IT function. The second point is that when the researcher was collecting the post-test data, he was asking the questions and reminding the employees about their pre-test

answers in order to avoid arbitrary answers.

Experimenting with the 'Leadership Awareness IT Function'

With regards the results of the first IT function, the 'leadership awareness IT function', the post-test data showed improvement in employees' motivation and some improvement in their abilities to achieve their work objectives. This improvement was reflected in the change between the pre-test and post-test data of the 'employee's engagement instrument' (see Appendix R (2)). For example, post-test answers of employees (A) improved in six questions in three different parts of the instrument. Only one question in instrument's part two went down. These improved questions were Question 2.1, which improved from 2 (disagree) to 4 (agree) and Question 2.2 which improved from 3 (neutral) to 4 (agree). These two questions represented questions that asked about the professionalism of the workplace environment. Question 2.1 asked specifically if the employee knows what is expected of him in the job. While Question 2.2 asked if he or she understands how his or her work contributes to the success of the organisation. In parts three and four, which asked about the manager's personal and professional skills, there were four improved questions: Question 3.3 asked if the organisation compensation is clearly tied to performance, which increased from 1 (strongly disagree) to 2 (disagree). Question 4.2 asked if the employee receives useful and timely feedback on his performance, which clearly improved from 2 (disagree) to 4 (agree). Question 4.7 asked if the manager is frank when dealing with them,which improved from 3 (neutral) to 4 (agree). Lastly, Question 4.9 asked if the manager is open to receiving feedback from employees which significantly improved from 2 (disagree) to 4 (agree). On the other hand, the only question which showed a decrease was Question 2.4 which became 4 (agree) from 5 (strongly agree). This question asked if the department's processes make it easy to work well with other departments.

This post-test was followed then with one-to-one semi-structured interviews, as planned in the experimental study design. These interviews were essential to understanding if this positive change in employees' satisfaction about the social subsystem in their organisation happened due to changes in the manager's practices, or due to other reasons. Their answers in these interviews incited considerable interest as they directly linked this satisfaction with their awareness of changes in their manager's practices, even though (as mentioned earlier) they were not aware of this experiment before and they had no idea that their manager was using the 'leadership awareness IT function". For example, employee (A) when was asked **what happened so that your satisfaction after two weeks was improved** (see Appendix R (3)), said it was because of "changes in my manager's way

of management", "He gave us priority which made us more motivated", "He explained to us our roles" and "he evaluated and appreciated our work better". Also, one very interesting answer came from employee (A) who said "now I intended to enrol in some training courses". This answer, in addition to a "Yes" answer to the question that asked if his motivation at work had improved, were both unexpected in this early stage of utilising the 'leadership awareness IT function', as it was only two weeks. These two weeks not only improved their motivation but also started to impact their desire to improve capabilities at work.

Reflecting on these results, it was not easy to say that the 'leadership awareness IT functions' was the sole factor that successfully allowed the manager to adopt and practice some professional aspects needed to make employees feel more satisfied and motivated. Therefore, as was planned, a semi-structured one-to-one interview with the manager after the end of this experiment was conducted to understand how this IT function had affected him. He was asked **how this IT function affected him so that he had managed to improve his employees' motivation**. The reason was as follows:

- "The IT function did not add new knowledge to me about the importance of these skills for manager to practice, but it helped bring them all in front of me in an organised way so they became also organised in my mind. This helped me in remembering them as well as practicing them."

The results of this experiment were very encouraging but it did not give the researcher a definitive answer about the ability of the IT tool to enable the social subsystem in the Qatari organisations to exist and to support them to improve workforce motivation and capabilities. This was first of all because of the duration (two weeks only) of the experiment. Employee (A) said that 50% of the improvement in his motivation was related to work and the other 50% was related to his personal "temper". Furthermore, the researcher did not collect post-test of the self-esteem instrument nor the manager's criteria instrument because it was not logical to assess these two significant aspects after only two weeks, as changes were expected to be after a longer period (at the end of the two month experiment).

Experimenting with the other IT functions

After the end of the first experiment, a new IT function was introduced for both managers and employees, in addition to the previous IT function which was used only by the manager. This new

IT function was the “communication IT function'. Two weeks later when the time for collecting the post-test data arrived, it was found that the manager did not use this IT function with his employee. Therefore, no post-test data was collected and a new IT tool was introduced which included the previous IT functions in addition to the new function, the 'guidance and development IT function'. Two weeks after the introduction of this tool, the same issue happened again. It was also found that the manager did not use the IT tool. So again, a new IT tool was introduced which included the previous IT functions in addition to the last one, which was the 'project management IT function'. To understand what happened to the manager as well as to employees' motivation, one-to-one semi-structured interviews were conducted with the manager as well as with their employees immediately after the two weeks period of testing the 'communication IT function'. Firstly the manager was **asked about the reasons which made him not use the IT tool**. His reason was as follows:

- It is due to unprofessional practices by the top management of his organisation, his commitment for using the IT tool began to fade and so he became himself demotivated by this unprofessional work environment.

Secondly, employees were **asked about their motivation in general** and their answers were “low”. When they were asked about what happened in the last two weeks that made their motivation lower, the answer was:

- The same feedback about the non-professional work environment and how it demotivated all of them.

Also, when the manager and their employees were asked about the functionalities of the IT tool and whether there were any usability issues as a possible cause for non-utilisation, they replied that:

- These IT functions are important for improving motivation and capability and they had no problem with them.

The control group in the other department, did not express the same reaction to the non-professional work environment during the experiment of IT function number one and two, because it did not affect them directly, but they did have a similar reaction after the end of testing of IT function number four.

Lastly, when asked about suggestions for better utilisation of the IT functions, the manager gave

these suggestions for using the IT functions:

Guidance and development IT function:

- "I use email for sending knowledge resources to my employees because they check their email regularly."
- "Employees have ideas for improving the work but they do not know how to turn them into official work suggestions."

Project management IT function:

- "I usually assign tasks to them on paper as it makes it more official and because I can photocopy this paper for later follow up."

These suggestions were focused on ways of better utilising these IT functions, but they did not give the researcher a clue as to why they were not utilised to enable the social subsystem function to exist to thereby helping to improve the Qatari workforce's motivation and capabilities.

7.3.3 Discussion of Round One Experiment Results

The two experiments in the two organisations showed no active utilisation of the IT tool, with the exception of the IT function number one in organisation Number Two. Table 7.5 summarises the results of the experimental study (round one).

No.	IT Functions	Org ID	(E) Group		(C) Group		Period	Results
			Pre-T	Post-T	Pre-T	Post-T		
1	Leadership awareness IT function	Org1	(T)	(T)	(T)	(T)	1 month	No usage
		Org2	(T)	(T)	(T)	(T)	2 weeks	**Positive change**
2	Communication IT function	Org1	Intv		Intv		1 week	No usage
		Org2	Intv		Intv		2 weeks	No usage
3	Guidance & development IT function							
		Org2	Intv		Intv		2 weeks	No usage
4	Project management IT function							
		Org2	Intv		Intv		2 weeks	No usage
(E):Experimental Group (C):Control Group (T):Test was administrated (Intv) Interview was conducted								

Table 7.5: Experimental study, overview of the results of round one experiments

In these experiments in the two different organisations there was one general result and three common issues. The general result is the non utilisation of the IT tool while, the three common issues that faced managers during the experiments were top management, non-professional work environment and suggestions of other means for utilising the IT functions.

With regards to the **top management issue,** the researcher realised that the managers who participated in the two experiments were heads of departments working under top managers, which meant they had limited control over their work environment. Therefore, the researcher was interested to find out if the IT tool had a better chance to enable the social subsystem functions required to improve Qatari workforce's motivation and capabilities in a work environment where the manager who uses the IT tool is the top manager himself. This necessitated another round of experiments in which the manager was not the head of a department but the top manager of the organisation. This was to examine the impact of being a manager with the full power (authority) over the effectiveness of the IT tool. The other two issues (**non-professional work environment and other means for utilising the IT functions)** were not the focus of the research in this round of experiment.

The next section, describes round two of the experiment, in which the manager who utilised the IT tool was the top manager of his organisation.

7.4 Conducting the Experiment (Round Two)

As discussed later, this experiment was set up to try to establish if the lack of control and power of a manager in an organisation was behind the ineffectiveness of the IT tool

This experimental study was conducted in a different way. Both its design and its process were different from the previous study. Regarding the design, this experiment had no control group because there was no possible way to have a control group that would not be affected by the top manager who was personally experimenting with the tool. With respect to process, the only difference was in experimenting with all the IT functions at one time as one IT tool, instead of introducing one IT function at a time. This was because the researcher noticed no big difference in the utilisation of the IT tool when its functionalities were separated into individual IT functions in the previous round of experiments. Hence, to save time and to concentrate on the main aim of this experiment, the researcher experimented with all the functions in one go.

It was difficult to find an organisation in the governmental sector with a top manager willing to allow the researcher in the organisation, and at the same time to use the IT tool himself or herself. Moreover, they and their employees would need to allocate some of their busy time to do pre-tests, post-tests and interviews. So, after contacting some people, a newly established governmental organisation was found which had a small number of staff (less than twenty) but most of them were non-Qatari employees. This was the available option, or in other words the 'convenience sample'; the organisation was contacted and its participation in the research successfully negotiated. So, the pre-test was used with him and with his only Qatari employee before the start of the experiment. Also, the IT tool was set up on his computer and the employee's computer and training was provided. Table 7.6 presents an overview of "Organisation Three'.

-**Organisation Three**: One manager and one employee.
Manager position: general manager
Manager education: bachelor of engineering
Manager work experience: (4 years) + (9 years as manager) = (13 years)

Table 7.6: Experimental study, overview of the organisation in round two

7.4.1 Experimental Study Results (Organisation Three)

After the end of the two week period, the results showed no difference in utilising the IT tool. The manager in this experiment did not use the IT tool; even the 'leadership awareness IT function' was not utilised.

To understand what happened and why the IT tool was totally neglected by the manager, a one-to-one semi-structured interview was carried out with the manager. He was asked **why he had not used the IT tool**, and his answer was: "I do not want to use the communication IT function to send messages to motivate my employees when I can use the email to do that, but I want a list of ready-made motivation messages for me to send by email." Also during the interview, it was clear from his words that because the organisation was going through a difficult phase in its life (the establishment phase), all the focus and resources were directed towards operation. This meant two things: firstly the manager's priority was to get the organisation going and not to adopt and practice skills to improve the workforce's motivation and capabilities, secondly the manager revealed that the organisation still had no work system such as job descriptions for staff, procedures for evaluating staff or even a clear organisational structure.

7.4.2 Discussion of Round Two Experiment Results

The results of this experiment show that top management is not the only issue that can impact the effectiveness of the IT tool; equally relevant were the other two issues identified in the previous round of experiments, which were the issue of non-existence of a professional work environment and the means for utilising the IT functions. Table 7.6 summarises the results of this round.

No.	IT tool	Org ID	Experimental Group		Period	Results
			Pre-Test	Post-Test		
1	All the IT functions in one IT tool (Awareness- Communication- Guidance and development – Project management)	Org 3	(T)	Interview	2 weeks	No usage
(E):Experimental Group (C):Control Group (T):Test was administrated (Intv) Interview was conducted						

Table 7.6: Phase three, overview of the results of round two experiment

After these two rounds of experiments the researcher was close to concluding that the IT tool developed based the proposed approach cannot perform the role of enabling the social subsystem functions to exist in the work environment and thus could not support something which did not already exist. It was concluded that in the organisations that hosted the experiments, the FIT between the social and the technical subsystems did not exist and therefore the IT tool failed to perform its role in this STS. However, the researcher was reluctant to accept this as the final conclusion because of one possible factor which may have had an impact on the effectiveness of the IT tool. This factor had not been taken into account in the previous rounds of experiments because it was an issue that had been brought up by the participating managers during the previous rounds. This possible factor was the technical need of utilising the functions of the IT tool without using the tool itself. Or in other words, the managers liked the functions of the IT tool but they wanted to utilise them on the existing IT systems they already using at work.

This issue was not clear in the previous rounds of the experiment nor in the process of studying the social subsystem when Grounded Theory was used because it is an issue that is linked to the future state of the situation rather than the current state of the problem situation. It is an issue that the CLIC (Champion et al., 2005) approach addresses by applying the SSM principles (Checkland, 1981) in its fourth phase, “the ideas into practise” phase. This phase emphasises learning about the technical solution with the people involved in the situation.

The study of the impact of this factor on the IT tool's ability to perform the role of improving the Qatari workforce's motivation and capabilities led the researcher to the third and final round of experiments, conducted using a new version of the IT tool that fulfilled this technical need. The next section will describe this study and will present its results.

7.5 Conducting the Experiments (Round Three)

This section describes the development and the impact of a new IT tool. This IT tool provided the same IT functions as previous versions but utilised the existing IT systems available at the organisations and focused more on improving leadership awareness. The following two sections will describe how the new IT tool was developed, then how it was used in the three organisations and lastly, it will present the results of these experiments.

7.5.1 Development of IT Tool Version Three

As explained earlier, this new version of the IT tool was developed based on suggestions which came from the managers, who requested a technical need that had not been identified in the phase three of this research (described in Chapter Six). This technical need was practically realised as **technical integration**. It was understood as an integration that could allow the IT tool's functions to be integrated with the IT systems already being used in the organisation.

The problem facing the fulfilment of this technical need was the difficulty in actually integrating the IT tool's functions with the IT systems that the managers proposed, such as the HR Enterprise Resources Planning (ERP) system as suggested by 'Organisation One' or the email system as suggested by 'Organisation Two' and 'Organisation Three'. Because these IT systems were ready-made commercial software, they were therefore not open to a third party non-certified modules or applications to integrate with their functions. Hence, the researcher benefited from one suggestion that particularly came from the manager of 'Organisation Three' who asked for ready-made motivation messages which he could use instantly to motivate his employees, instead of using the communion IT function of the IT tool. This idea prompted a new approach to be adopted in the research, summarised as **'technical integration leads to functional utilisation'**. This approach was understood as the integration that would allow the IT functions to be utilised by the already existing IT systems, rather than to technically integrate the IT tool itself as a module in these IT systems.

The conceptual design illustrated in Figure 7.1 describes how the new version of the IT tool was designed based on the 'technical integration that leads to the functional utilisation' approach to perform its functions to enable the social subsystem functions to exist and then to support them. This conceptual design consisted of two parts. The grey part represents the same IT functions used to develop the version one and two IT tools, while, the black part represents the technical subsystem that would utilise these IT functions.

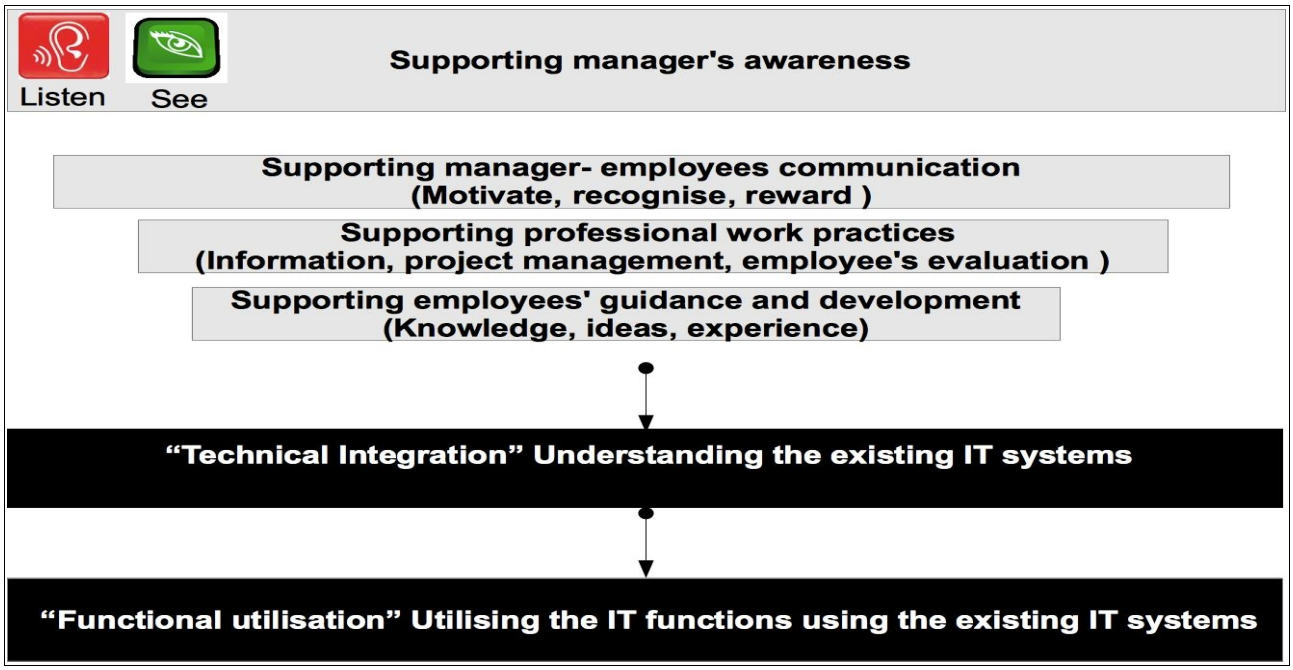


Figure 7.1: Conceptual design of the IT tool version three

The grey part of the above conceptual design focuses on the awareness functionality, due to the partial success of the 'leadership awareness IT function' in enabling some of the social subsystem function to exist in 'Organisation Two'. Therefore, this design made the awareness functionality an essential constituent in the new IT tool. Also, in order to develop this tool, the new design, the black part of the above conceptual design required a study to understand the existing IT systems available at the organisation so as to allow the right utilisation of them for the purpose of performing the IT functions.

Table 7.7 shows how the conceptual design was used to develop version three of the IT tool. In this table each IT function on the left was embedded in the awareness function and then they were all utilised by existing IT systems through samples, templates and URL links. The awareness was provided through the utilisation of the computer's screen to provide the visual means of getting the

manager's attention, while the computer's speakers were utilised to provide the acoustic means of attracting the manager's attention.

	Awareness	Integration	Utilisation
Supporting communication	Computer's display/ speakers	MS Office /Email	Samples/templates
Supporting guidance and development	Computer's display/ speakers	MS Office /Internet	URL links
Supporting professional work practices	Computer's display/ speakers	MS Office /Internet	Templates

Table 7.7: Utilising IT functions through existing IT systems

So the development of the new IT tool was based on identifying the IT systems in common usage in the Qatari organisations. These systems comprised computers that operate Windows XP OS and Windows 2000 OS, Microsoft Office (MS) application suite, Outlook email client and IE internet browser. Hence, to allow the new IT tool to utilise these systems, the tool was developed using Visual Basic version 6.0 (VB6). This was the Microsoft development platform specifically produced to allow the development of Windows-based applications. Therefore, IT applications developed by VB6 can work seamlessly with the Windows OS and all its applications.

So, developing this version of the IT tool did not require the same complexity that the older version required, such as connecting it to an online web and database server or programming it to execute complicated procedures. Instead, it was a simple tool that focused only on two main objectives: leadership awareness and utilising the identified IT functions through existing IT systems. However, since the importance of leadership awareness was high, as discussed earlier, the awareness was embedded in this tool in a way that can take the manager step-by-step through awareness highlights in order to become ready to utilise the IT functions through the existing IT systems. In the following section (7.5.1.1), this leadership awareness approach will be described followed by section (7.5.1.2) that describes the approach for utilising the existing IT systems to perform the IT functions.

7.5.1.1 Leadership Awareness

Leadership awareness was provided by this tool through two parts as illustrated in Figure 7.2. These two parts are only separated here in the figure for illustration purposes. The first part is located in the upper side of the tool as a *bar* which shows continuous moving messages about the importance of motivating employees. This part of the tool was developed to be permanently visible in front of the manager and cannot be closed. The tool itself is very compact (about 10cm x 7cm) and when it is resized to only its awareness function its size becomes (10cm x 2.5cm), so it does not distract the view on the computer screen. This part also automatically plays recorded voice reminders every hour with the same messages that were used in the 'leadership awareness tool' used in the older version of the tool. This part also has a button (the orange one) that can be used by the manager to play the reminders manually.

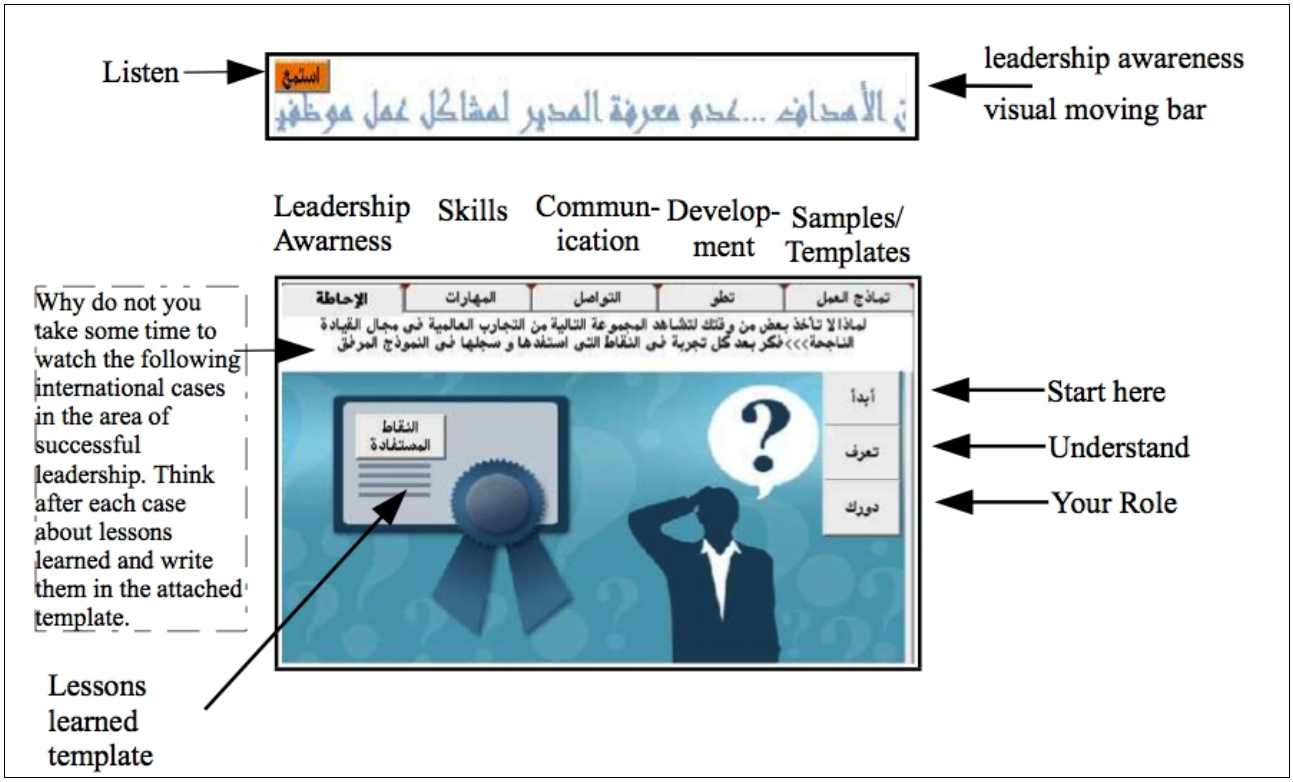


Figure 7.2: IT tool (version three, tab one)- introduction to leadership

The second part of the tool consists of five tabs. **The first tab** of the tool (lower part of Figure 7.2) aims to introduce managers to the concept of leadership. Hence, the approach consisted of providing them with three consecutive videos that talk about and describe leaders. The first

describes why leadership is important for organisations whereas the second describes what is the leadership role. The last video provides advice to managers about how to be successful leaders. These videos were selected from a collection of online media available to the public by the '50 Lessons for Leaders in partnership with IBM'. IBM is an international organisation which is well-known and well-recognised by people in the case study.

The second tab (illustrated in Figure 7.3) aims to direct managers' attention to think about their skills. It does this by providing them with an essential list of leadership personal skills (button: skills1) and professional leadership skills (button: skills2) which needed to be put into practise in order to improve the Qatari workforce's motivation and capabilities. These two lists were described to them as the results of this research's investigation. These two lists are the same used in the 'leadership awareness IT function'. The tool also asked managers- after reading these two lists, to start thinking about and compare their actual professional and personal skills and the required skills presented in these lists, and to write the result in 'My skills' template, provided to them in the tool.

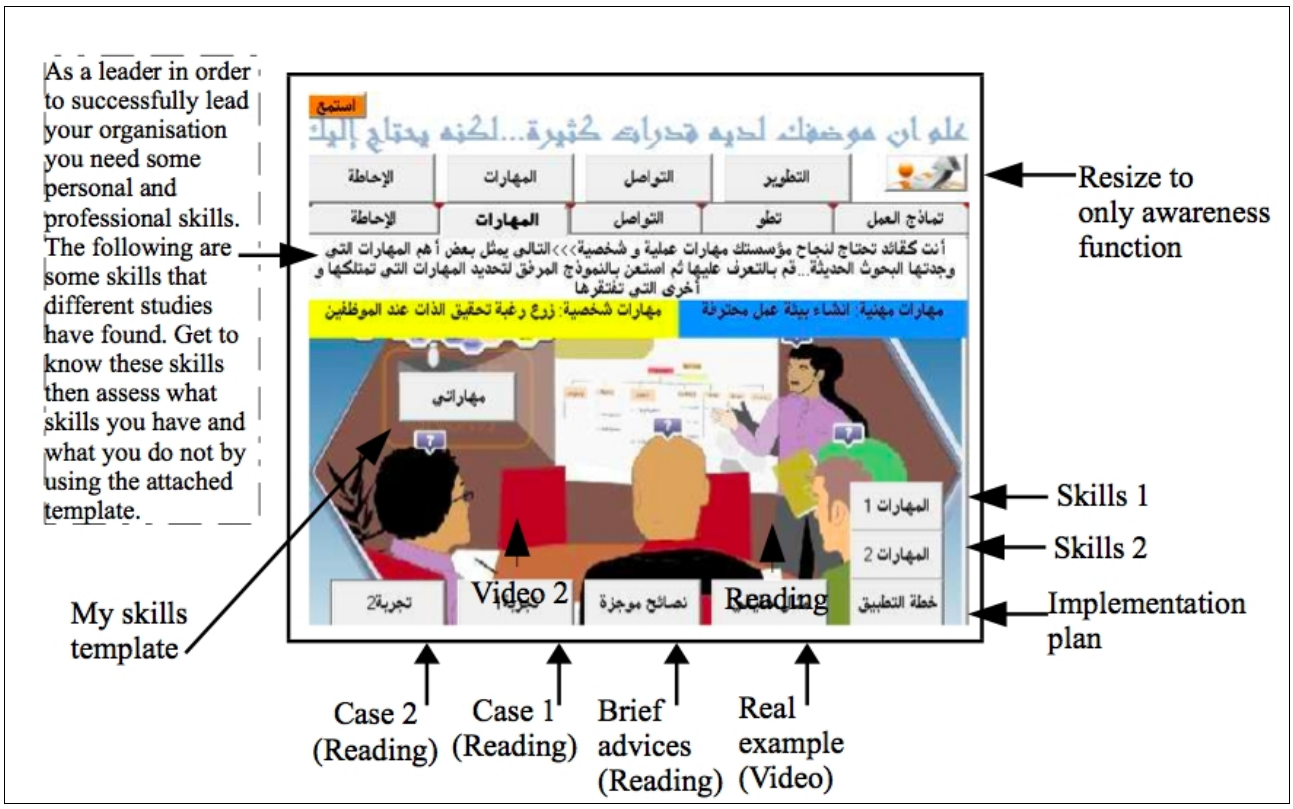


Figure 7.3: IT tool (version three, tab two)- leadership skills awareness

Also this tab provides the manager with a video from the same IBM leader collection, which speaks about real leaders who have successful leadership skills that have made them great leaders of their organisations. In addition, there are two cases from 'Insights From the Global CEO study' by IBM (available online at http:\\public.dhe.ibm.com), which are about leaders who through their leadership skills were able to change their organisations. With inspiration from these resources, the manager can use a proposed approach (button: implementation plan) to transform his improved leadership skills into a plan for the improvement of their workforce's motivation and capabilities. This proposed plan was prepared based on knowledge acquired from this research study in phase one (see Appendix X (1)).

The third tab (illustrated in Figure 7.4) aims to raise the awareness of the manager of a specific problem that was encountered throughout the case study. This problem is the lack of communication between managers and their employees, which not only leads to employee dissatisfaction but also means managers are entirely unaware of their employees view of them and their work, an issue that if prevented, would probably become a reason for managers to change their management approach. Hence, this tab was developed to help in preventing this problem by giving the manager the decision to use a ready-made online survey (using formsite.com) to send it to employees and then to receive the results by email.

Figure 7.4: IT tool (version three, tab three)- communication awareness

The survey was created using the available employees' satisfaction template from the website formsite.com. It asks about employees' opinions about some necessary aspects that usually concern employees at work as well as asking questions about what they like and do not like at work.

The IT tool utilises the existing email client to send the survey and to receive the results, through the URL link that leads to the online survey which the manager needs only to copy and paste in a new message and then send to all employees.

The fourth tab of the leadership awareness (illustrated in Figure 7.5) aims to provide managers with the required knowledge to start changing the work environment. This tab includes a list of easy to read, very brief resources that give direct ideas and suggestions of how to build a professional work environment.

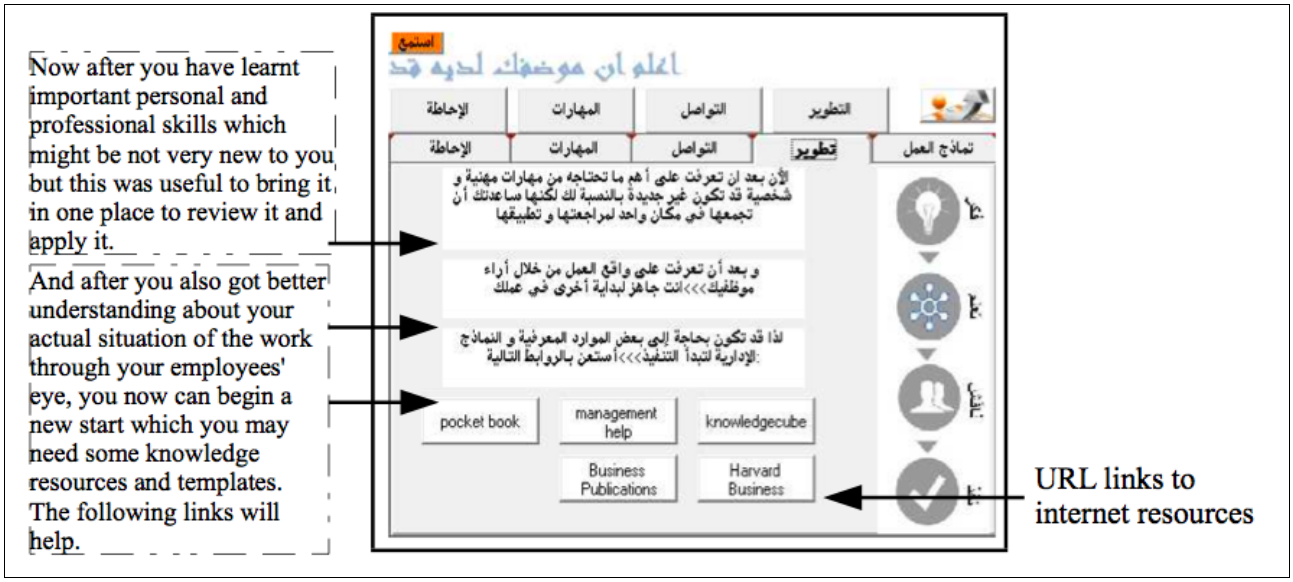


Figure 7.5: IT tool (version three, tab four)- professional development awareness

7.5.1.2 Utilisation Function

The Fifth tab (illustrated in Figure 7.6) provides the means for managers to go forward and transform their enthusiasm for change into immediate real changes using some samples, templates and online tools for creating a professional work environment.

This tab in the tool provides the means for utilising the existing IT systems for a communication that raises and satisfies the personal objective of self-esteem. It provides sample motivation cards and template letters (see Appendix X (2)). For conveying essential information about the organisation's mission, vision and goals as well as making the work objectives of each employee

clear, the tab provides a sample and template for documenting this essential information that employees need to know (see Appendix X (3)). And for evaluating and rewarding employees' achievements, the tab provides a sample evaluation and rewarding system (see Appendix X (4)). Also this tab proposes an electronic means for allowing teams to work together and think together, using 'Google Docs' tools and 'Adobe Idea' online collaboration service. These samples, templates and tools were specifically selected with the help of the manager in 'Organisation Two'.

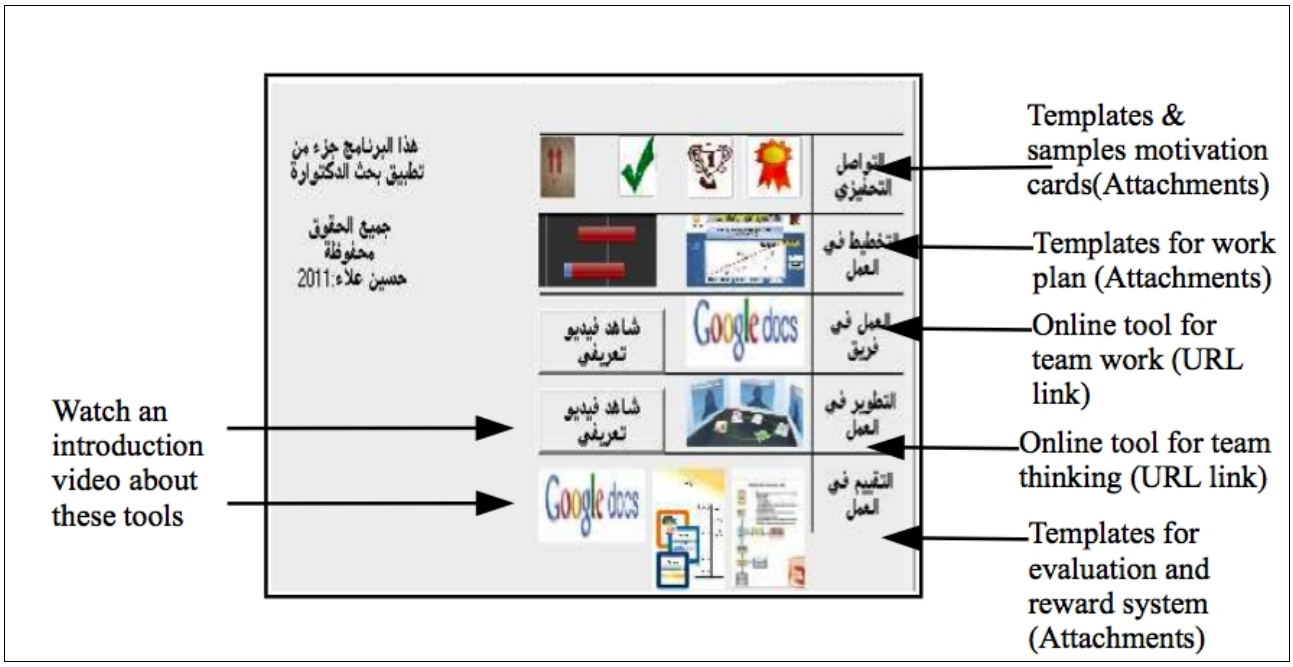


Figure 7.6: IT tool (version three, tab five)- professional sample, templates and tools

7.5.2 Experimental Study Design (Round Three)

As discussed at the beginning of this section, these experiments were designed to study the impact of a specific technical need as a possible factor of IT's ability to perform a role in an STS to improve the Qatari workforce's motivation and capabilities. Therefore, this experimental study was designed to find out if meeting this technical need and focusing more on improving leadership awareness would allow the IT tool to perform the role of enabling the social subsystem to exist and then support them. In order to prove or disapprove this effect, the study design included three different organisations, each with distinct characteristics, representing one of the social subsystem requirements in an STS to improve motivation and capabilities. These are professional and personal skills involved in effective leadership and the existence of a professional work environment. In addition, the research included the 'manager's power and authority' in the organisation.

To select the organisations for this study, some criteria for leadership skills and the professional work environment were produced. Table 7.8 shows leadership criteria used in the research, based on a discussion with a performance appraisal expert who worked in a governmental organisation in Qatar. This discussion was about what enables a manager to acquire leadership skills. The expert emphasised that this question had no straightforward answer but generally, he said that if the manager had the required knowledge in terms of a degree in the field of management and work experience of at least five years, then he should have acquired the necessary leadership skills.

- Five years of work experience in a management position.
- Holding a degree in business administration.

Table 7.8: Leadership criteria

On the other hand, Table 7.9 presents the professional work environment criteria. These criteria were selected as they were the basic professional features of a work environment identified by this research's study of social subsystems in different Qatari governmental organisations.

- Defined work objectives/policy/strategy.
- Functional organisational structure.
- Defined job description for all employees.
- Documented work procedures.

Table 7.9: Basic professional work environment criteria

After deciding on these criteria, finding organisations for experimenting with the new IT tool was the challenge. Therefore, the same sampling approach undertook previously in this research was adopted, which was through contacting previous research participants and people who were supportive of the research. The result of this search was two new organisations, each matched one group of criteria. '**Organisation Four**' was selected because one manager in this organisation met the criteria of the leadership while its organisation did not meet the professional work environment criteria. '**Organisation Five**' was selected because its work environment met the criteria of the professional work environment but the manager did not meet the leadership criteria. Lastly, '**Organisation Three**' was contacted again to participate in this round of experiments as it was

difficult to find other organisations in which the top manager himself could use the IT tool. Table 7.10 lists these organisations with the group of criteria they matched.

In 'Organisation Four', the same manager was interviewed who had been interviewed in the first phase of this research when she was head of the training and development department in one of the case study's organisations. She was known for her efforts in developing employees skills in her previous organisation but was not fully supported by the top management there. Therefore, she left this job after she received a job offer to become the HR manager of 'Organisation Four'. In her new position, she was given the task of developing the HR department of this organisation. This manager has a degree in management and work experience of at least five years as a manager. So this manager met the leadership criteria while her department did not meet the basic criteria of a professional work environment. Thus, the manager and her organisation were an appropriate choice for experimenting with the new IT tool, to study its impact on enabling the existence of the professional work environment when the manager has the leadership skills.

Leadership criteria	Org Three	Org Four	Org Five
- Five years of work experience in management capacity	Yes	Yes	No
- A degree in business administration	No	Yes	New Graduate
Basic professional work environment criteria	Org Three	Org Four	Org Five
- Documented work objectives/policy/strategy.	No	No	Yes
- Functional organisational structure.	Yes	Yes	Yes
- Defined job description for all employees.	No	No	Yes
- Documented work procedures	No	No	Yes

Table 7.10: Matching organisations with criteria

The manager of 'Organisation Five', in contrast, was a new business school graduate who had only six months of managerial work experience. She also was one of the people who was interviewed in phase one of this research when she was an employee in the HR department. Her appointment to become the manager of this department was a surprise for everybody in that organisation. She told me that she was appointed to this position to manage a new organisational wide restructuring project that involved many changes. The top management thought it required a young, active and open minded person to handle such major changes. Before becoming HR manager, she had only six months of management experience as a head of the performance management and development section. On the other hand, the organisation and the department were very well-established and met

the basic professional work environment criteria. Hence, this organisation was the appropriate choice for experimenting with the new IT tool to study its impact on enabling the manager's leadership skills when the basic professional work environment already exists.

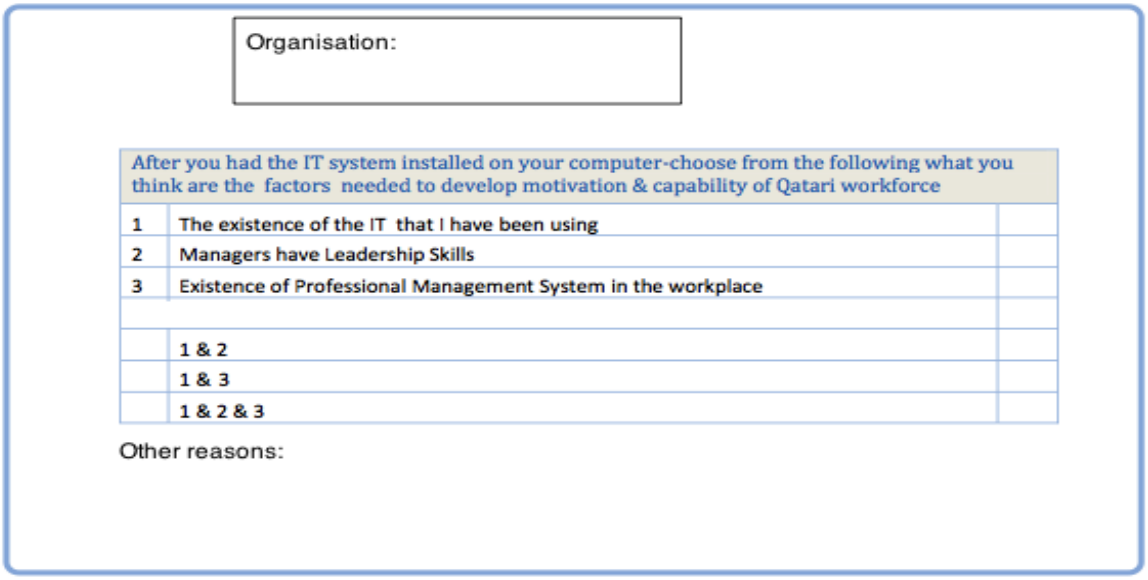
7.5.3 Experimental Study Results (Organisation Four and Organisation Five)

One main result came out of this round of experiments was no utilisation of the IT tool in all three of the organisations. The three managers did not use the tool during the period of one month given to them, even though the tool was developed to be integrated with their IT systems and was focused on improving manager's awareness. Table 7.11 shows the results of these experiments.

IT tool	Org ID	(E) Group		(C) Group		Period	Results
		Pre-T	Post-T	Pre-T	Post-T		
IT tool version three	Org3	(T)	Intv	/	/	1 Month	No usage
	Org4	(T)	Intv	(T)	/	1 Month	No usage
	Org5	(T)	Intv	(T)	/	1 Month	No usage
(E):Experimental Group (C):Control Group (T):Test was administrated (Intv): Interview was conducted							

Table 7.11: Experimental study, overview of round three experiments results

Semi-structured one-to-one interviews were conducted after the end of the one month period to understand better the results of these experiments. For the purpose of these interviews, a new data collection instrument was used (see Figure 7.7) which asked one question to get manager's reflections on the idea of using the IT tool to improve the Qatari workforce's motivation and capabilities. In other words, the aim was to get answers from these managers not as opinions, but rather as reflections on a real situation. This question was: “Choosing from the following options, after you had the IT tool installed on your computer, what do you think are the factors needed to improve the Qatari workforce's motivation and capabilities?”. Answers options were, Option one: the IT tool that was installed on their computers. Option two: leadership skills of managers. Option three: the existence of a professional work environment. Other options were a combinations of the above options as shown in the instrument.



Organisation:

After you had the IT system installed on your computer-choose from the following what you think are the factors needed to develop motivation & capability of Qatari workforce		
1	The existence of the IT that I have been using	
2	Managers have Leadership Skills	
3	Existence of Professional Management System in the workplace	
	1 & 2	
	1 & 3	
	1 & 2 & 3	

Other reasons:

Figure 7.7: Experimental study, data collection instrument for round three experiment

First of all, it is important to mention that none of the managers in these organisations was told about the way the researcher had classified their organisation. This was essential so as not to affect the results of the experiments or their answers.

Results of this question are presented in Table 7.12 which shows that there was a general agreement about the IT tool's inability to either enable the existence of a professional work environment or to improve leadership awareness. This was articulated in the answers of the managers of 'Organisation Three' and 'Organisation Four' which both did not have the basics of a professional work environment in their organisations and both said that the professional work environment is needed along side the IT tool for making employees motivated and capable at work. On the other hand, the manager of 'Organisation Five', whose managerial work experience did not meet the leadership criteria, did not agree with any of the three factors. She said alternatively, for a manager to motivate employees, he or she needs a stable situation at work (opposite to the uncertain one) which produces issues everyday, leaving no time for managers to motivate employees. She was referring to the situation she had at her organisation. The result from 'Organisation Three' also indicated that having power and authority (top manager) alone has no big effect on making the new IT tool effective in performing its role. Also some comments on the new IT tool came from the manager in Organisation Four. She pointed out that an improved user interface and functionality of the tool would have encouraged her to use the tool. She specifically was not satisfied with the old style

interface and the font size. In addition, she asked for a new functionality in which the tool recommends to the manager different motivation actions everyday. She was not happy with the tool giving all these awareness highlights at one time.

Org ID	Criteria			Manager's answers after the experiment			Comments of the reasons of no utilisation
	Top manager	Manager skills	Professional work system	Answer 1: IT	Answer 2: Leadership skills	Answer 3: Professional System	
Org3	Yes	No	No	Yes	Yes	Yes	No time due to load of work
Org4	No	Yes	No	Yes	No	Yes	User interface & Functionalities
Org5	No	No	Yes	No	No	No	No time due to issues at work

Table 7.12: Experimental study, managers' answers after round three experiments

These results further proved the research's preliminary conclusion after the end of round two of the experiments. These results indicated the importance of the FIT between the social subsystem functions and the technical subsystem functions to improve the workforce's motivation and capabilities. In other words, these results showed that the non utilisation issue facing this research was a result of a non-FIT situation between the IT tool and the social subsystem it was working in. This firstly and clearly proved the IT tool's inability to enable the existence of social subsystem functions in the case study and secondly, demonstrated that the IT tool cannot support social subsystem functions unless they already exist, whether these social subsystem's functions require leadership skills or require a professional work environment.

In the next section, the researcher further validates and generalises these results by involving a bigger sample in the case study to give their input about IT's ability to improve the Qatari workforce's motivation and capabilities.

7.6 Survey Study

This was the last study in this research. The aim of this survey was to validate and generalise the research's results which indicated IT's limited ability to improve the Qatari workforce's motivation and capabilities.

7.6.1 Survey Study Design

The survey was designed to bring the results of the three rounds of experiments to a bigger sample in order to validate them. Therefore, this survey was designed to validate the following two findings:

- IT cannot enable a manager's leadership skills to perform the social subsystem's functions of raising and satisfying the workforce's self-esteem, required to improve Qatari motivation and capabilities.
- IT cannot enable the existence of a professional work environment, required to improve Qatari motivation and capabilities.
- IT can help Qatari organisations improve their workforce's motivation and capability when it is developed to support specific functions of the social subsystem in performing their role of providing human needs.

In other words, the survey was designed to assess the impact of these two factors (professional work environment and leadership) on the effectiveness of the IT tool for improving the Qatari workforce's motivation and capabilities in what is called a 'cross-reference' (Creswell, 2009). Figure 7.8 shows the design of the survey in which the researcher validates the relation between a social subsystem, which is enabled by a manager who has leadership skills (and/or) a professional work environment on the one hand and the IT tool's ability to improve Qatari workforce's motivation and capabilities on the other. These relations were as follows:

- Relation (A): the proposed IT tool can enable the existence of the social subsystem's functions and support them to improve the Qatari workforce's motivation and capability.
- Relation (B): the proposed IT tool can support the social subsystem functions only when the social subsystem of the organisation is already enabled to perform its functions to improve Qatari workforce's motivation and capability.
- Relation (C): the proposed IT tool cannot be utilised either to perform the role of enabling the existence of the social subsystem's functions or of supporting them.

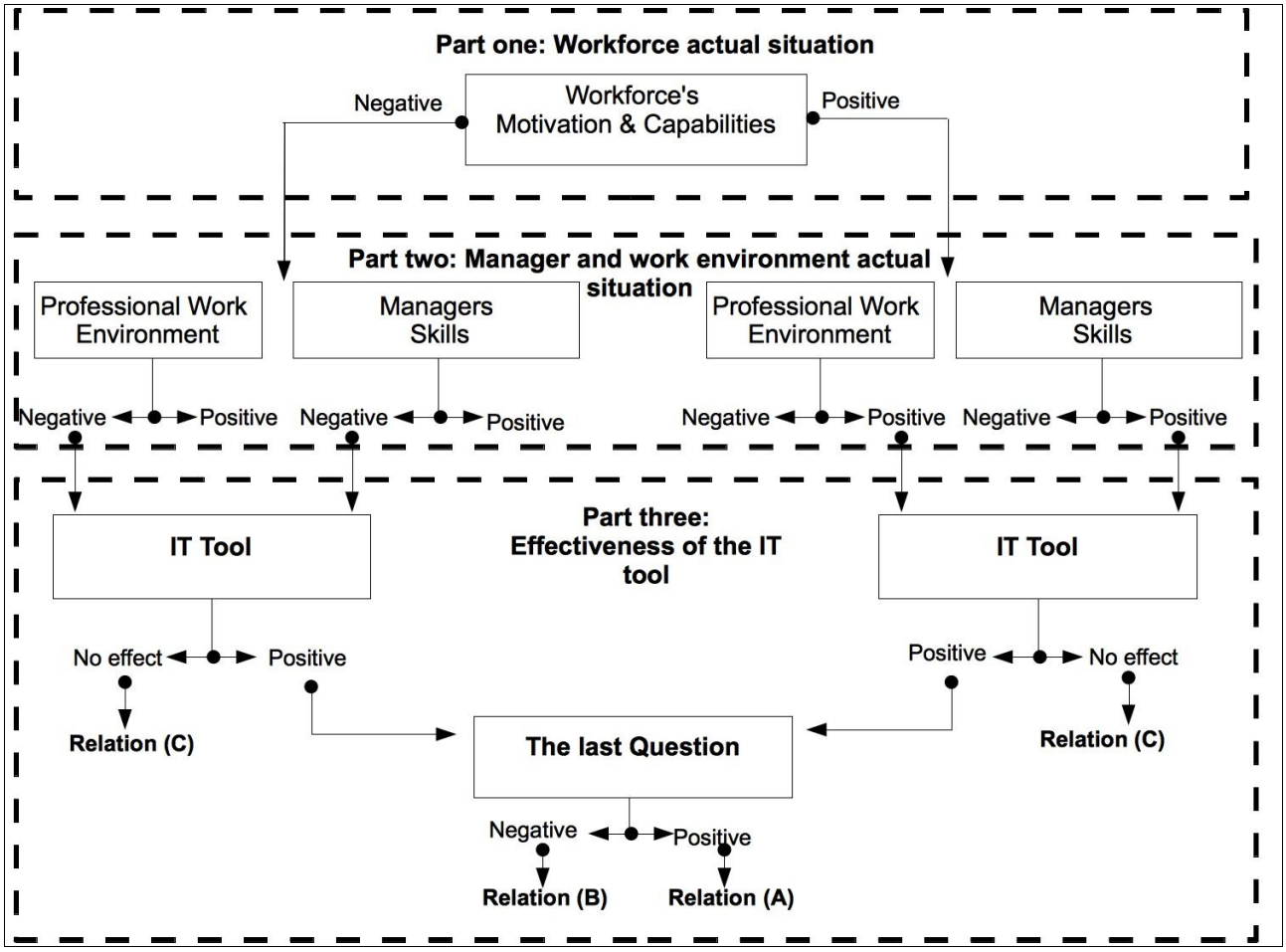


Figure 7.8: Survey design

Figure 7.8 illustrates the survey design in three parts, each part serves a specific role in the survey. **The first part** starts by asking two questions about the actual state of the employee's motivation and then about the employees' capability.

It was understood that these two questions as well as the next questions could not be answered by just anyone in an organisation. Therefore, the selected population to answer these questions was only HR and training managers, as will be discussed in section 7.6.2.

The second part of the survey asked about managers' current skills and professionalism of the work environment. The answers to this part relate directly to the answers in the first part. As illustrated in the above figure, the results of the first part set the direction of the analysis for the second part. If answers in the first part were **positive,** or in other words, employees' current motivation and capabilities were considered high, then the second part would try to establish a relation that related the employee's positive situation with either the managers' skills or the extent to

which the work environment could be deemed a professional one. If on the other hand, the answers were **negative,** or in other words, if the employees' motivation and capabilities were considered low, then the second part would try to relate the employee's negative situation with either the managers' skills or the professionalism in the work environment.

The third part of the survey asked about selected IT functions to find out about their ability to enable the improvement of manager's leadership skills and/or to enable the existence of the professional work environment. The answers to this part relate IT functions with the previous answers in the second part. If the answers in this part were positive or in other words, these IT functions had had a positive impact on the improvement of manager's leadership skills and/or the existence of a professional work environment and at the same time, answers to the second part were negative or positive, the last question in the survey would decide whether the IT functions could perform the role of enabling (relation A) if it was positive or only supporting (relation B) if it was negative. Otherwise, if the answers to this part were negative, this would indicate that these IT functions cannot enable or support the social subsystem to improve motivation and capabilities (Relation C).

It is worth mentioning that all the questions used in the second part of the survey were based on the phase one study of the needs of the social subsystem in Qatari organisations to improve Qatari workforce's motivation and capabilities. The questions in the third part of the survey were based on the study of the IT functions in phase two as well as an understanding of the technical needs of the IT tool, discussed in Chapter Seven.

Lastly, in the third part of the survey, illustrations (screen shots) of version three of IT tool were used when asking the questions. This was to allow respondents to understand what exactly the question was asking about so they could answer it with accuracy and not by guessing. Survey content validity was also checked by running a pilot test of the survey with two IS researchers (Creswell, 2009). A copy of the survey can be found in Appendix (Y).

7.6.2 Sampling and Process of Inquiry

Table 7.13 presents the overview of this process. A self-administrated online questionnaire was prepared to collect the data from a population consisting of HR and training managers in all governmental organisations. This population was selected because HR and training managers usually have a direct interest in improving an organisation's staff satisfaction and capabilities. This

population includes the people who have the required knowledge about their organisations to answer the survey's questions.

A single stage sampling procedure was used in which a list of all the governmental organisations was obtained, which the researcher then used to search for the emails of the HR or training managers of these organisations, as available on their organisations' websites. If the email was found, then this organisation was included in the sample. Then, the researcher sent emails to the people in the sample with a cover letter explaining the aim of the research, an overview of the questions, average time for answering these questions and their privacy and confidentiality rights. The URL link for the online questionnaire was provided at the end of the cover letter. When managers clicked on this link, the email forwarded them to the online survey where they could begin answering the questions. Also, to improve the response rate, the researcher sent reminder emails to all managers in the sample list after two weeks, to remind them to answer the survey. The survey was sent to thirty one managers of which seventeen answered, as shown in Table 7.13.

Population Size	50	Respondents	17 (55%)
Sample size	31	Non-respondents	14 (45%)
Data collection method	Nature of the Survey	Type	
Self-administrated questionnaire	Cross-sectional	Online questionnaire	
Population	Instrument	Protocol	
HR or training managers in Qatari governmental organisations	Web-based survey	Sending emails including a cover letter and URL link to the survey	

Table 7.13: Survey study, overview of process of inquiry

7.6.3 Survey Results and Analysis

All data received from respondents were analysed using descriptive analysis. The analysis was divided into three parts, similar to the parts introduced in the design of the survey in Figure 7.8.

7.6.3.1 Analysis of Part One

Part one aimed to find out the actual level of employees' motivation and capabilities. This part consisted of two questions:

Q1- *In your organisation, do you have low motivated employees?*

Q2- *In your organisation, do you have incapable employees who are unable to achieve their assigned objectives and goals?*

Table 7.14 shows that most answers were leading towards an understanding that there was a problem directly related to the workforce's motivation and capabilities in the organisations of the respondents. The table shows (14) out of the (17) respondents indicated a problem in the motivation and capabilities of their workforce. This result was driving the research towards the **negative part** of the survey design.

Social subsystem actual situation	Low motivation		Not capable		Analysis direction
The workforce's motivation and capabilities	No	Yes	No	Yes	**Negative**
	2	15	3	14	
	12%	88%	18%	82%	

Table 7.14: Survey results- current situation of the workforce's motivation and capabilities

7.6.3.2 Analysis of Part Two

This part asked one question to find out what HR and training managers thinks about managers' actual professional awareness and skills in their organisations. This part also asked several questions to find out about the level of professionalism in the work environment of their organisations.

This question used to assess managers' professional awareness and skills, the question asked managers to rate how strongly they agreed or disagreed with each of the statements listed below. These statements summarise the professional awareness and skills that are necessary for a manager to be able to improve the Qatari workforce's motivation and capability:

1- *Managers' awareness about their role in the organisation (in terms of creating professional work environment in the workplace) is high.*
2- *Managers have professional skills (such as: planning, creative thinking, adapting to change and communication skills).*
3- *Managers have personal skills (such as: trust, honesty, respect and understanding employees' needs).*
4- *Managers' awareness about the needs of their employees to achieve their self-esteem is high.*

The analysis of the responses was done by categorising them into three groups. The high skills group represented responses which strongly agreed and agreed with the statements.. The medium skills group represented responses which neither agreed or disagreed. The low skills group represented responses in which 'disagree' and 'strongly disagree' were selected. Table 7.15 shows that only (38%) of respondents answered that managers in their organisations had some or all of the necessary professional awareness and skills. Whereas, (61%) of respondents indicated medium or low awareness and skills. This result suggests that generally, more than half of the managers in these organisations did not have the high level of necessary awareness and skills. This result indicates a negative direction in the analysis.

Social subsystem actual situation	Rating managers' professionalism			Analysis direction
Managers' awareness and skills	High skills	Medium skills	Low skills	**Negative**
	38%	23%	38%	61%

Table 7.15: Survey results- managers' current awareness and skills

With regards to the question which was used to assess the actual level of the professionalism of their work environment, the question asked respondents to use the following categorical scale: do you have it, do you use it and is it important for improving motivation and capability of employees. This part of the survey consisted of the following statements:

1- *Long-term plan for the work which is easy to understand.*

2- *Clear objectives and follow up forms and procedures for each employee.*

3- *Teamwork tool to assist in the collaboration between employees in a project.*

4- *Knowledge, experiences, ideas sharing tools.*

5- *Project-based evaluation tool for employees (where an employee has clear tasks related to a project and is evaluated based on his/her work on them).*

6- *A reward system that rewards achievements when they occur, NOT waiting till the end of the evaluation period.*

Table 7.16 presents the results of this question which shows that only (39%) of respondents answered that they have and that they use one or all of the characteristics described in the above statements. At the same time, (58%) of respondents believed that what was described in the above statements was important for the motivation and capabilities of the Qatari workforce. So, the (39%) result also indicated a negative direction in the analysis.

Social subsystem actual situation	Rating Work's Professionalism		Analysis Direction
Work Environment	Have and use them	Important	Negative
	39%	58%	39%

Table 7.16: Survey results- current situation of the work environment

Negative directions of analysis in both of the above questions in this part means that the social subsystem of more than half of the respondents do not have in their organisations the necessary conditions to improve Qatari workforce's motivation and capabilities. The next part of the analysis will discuss whether the insufficiency in managers' awareness and skills and the low level of organisational professionalism can be improved using the proposed IT functions.

7.6.3.3 Analysis of Part Three

The third part of the analysis was the one that investigated the role IT could have on the Qatari workforce's motivation and capabilities. This part had two questions. The first question asked about the proposed IT functions to improve managers' awareness and leadership skills. This question asked specifically if the HR or the training manager thought these IT functions could be effective in making managers aware of important personal and professional skills. These IT functions were illustrated to these managers in their actual presentations (as screen shots). These IT functions were:

1- Computer's desktop background: image contains the most important leadership skills becomes a desktop background.
2- A voice reminder from computer speakers: it gives a manager advice on what he can do to improve employees' motivation.
3- Reading pdf documents: of the most important leadership skills as described in a professional study carried out by a well-known organisation.

4- Reading pdf documents: explain (step-by-step) how a manager can make a work environment ready for improving motivation and capability of employees.
5- Short videos: experienced managers talking about how their skills and leadership helped develop the workplace to achieve goals.

A categorial scale was used to respond, consisting of *(No, Not effective – Yes, effective - Yes effective, and If I have it I will use it).* Table 7.17 presents the results of this question.

Technical subsystem needs				Analysis Direction
IT functions to improve leadership awareness and skills	Effective	Effective and use	Not Effective	**Positive**
	50%	27%	22%	77%

Table 7.17: Survey result- IT functions to improve leadership awareness and skills

Results in Table 7.17 show that (77%) of the respondents believed that these IT function would be effective but only (27%) of them indicated that they would use them. This resonated with results from the three rounds of experimental study in which the managers responded positively to the potential importance of the IT tool but at the same time, did not use it.

The second question in this part of the survey asked about the proposed IT functions which were developed to help develop a professional work environment in the workplace. They were also illustrated to the managers in their actual representation (screen shots). In addition, they were provided with an URL link to visit and see some of the suggested tools and resources so that they could evaluate them directly themselves. Then the survey asked the managers the following questions:

1- Could an online survey tool sent by a manager to his employees with questions about their opinions and needs help a manager to better understand his employees? (If you do not know what an online survey is, then click here for an example: URL Link).
2- Could self-learning internet resources help managers to develop their skills? (If you have not used a self-learning internet resources before...you can check the followings (URL link provided).
3- Look below at these samples of motivational letters. Is this an effective tool for helping employees to achieve self-esteem by showing appreciation of their achievements even if they are small? (Illustration was provided).

4- Look below at this work plan sample for an employee. Is this an effective tool for creating professional work environment by clearly showing an employee what he/she has to do in the work? (Illustration was provided).
5- Look below at these tools (Google Docs tools). Are these effective tools for creating a professional work environment by providing some tools that help in practising how to do work professionally (such as work collaboration and idea sharing tools)? If you do not know these tools you can watch this short video about these tools (URL link was provided).
6- Look below at this performance evaluation tool. Is this an effective tool for both recognising and rewarding employees' achievements? (Illustration and explanation was provided).

A categorial scale was used for answering this question which consisted of (No, Not effective – Yes, effective - Yes effective, and If I have it I will use it). Table 7.18 presents the results of this question in which (93%) of respondents agreed that these IT functions were effective to achieve the tasks assigned to them. In addition, (66%) of them stated that they would use them if they were available.

Technical subsystem needs				Direction
IT functionalities to improve professionalism at a work environment	Effective	Effective and use	Not Effective	**Positive**
	27%	66%	6%	93%

Table 7.18: Survey result- IT functionalities to improve professionalism at a work environment

So the results of both questions in this part gave the same positive indications regarding the effectiveness of IT functions on improving the situation of the social subsystem, to be able to meet the needs of improving the Qatari workforce's motivation and capabilities. The analysis of the answers to the last question allowed the researcher to ascertain whether this effectiveness is related to the IT role of enabling the existence of these social subsystem's functions or whether it is only related to supporting them when they already exist in the organisation. Moreover, the last question aimed to find out if this IT tool, whether it is in an enabling role or supporting role, can help improve the Qatari workforce's motivation and capabilities.

7.6.3.4 Analysis of the Last Question

This question asked 'Do you think that using IT ALONE in this way can help organisations achieve their goals by improving the motivation and capability of the Qatari workforce?'

A categorial scale was used to answer this question with four options:

1- *IT alone in this way can help improve motivation and capability.*
2- *No. because it also requires professional work environment to exist in the workplace.*
3- *No, because it also requires leadership awareness and skills to be practised by managers.*
4- *No, because it needs both a professional work environment and leadership skills.*
5- *No*, o*ther reasons...Please mention.*

Table 7.19 presents the results of this question with only (4) respondents or about (24%) believing that IT alone, can help Qatari organisations improve their workforce's motivation and capability. The other (13) respondents or (76%) believed that IT with the fulfilment of the specific social subsystem requirements can positively impact Qatari motivation and capabilities. (35%) of them agreed about 'the existence of a professional work environment' and 'managers awareness and skills' together. Whereas, (29%) agreed only on the importance of leadership awareness and skills and (12%) agreed on the importance of only a 'professional work environment'. So the results of this question follow a **negative** direction or in other words, the proposed IT functions cannot perform the role of an enabler of the social subsystem functions to improve the Qatari workforce's motivation and capabilities. Hence, the overall results of this survey suggest that **relation (B)** is true, which means that the proposed IT functions cannot be utilised to enable the existence of the social subsystem functions but it can support them if they already exist.

Social and technical subsystem FIT	Options	Results
Can IT help improve motivation and capabilities of Qatari workforce?	Yes, IT only in this way can help in improving motivation and capability	24%
	No, it requires leadership awareness and skills	29%
	No it requires a professional work environment	12%
	No, it requires both	35%
	No, other reasons	0%
		Negative

Table 7.19: Survey results- social and technical subsystems FIT

7.7 Chapter Summary

This chapter has described the different stages of experimentation carried out to test the IT tool and to understand its impact. The experimental study showed no effect of the IT tool on the Qatari workforce's motivation and capabilities, due to lack of use of the tool by managers. These experiments indicate that the IT tool cannot perform the role of enabling the required social subsystem function to exist in the work environment to improve Qatari workforce's motivation and capabilities. This finding was further examined for the purpose of validation and generalisation in the context of a Qatar case study, using a survey. Results of the survey supported this finding which meant that the IT tool developed based the research's approach cannot achieve the objective of improving the Qatari workforce's motivation and capabilities. The results of these experiments are discussed thoroughly in the Finding and Discussions Chapter, in which literature will be reflected upon to understand what happened and why. Then in the Conclusions and Recommendations Chapter, lessons learnt, recommendations and insights based on what was learnt from this PhD research, are provided, with suggestions for future research.

8.Findings and Discussions

8.1 Introduction

In this chapter, the research findings and research method used to conduct this PhD research are highlighted and explained in relation to the literature. The research aim and objectives presented in Chapter One, Section 1.4 will be discussed in relation to the fieldwork findings and compared with the common problems identified in the literature and the method used.

The Introduction Chapter (Section 1.3.2) described the practical nature of this research and its main problem was to use an ISD methodology from a human-focused IS perspective to develop an IT tool to answer its question. Hence, a literature review in the main ISD approaches and methodologies was conducted, and two common problems were identified in Section 2.4, which were:

First: some ISD methodologies consider satisfying human resources' needs at the system operational level but do not apply the appropriate methods to actively engage them in all the phases of information system development. This problem in relation to research findings will be discussed in Section 8.2.

Second: some ISD methodologies that do consider human resources as the focus at both system development level and system operational level, provide few details on the practical approach to transform these considerations into an IT tool. This problem in relation to research findings will be discussed in Section 8.3.

8.2 Objective 1: Proposing an Approach for Developing the IT Tool

Initially, socio-technical theory (STT) was identified as the most appropriate theory to be used as a theoretical foundation to develop the IT tool for the purpose of improving workforce motivation and capabilities. ETHICS as an ISD methodology that applies STT principles was studied and then, SSM principles were used to overcome some of the limitations linked to ETHICS' participatory approach. The final approach therefore drew on STT concepts and ETHICS and SSM principles, as presented in Figure 2.5. The approach used to develop the IT tool for the purpose of answering the research question consisted of three main phases:

- The first phase involved understanding the needs of a social subsystem to improve workforce motivation and capabilities.
- The second phase was the transformation of this understanding into IT functions.
- The last phase was about understanding the needs of the technical subsystem for developing the IT tool to perform its functions.

In this research, it was found that the process of transforming the output of one subsystem to become an input to the other subsystem will only create a FIT at the level of system development but not a FIT that integrates the objectives of each subsystem to achieve the goal of improving workforce motivation and capabilities at the system operational level. Figure 8.1 illustrates this researcher's reflection on the results of applying the proposed approach. It shows a comparison of what was done to improve Qatari workforce's motivation and capabilities in Figure 8.1 (A) and what the results of the experiments clarified about the appropriate approach to improve Qatari workforce's motivation and capabilities in Figure 8.1 (B).

The experimental study findings presented in Figure 8.1 (A) show that when IT is developed to support a social subsystem which does not have the necessary characteristics in its work environment (information system operational level), the IT tool will not become operational and thus will have no impact on the workforce's motivation and capabilities. The other case presented in Figure 8.1 (B) based on the interviews conducted after the experiments and a survey distributed among Qatari managers, show that IT can improve the workforce's motivation and capabilities if the necessary managers and work environment characteristics are available in the social subsystem.

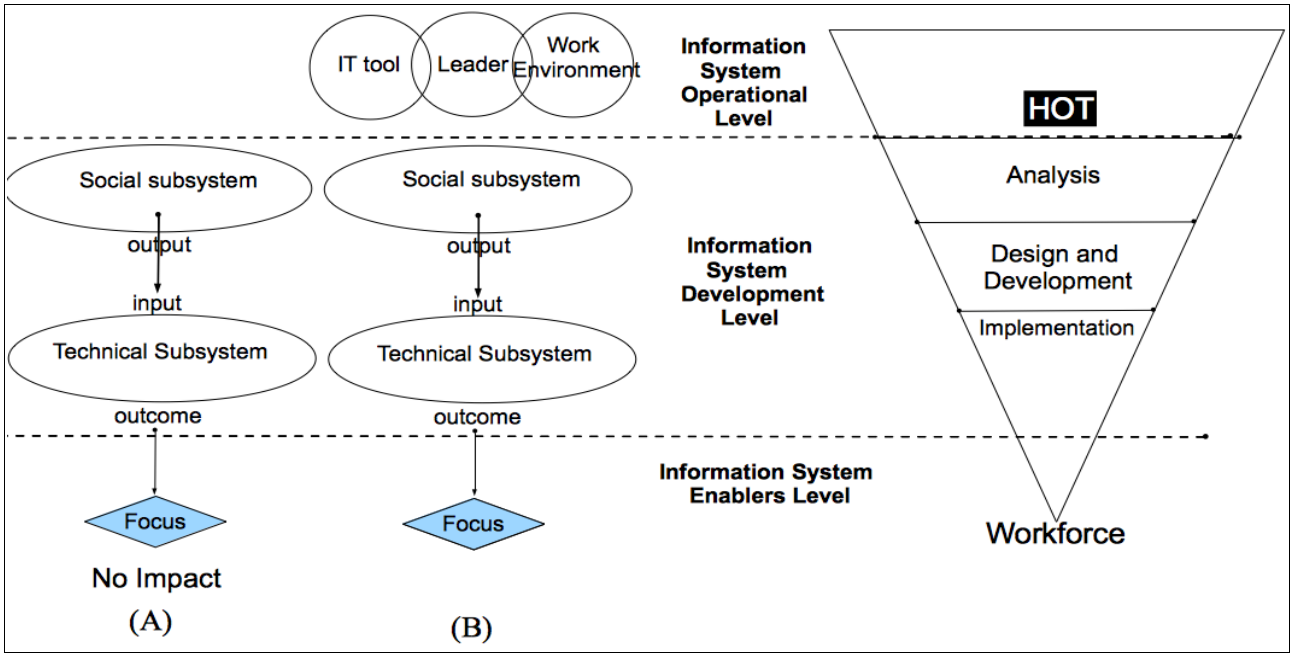


Figure 8.1: An application view of the research's approach

This finding is similar to those of the Oticon case study. Bjorn-Andersen & Turner (1995) indicated that Oticon passed through three phases to establish a socio-technical system that focuses on the workforce's humanistic needs, starting with a leader who was in charge of a change project aimed at improving the organisation's profits. The leader in this project decided to make this change focused on workforce humanistic needs, selecting human resources as the system enablers to achieve his change project goal. The project involved changes in the social subsystem that created a work culture and management practices that focused on the workforce's humanistic needs. These changes in this case can be considered at the system's operational level. Then, IT was developed to support the social subsystem changes, based on a study that involved employees and managers, which Bjorn-Andersen & Turner (1995) did not describe in detail. The project in this case focused on the workforce at the system development level. These two subsystems worked jointly to achieve the goal of focusing on the workforce's needs and successfully achieved the organisational goal as reported by Bjorn-Andersen & Turner (1995). This approach to using technology can also be seen from a professional point of view in a study conducted by Van Heck (2009). He studied Microsoft's new workplace in the Netherlands, which was awarded "the best workplace in Europe award". In this new workplace, Microsoft acknowledges that for the business to achieve "sustainable results", they need to offer the workforce "inspiration, flexibility, and the use of the newest collaboration tools" (p.1). Van Heck's (2009) study identified that a socio-technical FIT approach in this workplace demanded that both subsystems in the organisation jointly play a role to achieve this

objective. The social subsystem was used to enable management to encourage teamwork by providing spaces for collaboration and brainstorming with no private offices and no barriers between the employees themselves and their managers. The social changes were also supported using technology that supported it to allow easy collaboration, communication and knowledge sharing. However, Van Heck (2009) did not explore the technical development of the IT solutions in his article, which from this researcher's perspective is necessary to learn about. In another publication by Van Heck (2010) which also refers to Microsoft Netherlands case, the socio-technical systems are described as a combination of "the virtual dimension, the role played by technology", "the physical dimension", the role played by the new workplace and "the mental dimension, how people interact with the new technologies, new ways of working and a new environment" (p.4). He argues that this combination can improve "workforce satisfaction" and consequently improve organisational "performance". Van Heck (2010) specifically points to the role of technology in this context and encourages organisations to apply it.

This research's findings also concur with the ISD perspective of ETHICS (Mumford, 1995). The ETHICS approach is based on the understanding that in order to develop an information system that focuses on the workforce's humanistic needs, both social subsystem and technical subsystem should have roles. These roles should be understood at the information system development level and then subsequent changes should occur at the operational level to allow the information system to deliver its benefits. A comparison between the ETHICS approach and this research's approach will be discussed in Chapter 9 in Section 9.4.3.

Generally, the approach proposed in this research is primarily anti-positivist but also accepts the need for using positivist methods to construct the technical specifications. Thus, an "entangled" view (Orlikowski, 2009) of the social and technical subsystems in organisations led to the selection of a design and action theories of the STT, which adopts a functionalist paradigm (Burrell & Morgan, 1979), drawing also on SSM principles (Checkland, 1981). Learning from SSM principles was essential to overcome STT system development level limitation from a human-focused perspective. SSM principles as Symons (1991) describes, are a hybrid between traditional systems theory and a more interpretive methodology. Or in other words, it allows system developers to see the problem situation from the perspective of those who are involved. The combination of these two different concepts and principles were essential to develop the IT tool based on a human-focused approach at system operational level as well as system development level. In other words, this PhD

approach addresses the first problem identified in the literature by combining the systemic inquiry methods of SSM principles with the functionalist methods of STT concepts, hence "separating problem investigation from solution design" as suggested as a human-focused development approach by Gasson (2003, p.42). Gasson further suggests using our human abilities to reflect, analyse and "synthesize across incompatible domains of knowledge" to develop a human-focused technology (p.42) which in this PhD research was done by using Grounded Theory methodology, an interpretive approach, mainly qualitative, to understanding problem situation from the perspectives of all the individuals involved. This understanding then was used in a transformation process that applied DSR to develop the IT tool.

In summary, we can say that the approach which was proposed in this research to address the first research problem based on the STT supported by learning from SSM principles as an alternative to limitations linked to the participatory approach was able to engage people to all phases of ISD development but it was not able to satisfy their needs in the information system operational level. However, there are lessons learnt from applying this approach which can be applied in the area of developing human-focused IS to improve workforce motivation and capabilities as will be discussed in Chapter 9 (Section 9.4).

8.3 Objective 2: Developing the IT tool

This research has passed through several phases in developing the IT tool. The tool was developed based on an approach which was proposed after a literature review was conducted in the area of human-focused IS to find an ISD methodology that would practically allow the researcher to develop the tool. The proposed approach is illustrated in Figure 2.5 consists of three main phases. The first is about understanding the social subsystem needs and producing the required social subsystem functions to improve workforce motivation and capabilities. The second was about transforming the social functions into IT functions and developing them into an IT tool. The last phase was about understanding the needs of the technical subsystem function to allow the IT tool to perform its functions. The findings with respect to these phases are discussed in the next section.

8.3.1 The First Phase: Understanding the Social Subsystem

Understanding the needs of the social subsystem to improve Qatari workforce's motivation and capabilities was necessary to define the social subsystem's functions for transforming them later

into IT functions to be developed as an IT tool. In this research, Grounded Theory was used to find out about these needs and a theoretical model was developed based on this understanding to describe these needs and the relationship between them.

- This model shows the importance of three organisational elements in the social subsystem which need to be considered in order for the Qatari organisations' social subsystem to meet the workforce's needs: leadership, work environment and the workforce's need to achieve self-esteem.

Figure 8.2 presents this research's theoretical understanding of the social subsystem of Qatari government organisations, accompanied with the social subsystem functions (illustrated in the figure in white boxes) required to improve the Qatari workforce's motivation and capabilities.

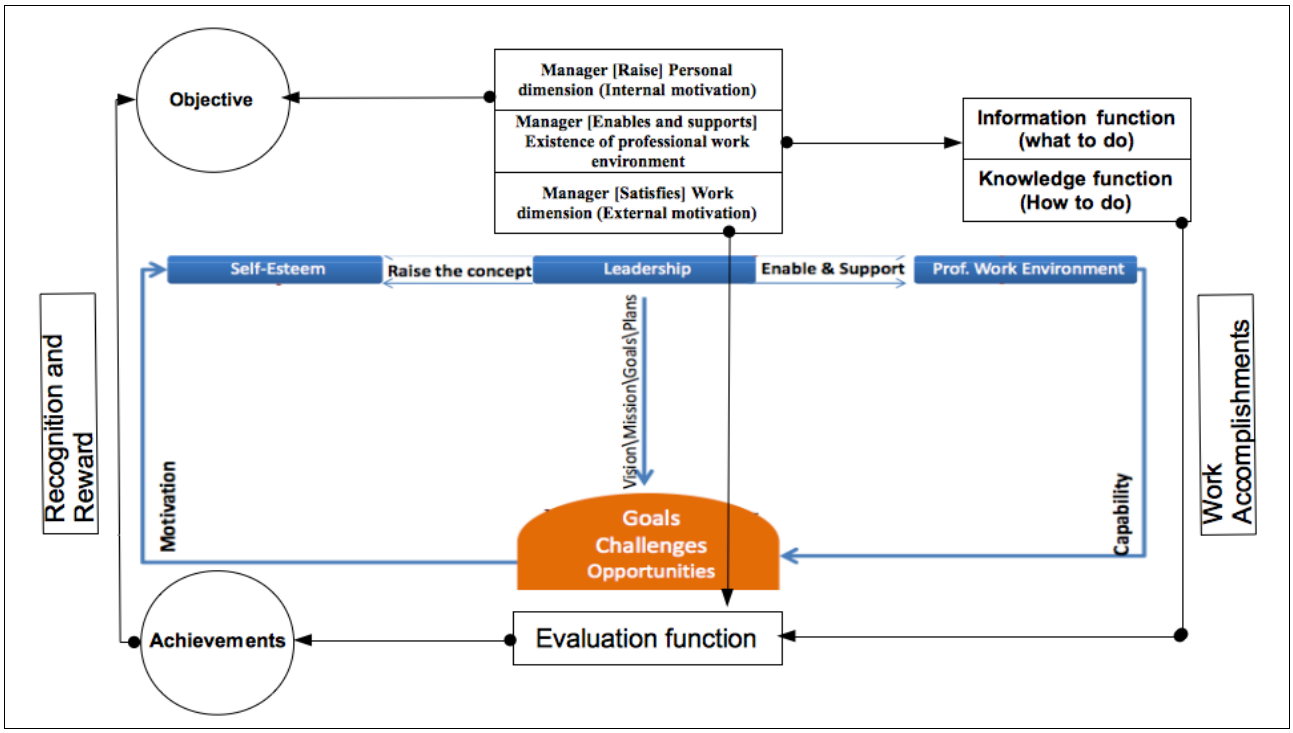


Figure 8.2: The model of the needs of the social subsystem and its related functions

Figure 8.2 shows that the leader is the main actor and as such, is required to satisfy the two main needs of employees, which collectively will affect employees' self-esteem. The first need is communicating with employees in a way that raises and satisfies their self-esteem, recognises their achievements and rewards them accordingly. This in turn requires that professional concepts and practices are applied in the work environment, which are: information about their organisation's goals and plans and the employee's role and responsibilities within these plans, as well as all other

information that they may need to start working towards achieving their organisation's goals, such as policies and procedures. But because not all the workforce may have the capabilities to achieve the work goals assigned to them, the work environment needs to also provide guidance from knowledgeable and experienced people, who can assist individuals to work professionally, enabling them to achieve their goals.. When evaluated using an evaluation function, the leader would recognise and then acknowledge their work achievements which will then form the basis for his/her decision to reward these achievements and publicise them within the organisation. This consequently will create a competitive work environment, fuelling the self-esteem of all employees. In addition, it will also become another motivation for other employees to work hard in a similar professional manner to achieve their work goals, because in this case they know that the work environment rewards the motivated and capable worker.

This researcher identified the following three functions that the social subsystem needs to perform in order to improve Qatari workforce's motivation and capabilities:

Social subsystem function (Number one)

Manager [Raise] personal dimension (internal motivation of self-esteem) [to] =

Positively affect employee's personal objective of self-esteem

In this function, findings show the essential role managers play to raise the personal dimension of employees' needs to achieve the personal objective of 'self-esteem', which when achieved affects employees' internal motivation, making them better motivated and capable at work. The researcher found that in this social function, managers need to discuss employees' personal goals and ambitions and inspire them to achieve those goals. These personal objectives then become a vehicle through which they can achieve or improve their self-esteem. This researcher found that self-esteem is the most powerful personal objective for motivating the Qatari workforce, which in turn becomes a motive for them to improve their work capabilities as well. On the other hand, this function alone is not enough to sustain the Qatari workforce's motivation and capabilities. The researcher found that another dimension was necessary in the social subsystem which was the work dimension of the employee's needs:

Social subsystem function (Number two)

Manager [satisfies] work dimension (external motivation of self-esteem) [to]=

Positively affect personal objective of self-esteem

The findings show that managers also need to satisfy the work dimension of the employee's needs by allowing employees to achieve their self-esteem through their work. This research found that satisfying the work dimension of employees' needs has a positive effect on employees' external motivation, required to achieve the personal objective of self-esteem. Both internal and external motivation is necessary to keep the Qatari workforce motivated. In the dimension of work, the researcher found that in this role, managers need to recognise, appreciate and make everybody in the organisation aware of other employees' achievements. In this way, employees who develop their personal goals to achieve self-esteem, then work accordingly to achieve them via the work, will receive the necessary recognition from the managers and from other employees on their achievements. As a result, self-esteem transforms from being merely an objective to an actual need that has been satisfied at work by the work and for the work. The results of implementing these two functions in the workplace, as the research established**,** will directly affect Qatari workforce's motivation and will affect indirectly their capabilities; in combination, they enable organisations to better achieve their goals. But, if organisations want this type of relationship between managers and their employees, they also need to meet another requirement:

Social subsystem function (Number three)

Manager [enables and supports] existence of professional work environment [to provide]=

(Information about organisation and work) (Professional guidance) (Evaluation system)

Findings show that a professional work environment is required for the other two social subsystem functions to achieve their objectives. A professional work environment can be achieved by making essential information about organisations and work available, providing the tools necessary for both professional guidance and professional development, as well as putting a work evaluation system in

place. It was found that in this function, managers have the role of supporting and enabling the existence of such a professional work environment by adopting and practising these functions. In other words, managers need to adopt professional work functions by making information related to work, such as the organisation's vision, mission and goals, job descriptions, work structure and work procedures, available to all employees. They also need to set work objectives for all employees, provide them with proper professional guidance and resources to allow them to work professionally towards their work objective. Lastly, they need to work on establishing an evaluation system that can professionally assess their employees' performance based on a professional rationale. This evaluation system should be designed so as to reward those employees who work professionally and achieve their objective and give them recognition over those who do not.

The three main social subsystem functions above were also found essential in the area of using technology for developing socio-technical systems (STS) as supported by George Gates -managing director of the Core-R.O.I consultancy-US socio-technical roundtable, who described an example of a "successful socio-technical re-design project" that included STS functions similar to those that this research has found such as: "open communication" between employees; "participative and facilitative leadership"; the "common goals" that are set to be "beneficial to employees [..] and the business"; "the continuous improvement of performance" strategy for the business and employees; and the "increasing [of] employee knowledge and commitment" (Mumford, 2003). However, Gates emphasised the role of "manager" in "support[ing] and coordinat[ing] rather than direct[ing] and control[ing]" and the importance of a "re-designed work environment" that provides "continuous improvement" to their workforce (Mumford, 2003).

Other studies, for example Brynjolfsson & Yang (1996), discussed in the literature review chapter, confirm these findings. Brynjolfsson & Yang (1996) view managers of organisations as playing the leading role in creating a work environment within which technology can be utilised to support humans to become more innovative. Other studies discuss the vital role the leader, self-esteem and a professional work environment play in an organisation in motivating employees. While they may discuss them from different perspectives, all agree on the importance of understanding employees' needs in order to motivate them. For example, Steers & Porter (1983) argue that motivation is driven by the needs of employees while McShane, McShane, & Glinow (2004) add that the needs of employees are not all monetary and identify intangible incentives that reward work achievements and teamwork. Steers & Porter (1983) argue that employees' own goals and behaviours have a big

role in their motivation and McShane & Von Glinow (2004) consider employees having goals as the most important factor of motivation because it clarifies what is required from them to achieve at work and hence they will focus on achieving them. McShane et al., (2004) further argue that this approach can be even more useful if goals are created that are specific, challenging and developed by the employees themselves.

Likert (1967) proposes that the best leader is the one who confers rewards based on the achievements of these goals. These goals have to be set in liaison with employees at all levels, so they feel real responsibility for their organisation and so that the work environment is characterised by communication and teamwork (Likert, 1967). It is important that managers have leadership skills that allow them to become a source of motivation for their employees, both personally, through their personal skills, and professionally through their professional skills, and that they know their employees' needs and are able to satisfy them personally and professionally. These results are also supported in a professionally focused study carried out by Accel-Team.com (n.d.) over a period of 20 years, involving 44,000 employees. The study, which set out to identify the factors affecting workforce motivation in a gas company in the US, elaborates on this relationship between employees and their managers. They explain the role of leaders in motivating employees as a set of activities in which managers assign goals to employees, treating them justly and fairly, appreciating their job's area of interest, rewarding them based on real achievements and guiding those who face problems at work with constructive criticism. This study adds another dimension to the aspect of the needs that link motivation with the work and organisations themselves. The results of Accel's study show that advancement in the workplace, type of work and an organisation's known reputation are important motivators for a workforce (Accel-Team.com, n.d.). These findings resonate professionally in the same study of Microsoft in the Netherlands by Van Heck (2009) who conducted two surveys, one before and one after moving to this new Microsoft workplace to assess the impact of a new STS that focused on satisfying the workforce's needs on their "work style and performance". Van Heck found that the new STS had improved the workforce's "mobility" and "flexibility" with little improvement in "productivity" and negligible improvement in "job satisfaction" as it was already "very high" before they moved to the new workplace. Van Heck's (2009) study also raised the importance of the role that "top managers" play in utilising technology in a socio-technical system, as well as to their roles in the "empowerment of employees" through their personal and professional skills. Van Heck states that managers on the one hand are required to "trust their employees" as well as to allow employees to "make their own decisions" and on the

other hand, also need to set “clear objectives”. Van Heck's study also supports this research's findings which links the motivation of the workforce with its capabilities. He discovered that the improvement in work productivity was related to improvement in “job competence”, “extrinsic job motivation” and “interaction outside the organisation” (p.2).

These findings should encourage organisations to establish STSs that focus on the workforce's needs so they can better achieve their organisational goals. However, we should also indicate that the task of establishing an STS requires people at management level in organisations to make efforts to deal with the different requirements of an STS, as we found in this research. For example, Carayon (2006) states the need for an in-depth understanding of the social subsystem also pointing out that all the STS models he explored stress the essential role of understanding the “interaction and relations” between people who use the system and the “elements of the socio-technical system” when developing a socio-technical system. This also requires, as we found in this research, the need to establish a professional work environment that focuses on the workforce's professional needs as well as the workforce's personal needs. With regards to the workforce's professional needs, we can refer to one large case study by Kim & Lee (2006) that involves five public as well as five private organisations in the Republic of South Korea. In this study, the workforce’s capabilities of sharing knowledge was studied in relation to management approaches in the organisations under study. The study showed that “performance-based reward systems” positively linked with the workforce's capabilities of sharing knowledge (Kim & Lee, 2006). Also in this study, the role of the leader in this type of work environment was highlighted as essential to provide “feedback” about the workforce's performance and “guidance” on how to obtain “specific knowledge and skills”. They specifically associate the word “fair” with the process of evaluating the workforce and also link the effectiveness of the management system for achieving the goal of improving the workforce's knowledge sharing capabilities with the leader's introduction of “career-development goals”, as well as with the “recognition” and rewarding of the workforce's achievements.

These findings from the Korean case study resonate with this case study of Qatar as well as other studies in other areas of IS in which technology interacts with professional work practises to positively impact workforce performance. An example is in the area of computer-supported cooperative work (CSCW) which Gill (1996) argues cannot produce successful technology unless it is applied with the considerations of the “human nature of cooperation”. It is also discussed in the area of Ergonomics through which technology can bring in “workplace well-being” (Heikkilä,

Ainasoja, & Oksman, 2015). In human resources management (HRM) practices it promotes employee engagement, performance management and training as effective strategies to positively impact organisations (Albrecht et al., 2015). The area of HRM practices was studied in relation to the role of IT in supporting them by many researchers such as Bartol & Liu (2002) who found that IT can have an impact on applying human resource management practices and hence a positive effect on employees' commitment and satisfaction. They argue that this in turn could improve organisational (workspace) performance. Another study by Carroll & Wagar (2010) found a link between the usage of IT and the improvement in the human resources management practices, such as the focus on “merit-based employee compensation” which, the authors explain, creates a work environment that encourages problem-solving skills.

Focusing on a workforce's professional needs alone, however is not enough to fulfil a workforce's humanistic needs, as we found in this research. A workforce also has personal needs, such as self-esteem in the case of Qatar. This important aspect of workforce needs is what differentiates the area of human-focused IS from the user-focused IS, as discussed in the Introduction and Literature Chapters. Approaches such as value sensitive methodology (VSM) (Friedman, Kahn, & Borning, 2006), human-driven design approach (HDD) (Niemelä et al., 2014) and life-based design approach (LBD) (Saariluoma & Leikas, 2010) focus on satisfying the humanistic needs of the people who use the technology. The recognition of personal needs is also evident in other areas such as quality of working life (QWL). Some studies only describe these needs from the perspective of QWL, for example, Morooka and Tsurushima (2014) who consider the workforce's needs as involving objective conditions and subjective conditions. The latter include personal needs such as “willingness” and “degree of success”. Others link personal needs with the impact they have on work such as Kuipers and Witte (2005) who identifies that “job enlargement” and “job enrichment” positively impact workforce satisfaction and involvement, resulting in better teamwork performance. In another study specifically concerned with self-esteem as a personal need, Pierce & Gardner (2004) summarise their input about motivation in what they called 'organisation-based self-esteem'. Their review of research studies which are related to the organisation and self-esteem over a period of more than ten years showed that employees' self-esteem “plays a significant role in determining employee motivation” when it is linked with organisational work and certain key elements which are “organisation structures”, “the messages sent by significant others in one’s social environment”, and “feelings of efficacy and competence derived from one’s own experiences” [p.593]. This finding is also supported by the findings of Van Baalen et al's (2007)

which emphasise the role of empowerment at work as significantly and positively affecting all the performance dimensions in the three cases studies conducted by them. They understand empowerment as "giv[ing] power to" employees and they relate this to three "cognitive variables" which are: "meaning" of a work goal, "self-efficacy" and "impact" of employees on the work (Van Baalen et al., 2007, p. 33). Lastly, a study conducted by an MBA student relates directly to a Qatar case study. The study that involved a sample size of (261) Qatari and non-Qatari nationals, in different organisations in Qatar, using a survey research method to collect data, concludes with two main findings. The first is that managers need "to give their employees responsibility and create platforms for feedback" to improve "employees' intrinsic value" and then "they will be able to develop themselves in their occupational role" (Mohamed, 2009, p. 14). The study also recommends that managers "should give enough room and create opportunities for responsibility and advancement in employee career path" (Mohamed, 2009, p. 3). This finding matches to some extent this research's findings in terms of the importance of the manager's role to create a situation that raises the desire of employees to achieve their self-esteem, which then reflects on their desire to develop themselves professionally for better career prospects. The other finding in Mohamed's study pertains to the "importance of providing information, knowledge and training to employees" and focusing on providing a "suitable work environment and conditions" (Mohamed, 2009, p. 2). This finding supports this research with regards to the importance of providing a professional work environment.

8.3.2 The Second Phase: Transforming the Social Functions into IT Functions

These IT functions were the result of transforming the understanding of the social subsystem's functions identified in the previous phase. The transformation process involved two studies: a qualitative study aimed to find out about the social subsystem processes that the IT functions need to perform in order to meet the social subsystem requirements. This study produced four processes as described in Table 5.6, which are as follows: the self-esteem process, the information process, the professional assistant process and the evaluation process. In the second quantitative study, a description of how these processes are required to be performed as IT functions was provided. These are described in Table 5.13, which are as follows: communication IT function, project management IT function, guidance and development IT function and the evaluation IT function. The result of this transformation was summarised in the following statements that define the

different functions of the IT tool to improve Qatari workforce motivation and capabilities:

Communication IT function (Number one)

IT function to raise and satisfy employees' self-esteem .

Project management IT function (Number two)

IT function to support employees to have goals at work

Guidance and development IT function (Number three)

IT function to support employees to achieve their goals at work .

Evaluation IT function (Number four)

IT function to support employees' achievements to be recognised and rewarded.

8.3.3 The Third Phase: Understanding the Needs of the Technical subsystem

Lastly, this phase for understanding the technical requirements involved developing an IT tool that would perform the IT functions identified in the previous phase. In this phase, the same employees and managers who were not specialists in IT, were supported to give technical specifications on how IT could work to achieve its objective. It is an approach that draws on CLIC (Champion et al., 2005). Descriptive and visual methods were made available to participants to help them identify technical needs. The methods consisted of prototyping and socio-technical scenarios using a demonstration video that showed a suggested way for using the proposed IT tool and then discussing it with participants. The other approach was the piloting approach, which was also used to allow them to experience the concepts they proposed in the previous phases in practise and then identify any technical needs.

The research found that studying the technical needs required more than prototyping, piloting or socio-technical scenario approaches because these methods only partially assisted in identifying the technical specification in the experiments, even though these methods involved people of the

situation actively, as suggested by the CLIC approach (Champion et al., 2005). The focus was on the future actions of the IT tool, with little attention devoted by the people in the situation on the current situation in terms of how the social subsystem might allow these functions to work in their actual work environment, an important aspect in CLIC approach.

Throughout this phase, whether prototyping, socio-technical scenarios or piloting methods, the researcher emphasised the practicality of applying the tool in their workplaces in his discussions with the participants, whether managers or employees. Nevertheless, participants in this phase did not give enough attention to the actual social situation when they described the technical specifications of the IT tool. It is important to understand why this occurred at the two information system levels identified in the introduction chapter: the information system development level and the information system operational level.

With respect to the information system development level, in this research, people in the situation were actively involved in all the phases of the ISD process, including different perspectives of people in the situation (i.e. employees in different ranks and managers) as learnt from the SSM principles. The notion of active participant involvement in the ISD process draws on the concept of user participation, as discussed by Lynch & Gregor (2004) who identified that a relation between the positive results of the process of system development ("system outcome") and the application of a development strategy that adopts "user participation" approach is determined by the "degree of user influence" in the process. Moreover, further analysis of the degree of user influence showed how it is determined by "type and depth of user participation".

There are three levels of participation, as Mumford (1979) describes: these types represent the magnitude of engagement in the process of development, and go from consultative (the least participation), representative (moderate participation) and consensus (highest type of participation). Consultative participation only requires system analysts to understand the needs of the users. Representative participation requires users who are affected by the new system in each group of interest in the organisation to have somebody represent them in the process of development. Consensus participation demands system analysts to engage all users through means of "communication and consultation" (Lynch & Gregor, 2004).

Meanwhile, depth of participation is dependent on three factors as stated by Lynch & Gregor (2004): the stages of system development that users are engaged in; the frequency of interaction with users in these stages; and lastly, whether their views on the aspects of the system at each stage

are considered or not. If users participate in all stages but their voices are not considered, this is regarded by Lynch & Gregor (2004) as “weak influence”. In contrast, if users' views are considered in all stages then this is considered as “strong influence”.

In the following Table (8.1), the degree of user influence is applied to this research to assess how user participation has influenced the outcome of this research. As Table (8.1) shows, the degree of user influence in this research was “moderate to strong”; moderate, because the type of participation is representative not consensual, but also strong because participation was in all phases, from the “conceptual phase” to the “ideas into practise phase”, with frequent interaction (on average twice in every phase). In addition, in this PhD research, the researcher aimed to develop strong relationships with participants by keeping in touch with them throughout the research project.

Research's phases	The degree of user influence	
	Type of participation based on Mumford (1979)	Depth of participation based on Lynch & Gregor (2004)
Understanding the requirements	Representative	Involved in all stages: yes Frequency: on-going Their voices are considered: yes
Developing the IT tool	Representative	
Assessing the IT tool	Representative	

Table 8.1: Assessing participation in the research based on type and depth of participation

The above approach to involving people from the situation in this research is seen from this researcher's perspective, supported by the above discussion of the literature, as playing a role in strengthening the commitment of the people to participate effectively throughout the ISD process. Sabherwal & Elam (1995) recognise this as an important factor in determining the outcome of ISD processes. Moreover, this kind of involvement also allows the establishment of a “rational discourse” with people of the situation that emancipates them from any “constraint” caused by psychological internal or socially external “compulsions” (Klein & Hirschheim, 1993). It consequently improved communication and allowed a shared understanding to emerge between the researcher and the people of the situation (Beers, 2014; Stowell, 2012; Checkland, 1981). Furthermore, it encourages people to be effectively involved in the situation (Lynch & Gregor, 2004; Mumford, 1981).

To summarise the above discussion, no issues can be related to the level of information system development in that respect. However, we can point to the information system operational level, as the cause of this problem. This conclusion is based on discussions and interviews with people from

the situation who were invariably positive about the IT tool and the role it would play in their work environment. They were expecting, in the same way as this researcher, that the IT tool would work and the work environment would gradually adapt to its functions. This proved to be not the case when the IT tool was put into operation. This important aspect of alignment or joint optimisation between the technology and work environment was a key aspect in the ETHICS (Mumford, 1995) approach, as discussed in Section 2.3.1. Other studies have indicated this, such as Fardal (2007) who argues that one important aspect of the success of an IT project is the existence of an alignment between the management of the IT project and the IT users. His study found that this type of alignment makes the IT project's goal more "sensible" for users as well as management. Another way of understanding what happened can be explained from a system thinking perspective, where the system is a whole entity interrelated to maintain its identity (Checkland, 1981). For this entity to "survive", "communication and control" is needed between its layers of hierarchy, where each has its specific "emerged properties" (Checkland, 1981). So, when one layer of a system is not interacting, interrelating or communicating with another, this implies that they do not share the same objective required to maintain their identity. This is what happened in the case of this PhD research. The IT tool (the technical layer of the system) with its emergent properties that aimed to improve workforce motivation and capabilities, did not interrelate with the work environment (the social layer of the system) that happened to have a different aim that focused on the organisation rather than the humans.

This issue is addressed in the SSM approach as "the possible plausible description of the reality" which should not be confused with "the reality itself" (Checkland & Scholes, 1990, p. 21). Therefore, in the SSM approach, the conceptual understanding that represents the situation in system development, which is called in SSM, "the system thinking level", should be "feasibly and desirably" compared with the reality, which is called in SSM the real world level (Checkland and Scholes, 1990). This understanding of SSM is a key principle required to ensure improvement in the situation under study (Checkland and Scholes, 1990). In this respect, the implementation of this principle in the case of this PhD research was totally dependent on people in the situation who participated in the study. This researcher had no power or control over the actual reality of the social subsystem of the organisations in the Qatari cases and was therefore trying to learn through the people in the situation about the feasible and desirable IT functions that could affect the social subsystem reality. Otherwise, he would be involved in an action research type of study and become directly involved in making the required changes with the support of management in these

organisations, which as discussed before was not the aim of this research. Checkland and Poulter (2006) also indicate that it is usual that "action emerging as desirable and feasible from an investigation [...] are not implementable" by the people of the study because they may not have the "necessary power" (p.160).

Langefors (1996) also raises this important aspect in information systems development projects. He suggests that an ISD methodology should have two roles: the first is to enable the identification of what users want and the second is to determine whether these are "feasible". He further explains that the first role can identify users' needs which they are "aware of" while the second role is to control the impact of new needs "unknown" to users but that IS developers have identified as being of potential interest to users. However, in this PhD research there were no "unknown" needs, rather there were unfeasible needs.

The above understanding of Mumford, Checkland and Langefors about the ISD process can explain the results in this research with regards to its second common problem: the transformation of humanistic needs identified in the social subsystem into an IT tool. What happened in this PhD research was that the transformation occurred only at the level of system development. In other words, when the research was focusing on the human in the system development level, the real needs of the people of the situation were considered. However, because these needs required actual changes in the social subsystem when the IT was used in operation, then these needs became just ideas that needed to be practised. Therefore, the Design in Science Research (DSR) approach was not able to transform the humanistic needs into an IT tool that can be utilised in the absence of other transformations in the social subsystem which focus on the identified humanistic needs. Hence, the IT tool was not utilised in the case study, as Section 8.4 will demonstrate.

8.4 Objective 3: Assessing IT tool Impacts on Qatari Motivation and Capabilities

This section assesses the IT tool in terms of success or failure with respect to the research's results in the three experimental studies conducted in different Qatari organisations in the case study.

Results in these experiments showed that all participants welcomed the idea of using the IT tool to improve workforce motivation and capabilities but when it came to its actual application, they did not use it with the exception of one IT function, utilised in one experiment by a manager and which

improved workforce motivation. This IT function provided the manager with awareness of their workforce's professional and personal needs via using visual as well as acoustic means, as described in Section 6.5.1. This function enabled the manager in experiment two to recognise the personal needs of his workforce and then work towards satisfying them. However, as discussed in Section 7.3.2, this was not enough to sustain the IT tool's positive impact on the workforce's motivation and capabilities, as the social subsystem as a whole was not enabled to do so, leading the manager himself to call what happened in the social subsystem as "unprofessional practices of top management".

Hence, it is not appropriate to say that the IT tool failed (did not have any impact on workforce) just because IT was not used in the case study. This is because researchers such as Myers (1995) points out, IS success cannot be seen only from a perspective of usage because it is a concept which is "open to many different interpretations" (p.293). Lynch and Gregor (2004) also argue that success in IS does not have a solid meaning but rather, depends on the "interpretation" which "can change over time" (p.298). Myers (1994) conversely, is very specific in defining IS success as the state in which "information system is perceived successful by the stockholders and other observes" (p.65). Lynch and Gregor (2004) make a similar point, arguing that, technical outcome and adoption impact are both important aspects of IS success. They explain that the technical outcome of IS success represents the knowledge acquired about the problem of the study as a result of involving participants in the technical development of the IS. Hence, if the IS development process yields such outcomes, it can be considered successful. From this perspective, in this research, the development of the IT tool produced both social and technical knowledge about the problem of how to motivate and improve capabilities of Qatari workforce, which might not have produced if this IT development had not started in the first place.

Lynch and Gregor (2004) on the other hand, describe the adoption impact as the "level" of using the system. However, they admit that it is difficult to precisely determine the level of usage and therefore they use another approach to describe the level of adoption, which is the "system impact", which refers to both adoption and other "outcomes that indicate impact". The other outcomes are, for example, the information and knowledge produced because of the system development reaching even those users who did not use the system (Lynch and Gregor, 2004). The impact factor of the information system also appears in DeLone and Mclean (2003) IS success model. In this model success comprises six "interrelated" factors, which are information quality, system quality, and

service quality, which impact the degree of IS utilisation as well as IS satisfaction. The result of utilising the information system at work as well as the degree of satisfaction, impacts the way users of the system do their job and hence impacts the overall performance of the organisation. This model can also explain that IS success does not only relate to IT utilisation because for IS to be utilised, data needs to be processed to produce information. But in the case of this PhD research, no data was fed into the tool to assess its impact. This issue can be considered one of the research's limitation. It is a limitation that relates to the sample of the case study, which was limited to those organisations that the researcher was given access to. This limitation prevented the researcher from experimenting with the IT tool in a work environment that had all the necessary work environment requirements to use the IT tool to assess its actual impact on the workforce. This limitation will be discussed in Section 9.5.

From another view, Mumford (2003) asks why technology when it is developed based on socio-technical system design principles (STSD) faces problems of adoption in organisations. She asks the following specific questions:

1- Is it about an organisational culture that promotes humanistic values, values that create a culture of equality, fairness and professionalism, making a workforce free of work exploitation, prejudice and the non-professional practices that make work an unpleasant environment?.
2- Is it about leadership skills at organisational level, skills that inspire motivation and belief in the organisation that make the workforce strive to do whatever it takes to achieve organisational goals?.
3-Is it about people themselves, people who have the instinct to develop and motivate themselves; people who enjoy responsibility and always look for new challenges; people who understand that learning is the key for overcoming any obstacle and teamwork is the door for the success?

The above three questions all relate to the social rather than technical subsystem. Reflecting on the results of the three experimental studies conducted in this PhD research, IT utilisation was a problem because of the social subsystem, as explained and discussed in Section 8.3.3. In other words, Mumford's (2003) three questions can all be asked in this context and their answers will give relevant answers that link the problem of non-utilisation in this research with the social subsystem.
In summary, this section suggests that non-utilisation does not mean that the IT tool has failed to improve our understanding of the problem studied in this thesis and how to address it. This understanding will be discussed in the Conclusions and Recommendations Chapter in Section 9.4.

8.5 Chapter Summary

This chapter has summarised the findings of the research and discussed them in relation to the literature. The next chapter presents the conclusions and provides recommendations for developing a human-focused IS to improve workforce motivation and capabilities. Lastly, the implications of the research's findings for the IS body of knowledge will be discussed.

9.Conclusions and Recommendations

9.1 Introduction and Research Overview

For years, IT has been recognised as one of the main tools of change that can help organisations achieve their goals. It is a change that does not just affect organisations operationally but one that can create strategic values in every aspect of organisational work. In **Chapter One**, three types of change in relation to IS projects were discussed to describe three IS perspectives. In that chapter we learnt that the IS perspective to answer this research question is the one that is concerned with humans as the main focus of information system development (ISD). In **Chapter Two**, a review of the literature was carried out to explore appropriate ISD methodologies that adopt a human-focused perspective. In that review, common problems were identified, the researcher's framework of ideas was declared, and themes were described. The researcher's framework of ideas adopts the functionalist concepts of the socio-technical theory (STT) and the interpretivist ideas of the soft system thinking. In this respect, STT concepts were identified as an essential foundation for this proposed research approach to answer the research question. In addition, ETHICS application of STT, and client-led information systems creation (CLIC) application of soft system methodology (SSM) were identified as important ISD approaches in terms of learning from their principles in this research approach. In **Chapter Three**, research methods to conduct the study were selected based upon the framework of ideas. **Chapter**

Four, **Chapter Five** and **Chapter Six** described the process of applying the proposed approach to develop the IT tool to answer the research question. **Chapter Seven** reported the three experiments in which the IT tool was tested in actual organisational settings in Qatari governmental organisations. Lastly, **Chapter Eight** discussed the findings from the three experiments. Results showed that the answer to the research question is that in the case of Qatar, IT itself cannot be used to improve a workforce's motivation and capabilities.

This chapter (**Chapter Nine**), draws overall conclusions, and describes the implications of this research in the area of human-focused IS, an area that needs more relevance to practise studies. This research contributes practically with a study that provides organisations with practical guidance for developing IT tools with descriptions of necessary practises for enabling a work environment to apply them to satisfy a workforce's needs. This research also contributes theoretically by reflecting on the results of applying the research's proposed approach in answering the research question. This chapter also outlines limitations and future work.

9.2 Answering the Research Question

This researcher's main aim was to empirically study whether IT itself can help organisations improve their workforce's motivation and capabilities. Answering this question was important to provide conclusions to:

- Allow a better understanding of the role of IT in satisfying workforce needs and specifically, workforce motivation and capabilities in the case of Qatar. These conclusions will be presented in Section 9.3.
- Provide a practical approach based on STT that finds an alternative to the ETHICS participatory approach in developing human-focused information systems. These conclusions will be presented in Section 9.4.

To answer the research question, three main objectives were identified as was shown in the research aims and objectives in Table 1.1. The **first objective** was about proposing an approach based on studying STT as well as learning from both the ETHICS application of STT principles, and from SSM system development principles.

The proposed approach aimed to overcome the two limitations identified in the ETHICS participatory approach to acquire understanding about a situation from a human-focused

perspective, as discussed in Section 2.3.1.2. The proposed approach was illustrated in Figure 2.5. This approach was then used to develop the IT tool as outlined in the **second objective** of this research. That objective (the second objective**)** included three studies. The first involved identifying the social subsystem functions (in Chapter Four). The second included identifying the IT functions that support the social subsystem functions (in Chapter Five). The last study involved understanding the technical requirements for developing the IT tool to perform its functions (in Chapter Six).

The **third objective** of this research was to experiment with the developed IT tool in actual organisational work environments and to assess its impacts on workforce motivation and capabilities. This objective included an experimental study in which the developed IT tool was tested in five Qatari organisations. In these organisations, the managers did not utilise the IT tool in all of its three versions, with the exception of one manager who utilised only one IT function of the tool which did in practise positively impact his workforce's motivation. The analysis of the results of these experiments, in addition to the survey which was completed by seventeen Qatari HR and training managers, showed that the IT tool cannot itself improve Qatari workforce motivation and capabilities unless the work environment is already enabled with necessary managers' practises and work environment requirements. The case study conducted in the Qatari governmental organisations provided the answer to the research question, which is:

- IT itself cannot be used to improve workforce motivation and capabilities in the case of Qatar. However, IT can do this by supporting a work environment enabled by necessary managerial practises and work environment requirements.

Answering the research question was a process of learning about, and comprehending theoretically, as well as practically, the development of human-focused information systems. Section 9.3 will summarise the theoretical contribution and Section 9.4 will summarise the practical contribution of this research.

9.3 Theoretical Contributions

In this research, a question had arisen from the researcher's work experience as described in the Motivation Section in Chapter One. This question led him to explore relevant literature in IS on its practical role in developing IT solutions. Three perspectives of developing information systems were proposed based on this exploration in association with the researcher's own work experience.

In all of the three IS perspectives, HOT (Human, Organisation and Technology) interactions are utilised in practise to achieve goals for organisations. However, what differentiates them is the type of change these goals aim to achieve. In this case, the researcher pointed to the perspective that can answer this research question which was the IS perspective that focuses on changes that satisfy the human needs of the workforce. This perspective, as discussed in Section 1.3.1, appeared in the literature with different names such as “human-centeredness”, “human-centred design”, “human-driven design”, “life-based design” and “human organisation”. To differentiate this perspective from other IS perspectives (technical-focused and organisation-focused perspectives), three general levels of thinking about an IS project were proposed which were, the information system enabler level, the information system development level and the information system operational level. In the human-focused IS perspective, all three levels focus on the humans. This review of the human-focused IS perspective was followed by a theoretical review of the IS literature which allowed the identification of the common problems, themes and eventually, a declaration of the researcher's framework of ideas. Based on the framework of ideas which is influenced by the functionalist concepts of STT concepts and the interpretivist ideas of soft system thinking, a review of ISD methodologies that focus on human needs at the three discussed levels of an IS project was conducted. In this review, ETHICS was described as an ISD methodology that focuses on the humans in the system operational level while soft system methodology (SSM) was an ISD approach that focuses on the human in the system development level. Studying STT and learning from ETHICS's application of STT principles and SSM principles in system development was necessary to propose an approach that brings these two different levels together. This approach has three phases as was illustrated in Figure 2.5. This approach was then applied in the Qatar case study using mixed methods research and Design Science Research (DSR). The selection of the research methods was based on the researcher's framework of ideas which adopts a dualistic epistemological and ontological view as well as ethically focusing on the humans and they are both primarily concerned with design of artefacts, as discussed in Section 2.2. In this regard, a qualitative approach including Grounded Theory and case study were used to understand the social subsystem, while quantitative questionnaires were used to “evaluate, extend and refine” the theoretical understanding of Grounded Theory. On the other hand, DSR was a method that guided the study through the phases of transformation: from identifying the main factors (constructs) that affect the workforce's motivation and capabilities; then, describing the types of relationships between them (the model); then, identifying the social functions (the methods) that perform the role of providing for the human

needs; then, transforming them into IT functions; lastly, developing them into an IT tool (the instantiation) to support the social functions.

Key theoretical findings regarding using this research's proposed approach for satisfying workforce needs were in line with the ETHICS approach. In this regard, the research's conclusion supports ETHICS in its understanding of the dependent role of the technical subsystem on the social subsystem to satisfy the humanistic needs of workforce. In other words, theoretically, the outcome of this PhD research approach of transforming the social subsystem functions into IT functions is that it can happen at the information system development level but it cannot happen in practise at the information system operational level. This finding was discussed in the Finding and Discussions Chapter (Section 8.3) where the principle of system thinking (Checkland, 1981), infology (Langefors, 1996) and ETHICS (Mumford, 1995) were used to explain why this happened in this PhD research.

Two recommendations can be given here based on the Qatar case study. The **first** relates to the system development level of human-focused information system projects, which recommends that a team of technical and organisational experts work together with people in the organisation to understand their needs in order to achieve the objective of satisfying them based on what is feasible in the situation. Then this team identifies the functions of the technical subsystem and the social subsystem that need to be implemented in order to achieve this aim. This understanding is supported by Langefors (1978), Checkland and Scholes (1990), Wood-Harper (1990), Avison et al. (1998) and Stowell and Welch (2012). The **second** recommendation relates to the system operational level of a human-focused information system project, and is that the team should introduce a number of change initiatives that include the work environment (including managers) to enable the social subsystem to be receptive to the required changes that need to be supported by the IT tool. This understanding is supported by Mumford (1995).

Reflecting on the above conclusions when applying the research approach in answering its question, allowed better understanding of the role IT can play in satisfying workforce needs and specifically, workforce motivation and capabilities in the case of Qatar. This role as explained above cannot be described without also considering the role of the social subsystem:

The social subsystem's role in improving workforce motivation and capabilities is through launching change initiatives to:

- Enable the work environment to satisfy workforce's needs.
- Develop managers' skills so they can interact with the work environment to satisfy a workforce's needs.

While the technical subsystem's role in improving workforce motivation and capabilities is through:

- Supporting the social subsystem in satisfying the workforce's needs.
- Supporting the task of managers in satisfying the workforce's needs.

The next section (Section 9.4) gives details about the social and technical practical requirements for developing a human-focused information system in Qatari organisations.

9.4 Practical Contributions

This section describes this research's practical contribution. Section 9.4.1, provides practical guidance to organisations for developing an IT tool that can support the work environment in improving workforce motivation and capabilities. Section 9.4.2, provides organisations with a description of necessary requirements for enabling a work environment to be supported by the IT tool. Lastly, Section 9.4.3 compares the approach taken by this research for answering its question with the ETHICS approach.

9.4.1 Guidance for Developing an IT Tool to Improve Workforce Motivation and Capabilities

In practise, this research has developed a specific understanding on how to develop an IT tool for the purpose of improving workforce motivation and capabilities. This understanding contributes to a relevant area of practise within human-focused IS. The design and methodology of this approach as illustrated in Figure 9.1 shows STT concepts that consider the human, organisation and technology elements in the development of information systems as supported by learning from ETHICS focus on the human at the operational level and SSM focus on the human at the development level. Extending the use of STT concepts in ISD from merely using methods such as the participatory approach and prototyping to using SSM principles, is a contribution that can be used in the practise of human-focused IS projects. Baxter and Sommerville (2011) call for a design approach that uses STT concepts and learns from ETHCIS (Mumford1983, 1995) and SSM

(Checkland, 1981) because as they argue, the SSM approach and other ISD approaches that share STT concepts can be used to "help inform the development of socio-technical systems" (p.7). This is in line with Checkland's, (2006) understanding of how an SSM approach should be used in action, not as a "method" or "techniques" but rather with appropriate approaches "in tune" with SSM principles that suits the "human situation" under study (p.144). In taking into account people's different perspectives, the SSM approach is to actively engage the humans in the situation in all phases of development and one in which the solution represents their needs (Checkland, 1981; Checkland and Scholes, 1999). These principles underpin the human-focused IS perspective as discussed from epistemological, ontological perspectives (Iivari et al., 1998), from a critical social theory perspective (Stowell, 2009; Klein & Hirschheim, 1993) and from the view of infology (Langefors 1978, 1996). SSM principles in terms of understanding the problem is also supported by researchers who have studied human-focused IS such as Gasson (2003). This contribution is important for promoting the IS discipline in practise as will be discussed in the implication of this research in Section 9.6. Figure 9.1 demonstrates the practical contribution this PhD research provides to the area of human-focused IS to develop IT tools that work.

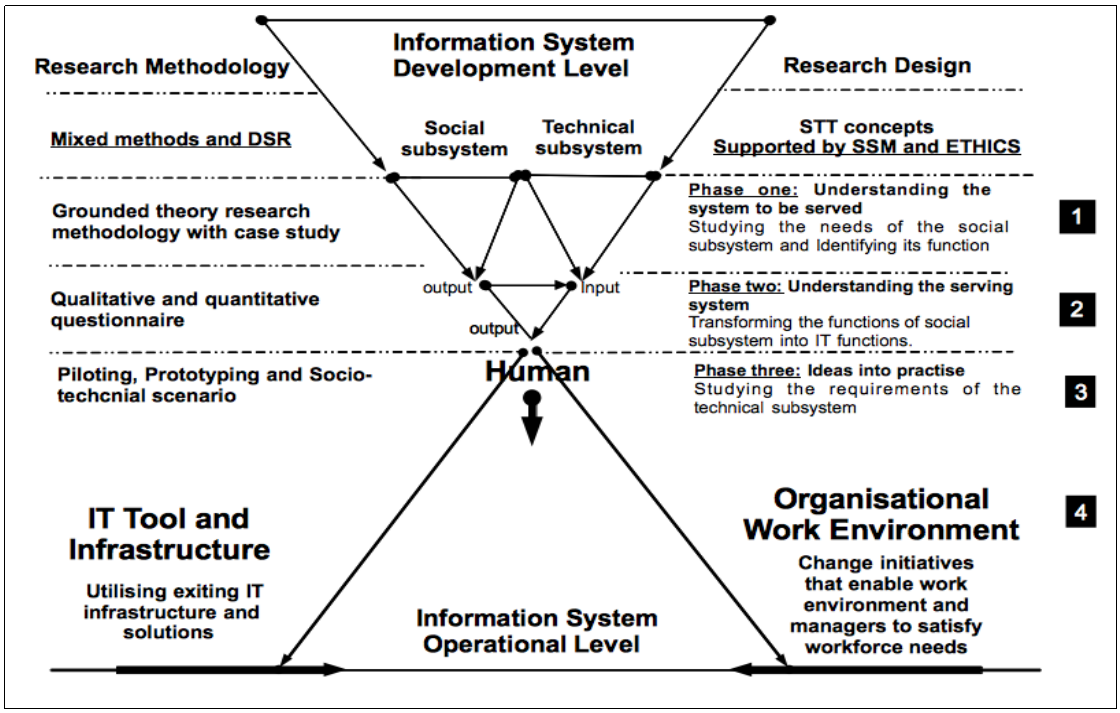


Figure 9.1: The research approach (design and methodology)

Phase One: conduct one-to-one semi-structured interviews with managers of the organisation and then their employees to gain an understanding of the social subsystem. This phase learns from the SSM principles, which are operationalised in client-led information system creation (CLIC) (Champion et al., 2005) in "understanding the system to be served" phase. This phase should aim to include people's different perspectives in understanding the problem situation using conceptual models. The use of Grounded Theory research methodology is recommended for the analysis of people accounts of the situation.

This phase represents the first stage in the DSR process of transforming social subsystem understandings into an IT tool. The result of this phase is a number of conceptual models that represent the current needs of the people of the situation to improve their motivation and capabilities. These needs are described as main factors (constructs) affecting workforces motivation and capabilities and the relationship between them. These models can be used later to engage the people to think about the specific tasks (functions) that the social subsystem is required to perform to satisfy their needs, as identified in the conceptual models.

Phase Two: in this phase, the understanding identified in the social functions in the previous phase is used to gain more understanding from the people of the situation about the IT tool or "the serving system" as termed in CLIC. This phase should aim to engage people in thinking about solutions for the identified social needs but from a technical view. The IS analysts should only play a role of supporters as technical consultants, rather than suggesting technical solutions on behalf of the people as suggested by CLIC.

This phase represents the second stage in the design DSR process of transforming social subsystem understandings into an IT tool. The identified social functions in phase one should be considered as input for this phase to identify the correlated IT functions (methods). The correlated functions can be identified using two recommended methods: a qualitative questionnaire can be used to find out about the processes that underpin the social subsystem functions, while the quantitative questionnaire can be used to figure out how IT can perform these processes to provide corresponding IT functions.

Phase Three: in this phase, the IT tool is technically developed. This phase involves testing people's ideas in the real situation. This phase is called "ideas into practise" in CLIC and "the instantiation phase" in DSR. Piloting, prototyping and socio-technical scenarios methods should be applied in discussions about the proposed IT tool as well as the required social changes. These

discussions can be in the form of focus groups and one-to-one meetings. In addition they should involve people at all levels of the organisations and from both technical and management sides. Existing IT infrastructure and solutions should be used as much as possible rather than introducing new ones. Also, the management team needs to understands fully the consequences of the changes required in this project in terms of organisational structure, policies and resources. The outcome of this phase is a general agreement which may not include all the needs identified in the first phase, either because they are not technically viable or not socially feasible.

Phase Four: this phase includes the actual application and operation of the social as well as technical changes that focus on improving workforce motivation and capabilities. For the social subsystem, change initiatives should be planned to enable the work environment to have the necessary requirements for satisfying the workforce needs. While for the technical subsystem, consideration should be taken to allow the new IT tool to perform its functions as much as it can, utilising the existing IT infrastructure of the organisation.

Figure 9.1 shows how the overturned pyramid's (representing the information system development level) focus on the humans can be transferred in practise into the information system operational level when STT concepts, supported by learning from ETHICS and SSM principles, are used to develop the IT tool to become a supporting component of a human-focused IS in organisations. The figure shows the interactions between the HOT components in the system operation level as focusing on satisfying the humanistic needs of the workforce.

The next section (Section 9.4.2) provides practical guidance for changes required in the work environment from the Qatari case study.

9.4.2 Guidance for Establishing a Work Environment to Improve Workforce Motivation and Capabilities

This section provides specific requirements for Qatari organisations to enable their work environment to apply an IT tool to improve workforce motivation and capabilities.

In the Qatari case study, change programmes should be initiated to establish a professional work environment that focuses on satisfying the workforce need for self-esteem. In addition, there is a need to focus on developing the personal skills of managers:

Change programme for establishing a professional work environment

First: by supporting professional work practices

- Provide essential organisational information about:

  -The organisation's vision, missions and goals.

  -The organisation's structure.

  -The organisation's work system.

  -The organisation's policies and procedures.

  -The organisation's competencies and evaluation.

- Provide 'what to do' information to employees: employees need to know what exactly they have to do in a professional project-based way. The manager should assign employees to tasks and directly evaluate their performance on each of them.

Second: by supporting employee's guidance and development

- Providing 'how to do' resources to employees: it is not enough to tell employees what to do but they also need the professional guidance of how to do it professionally through internal and external knowledge resources.

- Allowing 'knowledge sharing' in organisations between employees is an important catalyst for an active and professional work environment.

- Allowing 'experience transfer' from experienced people to less experienced ones is a quick solution for merging motivation with the experience they need to achieve results.

- Allowing 'ideas sharing': knowledge and experiences, if combined with an environment that encourages innovation, will result in a continuously developing organisation.

- Allowing 'ownership': people work better if they feel ownership of what they work on.

Change programme for developing managers' personal skills

This programme should focus on enhancing managers' communication skills in the following areas:

- Focus on motivation: managers should raise employees' personal motivation by inspiring them to be successful people.
- Focus on reward: managers should motivate employees who achieve work objectives with moral appreciation and material rewards.
- Focus on recognition: managers should recognise everybody's achievements so they become proud of their work and feel their uniqueness amongst their colleagues.

Third: awareness: the work environment should continuously provide appropriate awareness to managers to utilise the IT tool. It is recommended here that organisations utilise the IT awareness tool developed in this research to remind managers about their critical role in satisfying employees' personal and professional needs.

Fourth: IT should be utilised in the work environment of Qatari organisations to provide the following functions:

- **Functionality of communication** to allow open and easy two directional interactions between managers and their employees to raise and satisfy the self-esteem needs of the Qatari workforce.
- **Functionality of project management** for making information about the organisation and work available to all employees. It makes them aware of their work objectives at work, thereby they can think and plan for what they need to know and learn to achieve these objectives.
- **Functionality of guidance and development:** for facilitating knowledge, experience and idea sharing as they represent the medium by which employees know how to successfully accomplish the work objective assigned to them.
- **Functionality of evaluation:** for assessing employees' work objectively, as the basis for recognising employees' work accomplishments and rewarding them, in order to allow them to gain self-esteem when they achieve their work goals.

9.4.3 Comparing this Research's Approach with the ETHICS's Approach

A comparison between this research's approach and the ETHICS's approach concludes this section about the practical contribution of this research. This research provides an alternative to the ETHICS participatory approach as well as it extends the way ETHICS uses technology to support the humanistic needs of workforce. These two aspects of comparisons were discussed in Section 2.3.1 as the two main limitations that restricted ETHICS application in this PhD research.

With regard to the first limitation, two aspects of the ETHICS participatory approach were identified as problematic:

1- The issue of management power and control.
2- The issue of its tendency towards the technical aspects of the information system in the development phases.

These limitations were discussed in Section 2.3.1 and an alternative approach to participatory approach was suggested, drawing on the literature review, which was based on SSM principles. The selection of SSM principles as an alternative was discussed in Section 2.3.2.

With regards to the second limitation, the ETHICS approach depends on the organisation to provide three out of five of the workforce's humanistic needs in the workplace, as was shown in Table 2.2 and Table 2.3. These tables demonstrate that to apply ETHICS to improve the Qatari workforce's motivation and capabilities, an action research was needed in which the organisations in the case would need to pursue an overall change project. This was not the aim of this PhD research question, which was to understand the role of IT to achieve a change that would improve the Qatari workforce's motivation and capabilities.

Revising this issue from Mumford's view (2005), which is that a "fit" should exist in five aspects of the organisational system, linked with attaining job satisfaction. In these five aspects, ETHICS utilises technology to support only two of these needs, which are the "structural fit" and the "knowledge fit" as seen in Table 9.1. In contrast, in this research approach, technology was used to support the work environment in all of its needs to improve workforce motivation and capabilities as seen in Table 9.2.

Objective	Social subsystem enabling function	Technical subsystem support functions
Structural fit	To provide employees with different types of tasks and to allow employees to control their work activities.	Technical support is suggested based on the decision of the design team.
Knowledge fit	To allow employees to improve their knowledge for the purpose of using it at work.	Technical support is suggested based on the decision of the design team.
Psychological fit	To understand and fulfil employees' personal objectives such as “recognition, achievement, responsibility and work interest”	No technical support is suggested.
Efficiency fit	To provide proper work support such as “specialist knowledge and supervisory help” and to provide a fair rewards system.	No technical support is suggested.
Ethical fit	To make these values known to employees through means of “communication, consultation and participation” and make them match the employees' ones.	No technical support is suggested.

Table 9.1: ETHICS approach to improve job satisfaction utilising technology

Objective	Social subsystem enabling function	Technical subsystem support functions
Supporting managers employees communication	Enabling self-esteem to be employees' personal objectives and their achievements at work to be recognised.	Awareness function, communication function AND evaluation function
Supporting professional work practices	Enabling employees to have goals at work	Awareness function AND project management function
Supporting employee's guidance and development	Enabling employees to achieve goals at work	Awareness function AND guidance and development function

Table 9.2: The approach taken in this research to improve workforce's motivation and capabilities utilising technology

9.5 Limitations

This research has passed through several phases, which have produced findings with regards to developing an IT tool to improve workforce motivation and capabilities. However, this research has three main limitations:

First, the sample of the case study was limited to those organisations that the researcher was given access to. This limitation prevented the researcher from experimenting with the IT tool in a work environment that had all the necessary work environments requirement as indicated in Section 9.4.2. This means that if a Qatari organisation is interested in applying this research's finding, they may feel that some of the work environments requirements are not specific enough with regards to change programmes suggested in this research, because the objective of establishing a professional work environment and improving managers' skills includes many factors which require detailed study in actual IS projects.

The second limitation is that time allocated to conduct the experimental study was limited. This actually can be considered a necessary delimitation to finish this research within the available time frame.

With regards to the third limitation, care should be taken when generalising the research findings to other contexts outside the Qatar case study. Specifically, the theoretical model that describes factors affecting motivation and capabilities of the workforce only relates to the Qatari workforce in the government sector. It also means that the identified IT functions might not be effective in other contexts outside Qatari governmental organisations. This limitation can be considered as a motivation for other researchers in different regions of the world as well as in different types of organisations, to compare the findings of the Qatar case with the findings of their countries.

9.6 Research Implications and Future Work

This research has social implications for the way IT is utilised in organisations. First is the value that IS research provides to organisations and the second is how organisations take account of human psychological constructs when utilising IT. In this section, these two dimensions are discussed and future works are suggested.

The problem-solving and practical nature of this PhD research which was demonstrated in developing an IT tool that focuses on the humans in organisations, has allowed the researcher to

explore concepts, and approaches in the area of human-focused IS that he would have never known about without pursuing this study. The reason for this, from my point of view, is because human-focused concepts and approaches are scattered in a myriad of articles and studies, with the results that they are seldom seen practised. This can be seen as a gap between professional and academic people, a situation which made Henderson (2000) propose a discussion between industry professionals in the area of software engineering and IS academic researchers in order to find out ideas about how IS as a discipline could be of more value to the IT industry.

In this research, we can claim that this gap between professional and academic domains was bridged, by applying IS concepts, theories and approaches from academic studies to a new application area to improve the motivation and capability of the Qatari workforce. Researchers reading this thesis will recognise the value the IS discipline can offer to problems and questions that cannot be answered by any other discipline's theories and practices. It is due to the multidisciplinary nature of IS discipline that the study of different issues related to humans, organisation and technology is possible. This is the central advantage of IS in that it enables us to answer questions that exist in the "boundaries" between different disciplines (Hassan, 2014). It is this type of IS research that organisations need in order to deal with the changing environment affecting not only their products and services but also their human resources. For this type of IS research to be realised, a relationship between IS as an applied science and IS as an academic discipline needs to be considered by IS researchers.

We can see this type of separation in the literature, for example Iivari et al. (1998) realised in their paper the difference between the role of IS as an "academic discipline" and the "value of IS research" when they discussed the ISD methodologies. Vat (2004) on other hand, understands that IT can produce "new possibilities" but he insists that the focus should be towards IS because as they argue it "serve[s], help[s] or support[s] people taking action in the real world" (p.949). In his discussion about the importance of the IS discipline he describes the inseparable nature of "thinking about the world" (theory) and "having experiences in it" (practise) which gives IS the power to create change (p.949).

In this thesis, the fusion of theory and practise of the interaction between the human, organisation and technical aspects of information system development will inform future research in the area of human-focused IS, specifically those with subjects that have strong links with IS utilisation such as: workforce well-being, the role of leadership and utilising IT to consider the humanistic needs of

workers in virtual teams:

1- <u>IS utilisation and workforce's well-being</u>

With regards to IS utilisation and a workforce's well-being, it is envisioned that this research will fuel further interest in exploring this area of human-focused IS. There is now a full story of a study that started from an idea and went on to be developed practically, ending up with conclusions and recommendations. It is a piece of work that should encourage further study of IS applications for the purpose of improving workforce well-being in organisations. In this sense, Lamb and Kling (2003) encourages researchers to change how they look at humans in ISD research from the concept of users to the concept of "social actors". This, as he argues, will open new opportunities to fully understand the "complex and multiple roles that people fulfil while adopting, adapting and using information systems" (p.197). This in turn requires "applying socio-technical approaches" and most importantly, in the area of studying "integrated human-centric design", which as Baxter & Sommerville (2011), further discuss, has yet to be studied with the right emphasis (p.15).

This type of IS development approach can have implications for organisational management strategy. It is possible that in the future, organisations will start to apply IT for the purpose of focusing on their workforce's well-being. Hence, models of IT well-being in organisations could be developed based on the IT and organisational guidance provided in this research. These models could change organisational strategies in utilising IT. It could be through developing IT-management models that focus on workforce morale as a means of achieving well-being and organisational objectives, at the same time similar to Mumford's (2003) argument about the link between workforce "morale" in organisations and better work efficiency. She explains that the philosophy of utilising technology should include the impact of technology on the workforce and the impact of the workforce on technology. It is in her view the ability to design an information system that efficiently works for the organisation and it is user-friendly for the workforce, which makes an organisation a place that adheres with the idea of "humanisation of work".

On the other hand, it could be through developing IT-management models that focus on workforce well-being to implement change in organisations similar to Bjorn-Andersen & Turner's (1995) study of Oticon's success in using IT as a supporter of the humans, who drive successful change in Oticon. Eventually, these models can be improved to address the question of how IT can improve people's life at work. Then they can be applied in the area of organisational behaviour (OB) to practise different "process motivation theories" such as expectancy theories of motivation which are

concerned with what drives workforce actions; equity theories of motivation which are concerned with a workforce's need for fairness; and motivation, through goal setting theories which are concerned with people whose "life is goal-oriented" (Buelens et al., 2011).

2- <u>Leadership role in maximising the value of IS (human-focused view)</u>

This research has shown the importance of self-esteem as a personal objective for the Qatari workforce and the importance of the professional work environment as the place where these objectives can be achieved. It has also emphasised the role leadership plays in making this happen. Leadership has been studied intensively in the management discipline, but as Northouse (2016) points out, leaders have different traits and characteristics, thus different mode of behaviours in leading organisations, especially when dealing with human resources. Hence, future studies in leadership behaviours should take a new direction to include the organisational technology context. The proposed new type of studies could provide organisations with detailed understanding to prepare leaders to apply technology in a way that improves workplace morale and workforce well-being. The general guidelines this PhD research has provided about necessary leadership skills to use the IT tool to improve motivation and capabilities, can be expanded by studies that look at concepts such as "transformational leadership", which includes aspects of leadership influence, inspirational motivation, intellectual stimulation and individualised consideration (Northouse, 2016). Such studies link IS with leadership transformational skills will add a new dimension to leadership skills development programmes which are currently based upon "social learning theory" which focuses on improving "cognitive" and "behavioural" work (Whetten & Cameron, 2016). Thus, a new dimension can enrich these programmes with a view of using IS in applying leadership skills, as this PhD research has demonstrated.

In this regards, Lee et al. (2003) mention four factors that affect the quality of working life (QWL) which are social environment at work, job facet, IT and other factors. In other words, IT is one factor that leaders should learn how to use, not only to improve efficiency, but also to improve QWL. This was early recognised by Hammer (1990) who argues that technology is an "option that reorganises work" based on the "imagination" of the management and not the opposite way around in which technology decides how we manage the work. In other words, he argues that in order to make IT better utilised, leaders in organisations should imagine new ways of utilising IS. Kogetsidis (2013) also argues that IT managers need to reconsider technology utilisation from a different angle. Thus organisations need to bring the possibility of using technology to support the humans in

organisations into their leadership development programmes.

3- <u>Utilising IT in a virtual team that considers the humanistic needs of workers</u>

In cyber or virtual teams, people work together but rarely meet face-to-face, using instead ICT in their interactions (Maznevski & Chudoba, 2000). In this type of virtual team work, leaders are facing new challenges not only to control people who are working in different places and may be in different time zones, but also to provide them with what they need as humans to excel, innovate and be loyal to this virtual organisation. This PhD research has provided some insights in this regard that can influence more future research in the utilisation of IT not only to control or manage teams but also to consider the workforce's humanistic needs. Lipnack and Stamps (1997), discussing this area of research, argue that in virtual teams the "trust relationship" between members of the team is more important than in traditional forms of work because there are no face-to-face opportunities to meet and clear any "misunderstanding". In this case, trust is the alternative to "bureaucratic" management (Lipnack & Stamps, 1997). Carter et al. (2015) also emphasise that leadership in virtual teams requires different set of skills in order to deal with the "interplay" of the human, technology and "teamwork dynamics". They argue that the team leader task in the context of virtual teams critically depends on his or her behaviour for the success of the team. In this context, the most important behaviours are those they call "team emergent states" which are "affective, cognitive, or motivational characteristics of the team" (p.226). This area of research can further be studied by learning from the PhD's proposed approach to developing a virtual team solution, then test its impact on the humanistic needs of the virtual team members.

9.7 Concluding Remarks

In organisations managers are always seeking to achieve organisational goals efficiently and effectively. They utilise whatever tools are available to achieve these goals. One important tool is IT, which is known for its ability to perform difficult and demanding tasks very efficiently. Over time, this advantage has made IT a prominent solution in organisations, driving them to believe it can solve any problem and help achieve any goal. This belief in the power of IT has started a revolution in the IT sector, leading to the development of different types of solutions, affecting every aspect of an organisation. These IT solutions usually focus on improving the technical and organisational aspects of the organisation to enhance the work, gradually distancing organisations from considering the humanistic needs of the workforce.

In this PhD research, in order to develop an IT tool that focuses on the needs of the human resources of Qatari governmental organisations, a theoretical investigation to propose an approach based on Socio-Technical Theory (STT), supported by learning from the ETHICS application of STT concepts and Client-Led Information systems Creation (CLIC) application of Soft System Methodology (SSM) principles was conducted. This approach was used to guide the development of the IT tool which was then used in a number of experiments within actual organisational work environments to assess its impact on Qatari workforce's motivation and capabilities. Methodologically, a combination of research methods were used including Grounded Theory methodology, case study and design science research to conduct this PhD research to understand the social subsystem's requirements and then to transform them into IT functions. Lastly, the experimental research strategy and the survey research method were used to assess and understand the impact of the developed IT tool on improving Qatari workforce's motivation and capabilities.

In this research, I started with a question that related to my own job interest in applying the IS discipline in the human-focused area of ISD. I learnt from answering this question that using an ISD methodology to develop a human-focused IS requires the transformation of the understanding of human needs from IS development level to IS operational level. For this to happen effectively, the focus of the people of the situation should be directed towards the current as well as the future situation throughout the IS development process. This will allow both the IS analyst and the stakeholders to develop an IS that can be applied within the current situation and then it can be used to improve it to meet the identified human needs.

I specifically learnt from this study that between the theoretical understanding of a problem in IS and its application in a workplace, there is a gap that an IS analyst should learn how to bridge. This gap embodies the differences in thinking social versus thinking technical. In other words, the social understanding of the problem requires an holistic view that includes everybody's perspectives about the situation, while the deterministic view of the situation is the prime characteristic of the technical thinking. Therefore, it is the skills and knowledge I learnt from this PhD and presented in this thesis which will allow me and other IS researchers to bridge this gap and deliver effective socio-technical systems.

This researcher would approach this study differently by handling the development of the IT tool in different way. I would clearly identify the social changes required by the IT tool to meet the needs of the human resources and make sure they are “feasible and desirable” before putting them into

operation. For this to be achieved, the researcher would approach the management at organisations with a list of the changes required for the IT tool to be effectively applied, then to discuss with them the feasible and most desirable of these changes. These changes will allow the IT tool to be used by the management in the existing work environment in a way that can have a positive impact on the workforce's motivation and capabilities.

I can now also reflect on the impact of what I learnt from this PhD research on my view of IS and specifically how it affected the department I worked for, when I went back and applied what I had learnt.

I understand now that the IS discipline can help IS analysts design and develop organisational solutions in the same way that the pharmaceutics discipline can help pharmacists to design and manufacture dosage forms of medicines. Medical drugs can be very dangerous to human health, if pharmacists do not apply the right scientific understanding and use the right technology to convert drugs into medicine that cure the human body. In that respect, IT can also become a source of failure to organisations, if the IS discipline is not applied to provide scientific understanding about organisational behaviours and IS development approaches, to convert IT solutions to information systems that better achieve organisational goals.

When I went back to work while writing up this thesis, I applied this research's approach to the development of mini human-focused information systems (MiniHIS). I began this process by understanding what the problems that impacted the human resources were from the point view of management. Then I supported management through one-to-one discussions to define solutions about these problems and then I developed technology prototypes for a sample of managers and employees to test. This process resulted in a number of miniHIS that focused on feasible areas of work, which mostly supported the humanistic needs in the area of “supporting professional work environment”, as it has been referred to in this PhD or the “efficiency fit” in the ETHICS approach.

Some of these miniHIS are the 'employees work post box' (W.P.Box), the 'work news centre' (WNC) and the 'e-voting centre'. (eVC). These three systems were initiated out of problems that management were suffering from; they all had aspects of satisfying workforce professional needs and they were all solutions suggested by the management. The W.P.Box MinHIS includes shared folders for each employee at work. Each folder has specific permissions that allow only the person who owns the folder (“the box”) to manage its files, while allowing others to only share their files with him or her by using the box. The WNC on the other hand, is a web page, that is integrated in

the W.P.Box miniHIS and used by management to keep all the workforce informed about all aspects of work, whether announcements, or to express thanks, appreciations, congratulations or condolences. The strength of this miniHIS is in its integration with the W.P.Box, which means that employees do not need to open any other IT applications such as internet browsers or email clients to read the work news. Instead they read this news when they start the W.P.Box which everybody in the department uses to share files. Actually, in the department, email is used only to communicate with people outside the department, which makes everybody rely on the W.P.Box. The last miniHIS is eVC, which is used only in the annual department celebration when the management recognises employee's achievements. The eVC is used to allow the workforce to select the winners of the best employee prize and the best manager prize. The idea of eVC is to give everybody in the department a voice, when usually in such celebrations in a professional context management decides on the winners based on performance criteria.

Based on a comparison of the results of a satisfaction survey conducted by the administration section in the department, overall staff satisfaction with the administrative services has improved in the last two years from good to very good. This improvement in the department's satisfaction cannot scientifically be related to the introduction of the new miniHIS, because there might be other uncontrolled factors that affect the improvement of satisfaction, but generally it is a good indication that there is an improvement that IS could contribute to. Hence, it also good to know that my PhD positively contributed to this achievement.

References

Accel-Team.com. (n.d.). Employee Motivation, the Organisational Environment and Productivity. Retrieved from http://www.accel-team.com/productivity/productivity_01_what.html

Alsalemi, H. A., & Mayhew, P. (2010). IT SUPPORT FOR IMPROVING CAPABILITY AND MOTIVATION: APPLIED STUDY WITH REFERENCE TO QATAR. Presented at the European, Mediterranean & Middle Eastern Conference on Information Systems, Abu Dhabi, UAE.

Alshawi, S., Elliman, A. D., & Paul, R. J. (2000). People, Information Systems and Change. *Cognition, Technology & Work*, *2*(1), 1–6. doi:10.1007/s101110050001

Avgerou, C. (2001). The significance of context in information systems and organizational change. *Information Systems Journal*, *11*(1), 43–63. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=5608008&site=eds-live&scope=site

Avgerou, C. (2003). New socio-technical perspectives of IS innovation in organizations. In C. Avgerou & R. L. La Rovere (Eds.), *Information Systems and the Economics of Innovation* (pp. 141–161). Cheltenham, UK: Edward Elgar Publishing. Retrieved from http://www.e-elgar.co.uk/

Avison, D., & Wood-Harper, A. T. (1990). *Multiview: An Exploration in Information Systems Development*. Maidenhead: McGraw-Hill.

Avison, D., Wood-Harper, A. T., Vidgen, R. T., & Wood, J. R. G. (1998). A further exploration into information systems development: the evolution of Multiview2. *Information Technology & People*, *11*(2), 124 – 139. doi:10.1108/09593849810218319

Babbie, E. R. (2014). *The Basics of Social Research* (Sixth.). Cengage Learning.

Baroudi, J. J., Olson, M. H., & Ives, B. (1986). An empirical study of the impact of user involvement on system usage and information satisfaction. *Communications of the ACM*, *29*(3), 232–238.

References

Bartol, K. M., & Liu, W. (2002). Information technology and human resources management: Harnessing the power and potential of netcentricity. In 21 (Ed.), *Research in Personnel and Human Resources Management* (Vol. 21, pp. 215–242). Emerald Group Publishing Limited. Retrieved from http://www.emeraldinsight.com/journals.htm?articleid=1781314&show=abstract

Bartunek, J. M., & Seo, M. (2002). Qualitative research can add new meanings to quantitative research. *Journal of Organizational Behavior*, *23*(2), 237–242. doi:10.1002/job.132

Baxter, G., & Sommerville, I. (2011). Socio-technical systems: From design methods to systems engineering. *Interacting with Computers*, *23*(1), 4–17. doi:10.1016/j.intcom.2010.07.003

Beers, R. (2014). Humanizing organizations: Researchers as knowledge brokers and change agents. (D. Smith, R. G. Tian, D. Zhou, & A. H. van Marrewijk, Eds.)*International Journal of Business Anthropology*, *5*(1), 18–29. Retrieved from https://www.researchgate.net/profile/Jennifer_Watts-englert/publication/282977059_Collaboration_for_Impact_Involving_Stakeholders_in_Ethnographic_Research/links/563a22fe08aeed0531dca69d.pdf#page=18

Bergman, M. M. (2008). *Advances in mixed methods research: theories and applications*. SAGE Publications Ltd.

Berndtsson, M., Hansson, J., Olsson, B., & Lundell, B. (2008). *Thesis Projects: A Guide for Students in Computer Science and Information Systems* (2nd ed.). London: Springer Science & Business Media. Retrieved from www.springer.com/978-1-84800-008-7

Bjorn-Andersen, N., & Turner, J. (1995). Creating the 21st Century Organization: the Metamorphosis of Oticon. *SSRN eLibrary*. Retrieved from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1284838

Boland, R., & Hirschheim, R. A. (1985). Series Introduction. In *Series on Information Systems* (Vol. 1). England: Wiley.

References

Boland, R. J. J. (1987). The in-formation of information systems. In R. J. J. Boland & R. A. Hirschheim (Eds.), *Critical Issues in Information Systems Research* (pp. 363–394). New York, NY, USA: John Wiley & Sons, Inc. Retrieved from http://dl.acm.org/citation.cfm?id=54905.54919

Braund, P., & Schwittay, A. (2006). The Missing Piece: Human-Driven Design and Research in ICT and Development. In *International Conference on Information and Communication Technologies and Development, 2006. ICTD '06* (pp. 2–10). Presented at the International Conference on Information and Communication Technologies and Development, 2006. ICTD '06. doi:10.1109/ICTD.2006.301830

Braverman, H. (1998). *Labor and Monopoly Capital: The Degradation of Work in the Twentieth Century*. New York, NY, USA: Monthly Review Press.

Bryman, A. (2007a). The Research Question in Social Research: What is its Role? *International Journal of Social Research Methodology*, *10*(1), 5–20. doi:10.1080/13645570600655282

Bryman, A. (2007b). Barriers to Integrating Quantitative and Qualitative Research. *Journal of Mixed Methods Research*, *1*(1), 8 –22. doi:10.1177/2345678906290531

Bryman, A. (2016). *Social Research Methods* (Fifth.). OUP Oxford.

Brynjolfsson, E., & Yang, S. (1996). Information Technology and Productivity: A Review of the Literature (Vol. Volume 43, pp. 179–214). Elsevier. Retrieved from http://www.sciencedirect.com/science/article/pii/S0065245808606440

Buelens, M., Sinding, K., & Waldstrøm, C. (2011). *Organisational Behaviour* (Fourth.). McGraw-Hill Custom Pub.

Burrell, G., & Morgan, G. (1979). *Sociological Paradigms and Organisational Analysis: Elements of the Sociology of Corporate Life*. Heinemann Educational Books.

Campbell, D., & Stanley, J. (1966). *Experimental and Quasi-Experimental Designs for Research*. {Houghton Mifflin Company}. Retrieved from http://www.amazon.ca/exec/obidos/redirect?tag=citeulike09-20&path=ASIN/0395307872

References

Carayon, P. (2006). Human factors of complex sociotechnical systems. *Applied Ergonomics*, *37*(4), 525–535. doi:10.1016/j.apergo.2006.04.011

Carlsson, S. A. (2011). Critical realist information systems research in action. In M. Chiasson (Ed.), *Researching the Future in Information Systems* (pp. 269–284). Springer. Retrieved from http://link.springer.com/chapter/10.1007/978-3-642-21364-9_17

Carroll, W. R., & Wagar, T. H. (2010). Is there a relationship between information technology adoption and human resource management? *Journal of Small Business and Enterprise Development*, *17*, 218–229. doi:10.1108/14626001011041229

Carter, D. R., Seely, P. W., Dagosta, J., DeChurch, L. A., & Zaccaro, S. J. (2015). Leadership for Global Virtual Teams: Facilitating Teamwork Processes. In J. L. Wildman & R. L. Griffith (Eds.), *Leading Global Teams* (pp. 225–252). New York, NY: Springer New York. Retrieved from http://link.springer.com/10.1007/978-1-4939-2050-1_10

Champion, D., Stowell, F., & O'Callaghan, A. (2005). Client-Led Information System Creation (CLIC): navigating the gap. *Information Systems Journal*, *15*(3), 213–231. doi:10.1111/j.1365-2575.2005.00191.x

Charmaz, K. (2011). Grounded theory methods in social justice research. In N. K. Denzin & Y. S. Lincoln (Eds.), *The SAGE Handbook of Qualitative Research* (Fourth., pp. 269–299). SAGE.

Checkland, P. (1981). *Systems thinking, systems practice*. J. Wiley.

Checkland, P. (1999). *Systems Thinking, Systems Practice: Includes a 30-Year Retrospective*. Chichester, UK: John Wiley & Sons.

Checkland, P., & Holwell, S. (1998). *Information, Systems and Information Systems : Making Sense of the Field*. Wiley.

Checkland, P., & Poulter, J. (2006). *Learning for action: A short definitive account of soft systems methodology and its use for practitioner, teachers, and students*. England: Wiley.

Checkland, P., & Poulter, J. (2010). Soft systems methodology. In *Systems Approaches to Managing Change: A Practical Guide* (pp. 191–242). Springer.

References

Checkland, P., & Scholes, J. (1990). *Soft Systems Methodology in Action*. Wiley.

Churchman, C. W. (1979). *The Systems Approach*. Dell Publishing Company.

Clark, V., Creswell, J., GREEN, D., & Shope, R. (2013). Mixing quantitative and qualitative approaches: An introduction to emergent mixed methods research. In S. N. Hesse-Biber & P. Leavy (Eds.), *Handbook of Emergent Methods*. Guilford Publications.

Creswell, J. W. (2009). *Research design: qualitative, quantitative, and mixed methods approaches*. Sage Publications.

Creswell, J. W. (2011). Controversies in Mixed Methods Research. In N. K. Denzin & Y. S. Lincoln (Eds.), *The SAGE Handbook of Qualitative Research* (Fourth., pp. 269–299). SAGE.

Creswell, J. W., & Clark, V. L. P. (2011). *Designing and Conducting Mixed Methods Research* (Second.). SAGE.

Davenport, T. H. (2013). *Process Innovation: Reengineering Work Through Information Technology*. Harvard Business Press.

Davis, L. E., & Taylor, J. C. (1972). *Design of jobs: Selected readings*. Penguin Books. Retrieved from http://www.moderntimesworkplace.com/archives/ericsess/sessvol2/STS_Emery.pdf

Dawson, C. W. (2005). *Projects in Computing and Information Systems: A Student's Guide*. Addison-Wesley.

Delone, W. H., & McLean, E. R. (2003). The DeLone and McLean Model of Information Systems Success: A Ten-Year Update. *Journal of Management Information Systems*, *19*(4), 9–30. doi:10.1080/07421222.2003.11045748

Denzin, N. K., & Lincoln, Y. S. (Eds.). (2011a). *The SAGE Handbook of Qualitative Research* (Fourth.). SAGE.

Denzin, N. K., & Lincoln, Y. S. (2011b). The discipline and practice of qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), *The SAGE Handbook of Qualitative Research* (Fourth., pp. 1–19). SAGE.

Dick, B. (2005). Grounded theory: a thumbnail sketch. *Online at http://www. scu. edu. au/schools/gcm/ar/arp/grounded. html (accessed 1.6. 10)*.

References

Drucker, P. F. (1988, February). The coming of the new organization. *Harvard Business Review*, 45–53. Retrieved from http://secure.tutorsglobe.com/Atten_files/1286_ENG.pdf

Durant-Law, G. (2005). The Philosophical Trinity Soft Systems Methodology and Grounded Theory. Presented at the A Paper Presented to the Schools of Education and Community Studies and Information Management and Tourism, Division of Communication and Education, The University of Canberra, University of Canberra.

Durant-Law, G. (2015). Soft systems methodology and grounded theory combined – a knowledge management research approach? *actKM Online Journal of Knowledge Management*, *2*(1). Retrieved from www.actkm.org

Eason, K. (2008). Sociotechnical systems theory in the 21st Century: another half-filled glass. (D. Graves, Ed.)*Sense in Social Science: A collection of essays in honour of Dr. Lisl Klein*, 123–134. Retrieved from http://www.ulbodesitterkennisinstituut.nl/media/16411/sociotechnical_systems_theory_in_the_21st_century.pdf

Eisenhardt, K. M. (1989). Building theories from case study research. *Academy of management review*, *14*(4), 532–550. Retrieved from http://amr.aom.org/content/14/4/532.short

Emery, F. E. (1980). Designing socio-technical systems for'greenfield'sites. *Journal of Occupational Behaviour*, *1*(1), 19–27.

Emery, F. E., & Trist, E. L. (1965). The causal texture of organizational environments. *Human relations*, *18*(1), 21–32.

Emery, M. (2000). The current version of Emery's open systems theory. *Systemic Practice and Action Research*, *13*(5), 623–643.

Fardal, H. (2007). ICT strategy in an ICT user perspective: Exploring alignment between ICT users and managers. *Issues in Informing Science and Information Technology*, *4*, 661–673. Retrieved from http://www.proceedings.informingscience.org/InSITE2007/IISITv4p661-673Fard362.pdf

References

Fernandez, W. D. (2004). The grounded theory method and case study data in IS research: issues and design. *The Australian National University*. Retrieved from www.ejbrm.com

Friedman, B., Kahn, P., & Borning, A. (2006). Value Sensitive Design and Information Systems In: Zhang, P. & Galletta, D.(eds.): Human-Computer Interaction in Management Information Systems: Foundations. ME Sharpe. In P. Zhang & D. Galletta (Eds.), *Human-Computer Interaction in Management Information Systems: Foundations*. NY: M.E. Sharpe, Inc.

Gasson, S. (2003). Human-Centered Vs. User-Centered Approaches to Information System Design. *Journal of Information Technology Theory and Application (JITTA)*, *5*(2), 29–46. Retrieved from http://www.cis.drexel.edu/faculty/sgasson/vita/SG-JITTA.pdf

Giacomin, J. (2014). What Is Human Centred Design? *The Design Journal*, *17*(4), 606–623. doi:10.2752/175630614X14056185480186

Gill, K. (1991). Summary of Human-Centered Systems Research in Europe, Part 1. *Systemist, The Journal of the UK Systems Society*, *13*(1), 7 – 27.

Gill, K. S. (1996). The Foundations of Human-centred Systems. In K. S. Gill (Ed.), *Human Machine Symbiosis* (pp. 1–68). Springer London. Retrieved from http://link.springer.com/chapter/10.1007/978-1-4471-3247-9_1

Glaser, B. G. (1978). *Theoretical Sensitivity: Advances in the Methodology of Grounded Theory.* Mill Valley, CA: Sociology Press.

Glaser, Barney G. (1998). *Doing Grounded Theory: Issues and Discussions*. Sociology Press.

Glaser, Barney G., & Strauss, A. L. (1967). *The discovery of grounded theory.* Aldine Transaction.

Gordon, S. R., & Tarafdar, M. (2010). The IT audit that boosts innovation. *MIT Sloan Management Review*, *51*(4), 39–47. Retrieved from http://eprints.lancs.ac.uk/65199/

Gray, D. E. (2009). *Doing research in the real world*. SAGE Publications Ltd.

Gregor, S. (2005). The struggle towards an understanding of theory in information systems. In D. Hart & S. Gregor (Eds.), *Information Systems Foundations: Constructing and Criticising* (pp. 3–12). Canberra, Australia: The Australian National University. Retrieved from http://press.anu.edu.au?p=128271

References

Gregor, S. (2006). The Nature of Theory in Information Systems. *MIS Quarterly*, *30*(3), 611–642. doi:10.2307/25148742

GSDP. (2008). QNV 2030 Document. General Secretary of Development Planning (GSDP). Retrieved from http://www.gsdp.gov.qa/portal/page/portal/gsdp_en/qatar_national_vision/qnv_2030_document

GSDP. (2011). Qatar National Development Strategy. General Secretary of Development Planning (GSDP). Retrieved from http://www.gsdp.gov.qa/portal/page/portal/gsdp_en/nds

Guba, E. G. (1990). The alternative paradigm dialog. In E. G. Guba (Ed.), *The Paradigm Dialog* (pp. 17–30). SAGE Publications.

Gulf Times Newspaper. (2009, April 12). Second Qatar career fair begins today. Retrieved April 22, 2009, from http://www.gulf-times.com/site/topics/article.asp?cu_no=2&item_no=284122&version=1&template_id=36&parent_id=16

Hammer, M. (1990). Reengineering work: don't automate, obliterate. *Harvard business review*, *68*(4), 104–112.

Hassan, N. R. (2014). Value of IS research: Is there a crisis? *Communications of the Association for Information Systems*, *34*(41), 801–816. Retrieved from http://aisel.aisnet.org/cgi/viewcontent.cgi?article=3764&context=cais

Heck, H. (2010). New ways of working: Microsoft's "mobility"office. *RSM insight*, *4*(1), 4–6. Retrieved from http://repub.eur.nl/pub/39942/

Hedberg, B. (1980). Using Computerized Information System to Design Better Organizations and Jobs. In N. Biota-Andersen (Ed.), *The Human Side of Information Processing*. Holland: The human side of information processing.

Heikkilä, P., Ainasoja, M., & Oksman, V. (2015). The Potential of Technology in Facilitating Positive Stress Experiences. In *Proceedings of the European Conference on Cognitive Ergonomics 2015* (pp. 1–8). Warsaw, Poland: ACM.

References

Henderson, P. (2000). *Systems Engineering for Business Process Change: Collected Papers from the Epsrc Research Programme*. Springer.

Hill, P. (1971). *Towards a New Philosophy of Management: The Company Development Programme of Shell U.K.* Gower Press.

Hirschheim, R., Iivari, J., & Klein, H. (1997). A comparison of five alternative approaches to information systems development. *Australasian Journal of Information Systems*, *5*(1).

Hirschheim, R., Klein, H. K., & Lyytinen, K. (1996). Exploring the intellectual structures of information systems development: A social action theoretic analysis. *Accounting, Management and Information Technologies*, *6*(1–2), 1–64. doi:10.1016/0959-8022(96)00004-5

Howcroft, D., & Wilson, M. (2003). Participation: "bounded freedom" or hidden constraints on user involvement. *New Technology, Work and Employment*, *18*(1), 2–19. doi:10.1111/1468-005X.00107

IFIP WG 8.2. (1996). Scope and Aims of IFIP WG 8.2- IFIP Working Group 8.2. Retrieved June 22, 2015, from http://ifipwg82.wikidot.com/aim-and-scope

Iivari, J. (1991). A paradigmatic analysis of contemporary schools of IS development. *European Journal of Information Systems*, *1*(4), 249–272.

Iivari, J., & Hirschheim, R. (1996). Analyzing information systems development: A comparison and analysis of eight IS development approaches. *Information Systems*, *21*(7), 551–575.

Iivari, J., Hirschheim, R., & Klein, H. K. (1998). A Paradigmatic Analysis Contrasting Information Systems Development Approaches and Methodologies. *Information Systems Research*, *9*(2), 164–193. doi:10.1287/isre.9.2.164

Ikonen, V. (2009). Towards Empowering Design Practises. In P. Mickulecký (Ed.), *Ambient Intelligence Perspectives: Selected Papers from the First International Ambient Intelligence Forum, 2008* (pp. 129–136). IOS Press.

Institute of Administrative Development-Qatar. (2009). Training Plan.

References

Johnson, R. B., & Onwuegbuzie, A. J. (2004). Mixed Methods Research: A Research Paradigm Whose Time Has Come. *Educational Researcher*, *33*(7), 14 –26. doi:10.3102/0013189X033007014

Johnson, R. B., Onwuegbuzie, A. J., & Turner, L. A. (2007). Toward a Definition of Mixed Methods Research. *Journal of Mixed Methods Research*, *1*(2), 112 –133. doi:10.1177/1558689806298224

Jones, C. (2004). Software project management practices: Failure versus success. *CrossTalk: The Journal of Defense Software Engineering*, *17*(10), 5–9.

Kensing, F., & Blomberg, J. (1998). Participatory design: Issues and concerns. *Computer Supported Cooperative Work (CSCW)*, *7*(3-4), 167–185.

Kim, S., & Lee, H. (2006). The impact of organizational context and information technology on employee knowledge-sharing capabilities. *Public Administration Review*, *66*(3), 370–385.

Klein, H. K., & Hirschheim, R. (1993). The Application of Neohumanist Principles in Information Systems Development. In *Proceedings of the IFIP WG8.2 Working Group on Information Systems Development: Human, Social, and Organizational Aspects: Human, Organizational, and Social Dimensions of Information Systems Development* (pp. 263–280). North-Holland Publishing Co.

Klein, L. (2005). *Working Across the Gap: The Practice of Social Science in Organizations*. Karnac Books.

Kling, R., & Lamb, R. (1999). IT and organizational change in digital economies: a socio-technical approach. *SIGCAS Comput. Soc.*, *29*(3), 17–25. doi:10.1145/572183.572189

Kling, R., & Star, S. L. (1998). Human centered systems in the perspective of organizational and social informatics. *SIGCAS Comput. Soc.*, *28*(1), 22–29. doi:10.1145/277351.277356

Kogetsidis, H. (2013). Change Management: The Need for a Systems Approach. *International Journal of Information Technologies and Systems Approach (IJITSA)*, *6*(2), 1–12. Retrieved from http://www.igi-global.com/article/change-management/78903

References

Kuipers, B. S., & Witte, M. C. de. (2005). Teamwork: a case study on development and performance. *The International Journal of Human Resource Management*, *16*(2), 185–201. doi:10.1080/0958519042000311390

Kumar, R. (2010). *Research Methodology: A Step-by-Step Guide for Beginners*. SAGE Publications Ltd.

Labaree, R. V. (2009). Research Guides: Organizing Your Social Sciences Research Paper: The Research Problem/Question. *University of Southern California*. Retrieved April 30, 2015, from http://libguides.usc.edu/c.php?g=235034&p=1561764

Lamb, R., & Kling, R. (2003). Reconceptualizing Users as Social Actors in Information Systems Research. *MIS Quarterly*, *27*(2), 197–235. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=10030460&site=eds-live&scope=site

Langefors, B. (1978). Analysis of user needs. In G. Bracchi & P. C. Lockemann (Eds.), *Information Systems Methodology* (pp. 1–38). Springer Berlin Heidelberg. Retrieved from http://link.springer.com.ueaezproxy.uea.ac.uk:2048/chapter/10.1007/3-540-08934-9_71

Langefors, B. (1996). *Essays on Infology*. Chartwell Learning & Development Limited.

Larsen, K. R., Allen, G., Vance, A., & Eargle, D. (2010). Theories Used in IS Research Wiki. Retrieved February 23, 2010, from http://IS.TheorizeIt.org

Lee, A. S. (2001). MIS Quarterly's Editorial Policies and Practices. *MIS Quarterly*, *25*(1), iii–vii.

Lee, A. S. (2004). Thinking about social theory and philosophy for information systems. In J. Mingers & L. P. Willcocks (Eds.), *Social Theory and Philosophy for Information Systems* (pp. 1–26). Chichester, UK: John Wiley & Sons Ltd. Retrieved from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.137.3685&rep=rep1&type=pdf

Lee, D.-J., Sirgy, J., Efraty, D., & Siegel, P. (2003). A Study of Quality of Work Life, Spiritual Well-Being, and Life Satisfaction. In R. A. Giacalone & C. L. Jurkiewicz (Eds.), *Handbook of Workplace Spirituality and Organizational Performance* (pp. 209–230). USA: M.E. Sharpe.

Likert, R. (1967). *THE HUMAN ORGANIZATION*.

References

Lincoln, Y., Lynham, S., & Guba, E. (2011). Paradigmatic Controversies, Contradictions and Emerging Confluences, Revisited. In N. K. Denzin & Y. S. Lincoln (Eds.), *The SAGE Handbook of Qualitative Research* (Fourth., pp. 97–128). SAGE.

Lipnack, J., & Stamps, J. (1997). *Virtual Teams: Reaching Across Space, Time, and Organizations with Technology*. Jeffrey Stamps.

Lynch, T., & Gregor, S. (2004). User participation in decision support systems development: influencing system outcomes. *European Journal of Information Systems*, *13*(4), 286–301. Retrieved from http://www.palgrave-journals.com/ejis/journal/v13/n4/abs/3000512a.html

Lyytinen, K. (1986). *Information systems development as social action: Framework and critical implications* (Vol. 8). Jyväskylän yliopisto.

March, S. T., & Smith, G. F. (1995). Design and natural science research on information technology. *Decision Support Systems*, *15*(4), 251–266. doi:10.1016/0167-9236(94)00041-2

Markus, M. L. (2004). Technochange management: using IT to drive organizational change. *Journal of Information technology*, *19*(1), 4–20. Retrieved from http://dx.doi.org/10.1057/palgrave.jit.2000002

Markus, M. L., & Robey, D. (1988). Information Technology and Organizational Change: Causal Structure in Theory and Research. *Management Science*, *34*(5), 583–598. Retrieved from http://pubsonline.informs.org/doi/abs/10.1287/mnsc.34.5.583

Martin, P. Y., & Turner, B. A. (1986). Grounded Theory and Organizational Research. *The Journal of Applied Behavioral Science*, *22*(2), 141–157. doi:10.1177/002188638602200207

Mason, R. O., & Mitroff, I. I. (1973). A program for research on management information systems. *Management science*, *19*(5), 475–487. Retrieved from http://www.jstor.org/stable/2629445

Maton, B. (1988). Socio-technical systems: conceptual and implementation problems. *Relations industrielles/Industrial Relations*, 869–889.

Maznevski, M. L., & Chudoba, K. M. (2000). Bridging space over time: Global virtual team dynamics and effectiveness. *Organisation Science*, *11*(5), 473–492.

References

McShane, S. L., McShane, S., & Glinow, M. A. V. (2004). *Organizational behavior*. McGraw-Hill.

Mildeová, S. (2013). Research problem description and definition: From mental map to connection circle. *Journal on Efficiency and Responsibility in Education and Science*, *6*(4), 328–335. Retrieved from www.eriesjournal.com/_papers/article_230.pdf

Mingers, J. (2001). Combining IS Research Methods: Towards a Pluralist Methodology. *Information Systems Research*, *12*(3), 240–259.

Mingers, J., & Stowell, F. A. (1997). Information Systems: An Emerging Discipline?- Introduction. In J. Mingers & F. A. Stowell (Eds.), *Information Systems: An Emerging Discipline?* (pp. 1–15). McGraw-Hill.

Mitroff, I. I., & Linstone, H. A. (1995). *The Unbounded Mind: Breaking the Chains of Traditional Business Thinking*. Oxford University Press.

Mohamed, A. M. (2009). *Emlpoyee's Motiation Factors in Qatar Workplace* (MBA). Qatar University.

Molleman, E., & Broekhuis, M. (2001). Sociotechnical systems: towards an organizational learning approach. *Journal of Engineering and Technology Management*, *18*(3–4), 271–294. doi:10.1016/S0923-4748(01)00038-8

Morooka, K., & Tsurushima, N. (2014). Quality of Working Life: A New Model for the Quantitative Measurment of the Quality of Working Life. In G. E. Lasker (Ed.), *The Quality of Life: Systems Approaches: Proceedings of the International Congress on Applied Systems Research and Cybernetics* (pp. 389–430). Elsevier.

Mumford, E. (1979). Consensus systems design: An evaluation of this approach. In N. Szyperski & E. Grochla (Eds.), *Design and Implementation of Computer Based Information Systems*. Gromingen,: Sijthoff and Noordhoff.

Mumford, E. (1981). Participative Systems Design: Structure and Method. *Systems Objectives, Solutions*, *1*(1), 5–19.

Mumford, E. (1983). *Designing human systems for new technology: the ETHICS method*. Manchester: Manchester Business School.

References

Mumford, E. (1993). *Designing human systems for health care: the ETHICS Method*. England: Eight Associates.

Mumford, E. (1995). *Effective Systems Design and Requirements Analysis: The ETHICS Approach*. Macmillan.

Mumford, E. (1996). *Systems Design: Ethical Tools for Ethical Change*. London: Macmillan.

Mumford, E. (2003). *Redesigning Human Systems*. Idea Group Inc (IGI).

Mumford, E. (2006). The story of socio-technical design: reflections on its successes, failures and potential. *Information Systems Journal*, *16*(4), 317–342. doi:10.1111/j.1365-2575.2006.00221.x

Myers, M. D. (1995). Dialectical hermeneutics: a theoretical framework for the implementation of information systems. *Information Systems Journal*, *5*(1), 51–70. doi:10.1111/j.1365-2575.1995.tb00089.x

Myers, Michael D. (1994). A disaster for everyone to see: An interpretive analysis of a failed is project. *Accounting, Management and Information Technologies*, *4*(4), 185–201. doi:10.1016/0959-8022(94)90022-1

Myers, Michael D. (2003). The IS Core - VIII: Defining the Core Properties of the IS Disciplines: Not Yet, Not Now. *Communications of the Association for Information Systems*, *12*(1). Retrieved from http://aisel.aisnet.org/cais/vol12/iss1/38

Niemelä, M., Ikonen, V., Leikas, J., Kantola, K., Kulju, M., Tammela, A., & Ylikauppila, M. (2014). Human-Driven Design: A Human-Driven Approach to the Design of Technology. In K. Kimppa, D. Whitehouse, T. Kuusela, & J. Phahlamohlaka (Eds.), *ICT and Society: 11th IFIP TC 9 International Conference on Human Choice and Computers, HCC11 2014, Turku, Finland, July 30 – August 1, 2014. Proceedings* (pp. 78–91). Berlin, Heidelberg: Springer Berlin Heidelberg. Retrieved from http://dx.doi.org/10.1007/978-3-662-44208-1_8

Northouse, P. G. (2016). *Introduction to leadership: concepts and practice* (Seventh Edition.). Sage Publications.

References

Okoli, C., & Schabram, K. (2010). A guide to conducting a systematic literature review of information systems research. *Sprouts Work. Pap. Inf. Syst*, *10*, 26. Retrieved from http://www.nti.ufpb.br/~evandro/pesquisa/RSL/(Okoli,%20Schabram%202010%20Sprouts)%20systematic%20literature%20reviews%20in%20IS%20research.pdf

Olsen, W. (2012). *Data Collection: Key Debates and Methods in Social Research*. SAGE.

Orlikowski, W. J. (1992). The Duality of Technology: Rethinking the Concept of Technology in Organizations. *Organization Science*, *3*(3), 398–427. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=edsjsr&AN=edsjsr.2635280&site=eds-live&scope=site

Orlikowski, W. J. (1993). CASE Tools as Organizational Change: Investigating Incremental and Radical Changes in Systems Development. *MIS Quarterly*, *17*(3), 309.

Orlikowski, W. J. (2009). The sociomateriality of organisational life: considering technology in management research. *Cambridge Journal of Economics*, bep058. doi:10.1093/cje/bep058

Orlikowski, W. J., & Barley, S. R. (2001). Technology and institutions: what can research on information technology and research on organizations learn from each other? *MIS Q.*, *25*(2), 145–165. doi:10.2307/3250927

Owen, C. L. (1998). Design research: building the knowledge base. *Design Studies*, *19*(1), 9–20.

Pasmore, W. A., & Khalsa, G. S. (1993). The Contributions of Eric Trist to the Social Engagement of Social Science. *The Academy of Management Review*, *18*(3), 546–569. Retrieved from http://www.jstor.org/stable/258908

Pendse, P. (2008). *Business Analysis: Visualizing Business Processes And Effective Software Solutions*. PHI Learning Pvt. Ltd.

Pierce, J. L., & Gardner, D. G. (2004). Self-esteem within the work and organizational context: A review of the organization-based self-esteem literature. *Journal of Management*, *30*(5), 591.

Probert, S. (1997). The Actuality of Information Systems. In J. Mingers & F. A. Stowell (Eds.), *Information Systems: An Emerging Discipline?* (pp. 21–62). McGraw-Hill.

Qatar Statistics Department. (2009). Summary of training data.

References

Raya Newspaper. (2009, January 22). Qatar career fair begins 13 of April. Retrieved April 22, 2009, from http://www.raya.com/Home/GetPage/f6451603-4dff-4ca1-9c10-122741d17432/6ba72185-89db-49aa-943c-26524a23359c

Ropohl, G. (1999). Philosophy of Socio-Technical Systems. *Society for Philosophy and Technology*, *4*(3). Retrieved from http://scholar.lib.vt.edu/ejournals/SPT/v4_n3html/ROPOHL.html

Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, NJ: Princeton University Press.

Rosenthal, R., & Rosnow, R. L. (1991). *Essentials of behavioral research: methods and data analysis*. McGraw-Hill.

Rowland, D. R. (2014). Reviewing the Literature: A Short Guide for Research Students. The University of Queensland. Retrieved from http://www.uq.edu.au/student-services/learning/literature-review

Saariluoma, P., & Leikas, J. (2010). Life-based design-an approach to design for life. *Global Journal of Management and Business Research*, *10*(5), 17–23. Retrieved from http://journalofbusiness.org/index.php/GJMBR/article/viewFile/199/174

Sabherwal, R., & Elam, J. (1995). Overcoming the problems in information systems development by building and sustaining commitment. *Accounting, Management and Information Technologies*, *5*(3), 283–309.

Saevik, S. E. (2013). From Infology to Artificial Science. Lund University. Retrieved from http://lup.lub.lu.se/student-papers/record/3935717

Savage, A., & Mingers, J. (1996). A framework for linking Soft Systems Methodology (SSM) and Jackson System Development (JSD). *Information Systems Journal*, *6*(2), 109–129. doi:10.1111/j.1365-2575.1996.tb00008.x

Scacchi, W. (2004). Socio-technical design. *The encyclopedia of human-computer interaction*, *1*, 656–659. Retrieved from http://www.ics.uci.edu/~wscacchi/Papers/SE-Encyc/Socio-Technical-Design.pdf

References

Seale, C. (1999). Quality in Qualitative Research. *Qualitative Inquiry*, *5*(4), 465 –478. doi:10.1177/107780049900500402

Simon L Albrecht, Arnold B Bakker, Jamie A Gruman, William H Macey, & Alan M Saks. (2015). Employee engagement, human resource management practices and competitive advantage: An integrated approach. *Journal of Organizational Effectiveness: People and Performance*, *2*(1), 7–35. doi:10.1108/JOEPP-08-2014-0042

Stahl, B. C. (2007). ETHICS, Morality and Critique: An Essay on Enid Mumford's Socio-Technical Approach. *Journal of the Association for Information Systems*, *8*(9), 479–490. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=27677956&site=eds-live&scope=site

Steers, R. M., & Porter, L. W. (1983). *Motivation and work behavior*. McGraw-Hill.

Stowell, F. (2007). The knowledge age or the age of ignorance and the decline of freedom? *Systemic Practice and Action Research*, *20*(5), 413–427. Retrieved from http://link.springer.com/article/10.1007/s11213-007-9076-2

Stowell, F. (2009a). Soft Systems and research. *Kybernetes, The International Journal of Systems and Cybernetics*, *38*(6), 879–896. Retrieved from http://www.emeraldinsight.com/journals.htm?articleid=1800574&show=abstract

Stowell, F. (2009b). A question for research: Do we mean information systems or systems of information? In D. Paradice (ed.), *Emerging Systems Approaches in Information Technologies: Concepts, Theories, and Applications* (pp. 25–38).

Stowell, F., & Welch, C. (2012). *The Manager's Guide to Systems Practice: Making Sense of Complex Problems*. Chichester: John Wiley & Sons.

Stowell, F., & West, D. (1994). *Client-Led Design: A Systemic Approach to Information System Definition*. McGraw-Hill.

Strauss, A., & Corbin, J. (1990). *Basics of qualitative research* (Vol. 15). Newbury Park, CA: Sage.

Symons, V. J. (1991). Impacts of information systems: four perspectives. *Information and Software Technology*, *33*(3), 181–190. doi:10.1016/0950-5849(91)90132-U

References

Tang, Z. (2012). The Applied Research of Information System Project Management in Logistics Enterprises. In *2012 Second International Conference on Business Computing and Global Informatization (BCGIN)* (pp. 477–480). Presented at the 2012 Second International Conference on Business Computing and Global Informatization (BCGIN). doi:10.1109/BCGIN.2012.130

The Ministry of Development Planning and Statistics. (2013). Qatar National Vision - The Human Development Pillar. Retrieved February 13, 2013, from http://www.mdps.gov.qa/portal/page/portal/gsdp_en/qatar_national_vision/Human_development

Trist, E. (1981). The evolution of socio-technical systems. *Occasional paper*, *2*. Retrieved from http://www.sociotech.net/wiki/images/9/94/Evolution_of_socio_technical_systems.pdf

Trochim, W. M. K. (2006, October 20). The Research Methods Knowledge Base, 2nd Edition. Retrieved September 22, 2012, from http://www.socialresearchmethods.net/kb/

Ulrich, W. (1988). Systems thinking, systems practice, and practical philosophy: A program of research. *Systems Practice*, *1*(2), 137–163.

Vaishnavi, V., & Carroll, W. R. (2009, August 1). Design Research in Information Systems. Retrieved February 11, 2010, from http://desrist.org/design-research-in-information-systems/

Van Baalen, D., Engels, G., Van Heck, K., Legerstee, van N., & Van Oosterhout, V. (2007). *Results from the New Worlds of Work Research Report 2007*.

Van Heck, E. (2009). The Next Generation Workplace. *MIT CISR Research Briefing*, *9*(9B). Retrieved from http://cisr.mit.edu/blog/documents/2009/09/25/2009_0902_nextgenworkplace_vanheck.pdf/

Vat, K. H. (2004). On the idea of organization transformation: The IS/IT design challenge in systems thinking. *Journal of Issues in Informing Science and Information Technology*, *1*, 0941–0950. Retrieved from http://proceedings.informingscience.org/InSITE2004/120vat.pdf

Vickers, G. (1965). *The art of judgment: A study of policy making*. Basic Books.

Vickers, G. (1995). *The Art of Judgment: A Study of Policy Making*. SAGE Publications.

Von Alan, R. H., March, S. T., Park, J., & Ram, S. (2004). Design science in information systems research. *MIS quarterly*, *28*(1), 75–105.

Walker, G. H., Stanton, N. A., Salmon, P. M., & Jenkins, D. P. (2008). A review of sociotechnical systems theory: a classic concept for new command and control paradigms. *Theoretical Issues in Ergonomics Science*, *9*(6), 479–499. doi:10.1080/14639220701635470

Walsh, B. (1978). Job satisfaction in the office. *Education+ Training*, *20*(2), 60–64.

Whetten, D. A., & Cameron, K. S. (2016). *Developing Management Skills* (Ninth.). England: Pearson.

Whitworth, B. (2006). The Socio-Technical Systems. *Encyclopedia of human computer interaction*, 533–541. Retrieved from http://brianwhitworth.com/hci-sts.pdf

Willcocks, L., & Smith, G. (1995). IT-enabled business process reengineering: organizational and human resource dimensions. *The Journal of Strategic Information Systems*, *4*(3), 279–301. doi:10.1016/0963-8687(95)96806-J

Wilson, B. (1990). *Systems: Concepts, Methodologies, and Applications*. Wiley.

Yin, R. K. (2009). *Case Study Research: Design and Methods*. Thousand Oaks, CA.: Sage.

Appendices

Appendix (A): Supporting Letter from the Supervisor

University of East Anglia

School of Computing Sciences

University of East Anglia
Norwich NR4 7TJ
United Kingdom

To Whom It May Concern,

Re: Mr.Hussein A. Alsalemi

Hussein Alsalemi is a research postgraduate student in the School of Computing Sciences at the University of East Anglia, Norwich. He began in October and his research topic has the working title of, "IT systems for improving the capability and motivation of workforce in organizations". This is an applied study working in association with the Qatar National Vision 2030. The aim of Hussein's research is to find practical solution that will help employees to become better motivated and appropriately equipped with the capabilities they need to work towards achieving their 21st century organizations' goals.

Hussein is focusing his work on organisations in Qatar and in order to successfully carry out his research he need to talk to a variety of organisations. Would your organisation be interested in being introduced to, and possibly being involved in, this interesting and exciting area of research? If so, please meet with Hussein, who is an innovative, skillful, and forward looking person, and he will be more than happy to discuss it with you. Please be reassured that should you agree to participate, all the data collected will be treated with strict confidentiality and neither your organization's name nor your employees' names will be discussed in any of the research deliverables.

Please feel free to contact me if I can be of further assistance.

Yours faithfully,

Dr P. J. Mayhew
Hussein's supervisor.

Appendix (B): Research's Guidelines for Conducting Interviews

University of East Anglia

PhD Research بحث دكتوراة

Researcher: Hussein Al-Salimy الباحث: حسين علاء السالمي

إن تحقيق أهداف المؤسسات لا يمكن أن ينجز بدون وجود كادر بشري لديه دافعية للعمل و قدرات تمكنه من أداء هذا العمل بشكل محترف و متميز يرتقي للفرص و التحديات التي تواجها المؤسسات في القرن الواحد و العشرون.

لذا فإن بحث الدكتوراه الذي أقوم به يتضمن دراسة العوامل الأساسية المؤثرة في دافعية الموظفين و المؤثرة في قادراتهم المعرفية و العملية و التي تؤثر بشكل مباشر في امكانياتهم على تحقيق أهداف مؤسساتهم.

كما يتضمن البحث دراسة كيف يمكن تحويل هذه العوامل إلى نظام عملي يستخدم في المؤسسات يساعد على الرفع من دافعية العمل لدى الموظفين و وكذلك الارتقاء من قدراتهم و إمكانياتهم في العمل لتصل للمستوى المطلوب الذي يؤهلها للمشاركة في تحقيق اهداف مؤسساتها.

Interview Instructions

1- Give an overview of the research and its objectives.
2- Explain that this research will not ask any question specific about your organization, all the questions are general and all data collected will be treated with confidentiality and neither your organization's name nor your name will be discussed in the thesis.
3- Make clear that interviewee has the right to withdraw or refuse to answer any question.
4-Make clear that further contact will be made afterwards (Focus Group and Experiment) and they have the option to not participate in any of them.
5-Take questions before the start of the interview regarding the interview or the research.

سرية و خصوصية المعلومات

- لقد حصل هذا البحث على موافقة لجنة أخلاقيات البحث العلمي في الجامعة التي أدرس فيها.
- هذا البحث لن يقوم بسؤال عن أي شيء يخص المؤسسة (جميع الأسئلة عامة).
- لن يتم ذكر أسم المؤسسة و لا أسماء المشاركين في البحث.
- للمشاركين حرية الكاملة في رفض المشاركة أو الاجابة على أي سؤال.

Appendix (C): Data Collection Instrument for the Explanatory Study (Round One)

Date:					
Organization					
Position	Manager		Employee		

If you would like to be contacted afterwards:

Name:					
Department:					
Participation	Focus Group		Experiment		

Q1: What do you think are the main factors that make employees capable and motivated at work?
ما هي العوامل الأساسية التي إذا تواجدت في أي مؤسسة سوف ترفع من دافعية و قدرات الموظف؟

Q2: Do you think that knowledge, Innovation, Planning and Teamwork are factors? Why? Example? How?
هل تعتبر أن المعرفة- التخطيط - العمل في فريق- الابتكار عامل من هذه العوامل التي ترفع من دافعية الموظف و قدراته؟ لماذا؟ أذكر مثال؟

Q3: What is the main motivator that makes you capable and motivated in your work?
ما هو الأمر الذي كان له الأثر الأكبر في الارتقاء من دافعيتك و قدراتك في العمل؟

Appendix (D): Explanatory Study - Question One Coding and Answers (Round One)

Instance of concepts	Participants' answers (qualitative datum)	M. No.	Total No. of Occurrence
Experienced leader	Leadership skills	8	**9**
Leader personal skills	Taking care of his/her employees	2,5	
Experienced leader	No barriers between manager and his employees	5,6	
Experienced leader	Give employee a chance to be in charge of a certain work or to implement his ideas (trust)	3,5	
Experienced leader	Employee proud that he is working with his manager	5	
Experienced leader	Sharing decision taking with employees	2,5,9,4	
Experienced leader	Experienced manager	4	
Experienced leader	Managers should be creative and active and work more than their employees.	4	
Experienced leader	Work achievements in the name of employees who achieve them	1	
Leader personal skills	Nice words from manager to employees	7	

Instance of concept	Participants' answers (qualitative datum)	M. No.	Total No. of Occurrence
Management	System, Structure, Procedures, Work plan, Well-organised organisation	8,9,4	6
	Employee knows his work duties	7	
	Protected and maintained employees' rights	2	
	Reputation and advancement of the organisation	9	
	Giving employee challenging job that has a potential	4	
	Employee feels that he has a value in the work	5	

Clear goals communicated to the employees about his career progress	5
Everybody understand and appreciate what he is doing and management support him and gives him the resources he needs	5
Achievements linked to career path	7
Link training with career path	8
Linking personal goals with his work goals by introducing a career path suitable for self development, Making employee know the potential of the work	7,4
Give the employee the chance to transform what he learned to practice (training without implementation is nonsense)	8
Training: -Specialised Training on subject of employee's work	2,5,7

Instance of concept	Participants' answers (qualitative datum)	M. No.	Total No. of Occurrence
Organisational Work Culture	Making the employee feel the importance of his organisation	6	7
	Appreciation: feel you are important and your work is appreciated	1	
	Communication between staff and management	2,4	
	Work environment: Collaboration, Team work, respect	1,2,3	
	Work achievements in the name of employees who achieve them	7	
	Work environment: taking care of employees	7	
	Flexibility: Work from home, no restricted work hours	9	
	Work culture, Professional Environment	9,4	
	Guidance and consultation service	4	

Instance of concept	Participants' answers (qualitative datum)	M. No.	Total No. of Occurrence
Changing Employee Work Practice & Culture	Employees: Love work, Respect work, Innovative at work, Not arrogant	1,3,5	6
	Previous experience	9	
	The way employee thinks	6,7,9	
	Communication skills	7	
	Personal Relationship with other employees	5,6,7	

Instance of concept	Participants' answers (qualitative datum)	M. No.	Total No. of Occurrence
Resources	Work Facilities (offices, equipments…	1,5,3	6
	Money	5,6,7, 4	

Instance of concept	Participants' answers (qualitative datum)	M. No.	Total No. of Occurrence
Evaluation	Evaluation system, rewards and punishments	8,6,7, 4	6
	Treat me in different way than others	2	
	Appreciation based on excellence and work achievement	5	

Appendix (E): Explanatory Study - Question Two Answers (Round One)

Theme	Is it a factor	Why	How	Participants' answers (qualitative datum)	M. No.
Planning	1	1	1	Because if I have personal goals (ambition) then I will have the desire and the power to achieve it.	1
	1	0	0	No details	2
	0	0	0	No answer	3
	1	1	1	Goals are important factor that helps employee knows what he should do	4
	1	0	0	No details	5
	1	0	0	No details	6
	1	1	1	Clear goals that are linked to organisation's goals will motivate me to work	7
	0	0	0	No answer	8
	1	0	1	Clear work's goals should be known by everybody in organisation	9
Total	7	3	4		

Theme	Is it a factor	Why	How	Participants' answers (qualitative datum)	M. No.
Teamwork	1	1	0	It makes work easier.	1
	-1	0	0	I give order to my employees (they do not have the experience to share decision taking).	2
	1	0	1	Training.	3
	1	0	1	-Every team member should know his role clearly. -There should be good team leader.	4
	1	0	0	No details	5
	1	0	0	No details	6
	0	0	0	No answer	7
	1	0	1	It needs at least one who has experience to manage the team (Teamwork skills)	8
	1	0	1	- It requires teamwork spirit. - Management to endorse it.	9
Total	7	1	4		

Theme	Is it a factor	Why	How	Participants' answers (qualitative datum)	M. No.
Knowledge	1	1	1	-To know things that I need in my work -Training course -Asking friend -Internet as a source of knowledge: he Google about PR	1
	1	1	1	-Using training course materials afterward frequently to remember things he learned to use at work -Experience exchange with people attending training courses who have long experience in my work • I use internet to look for new training courses • I asked him if his study in university helped him. He said: yes	2
	1	0	1	Asking friend in other ministries	3
	1	0	1	Employees should have the wish and desire to knowledge	4
	1	0	0	No details	5
	1	1	1	-Developing services of the organisation -Exchanging experiences with experienced people	6
	1	0	1	Knowledge about the latest in your specialisation is a duty of the organisation by providing training courses and emphasising the importance of this knowledge in employee's work	7
	0	0	0	No answer	8
	1	0	0	No details	9
Total	8	3	6		

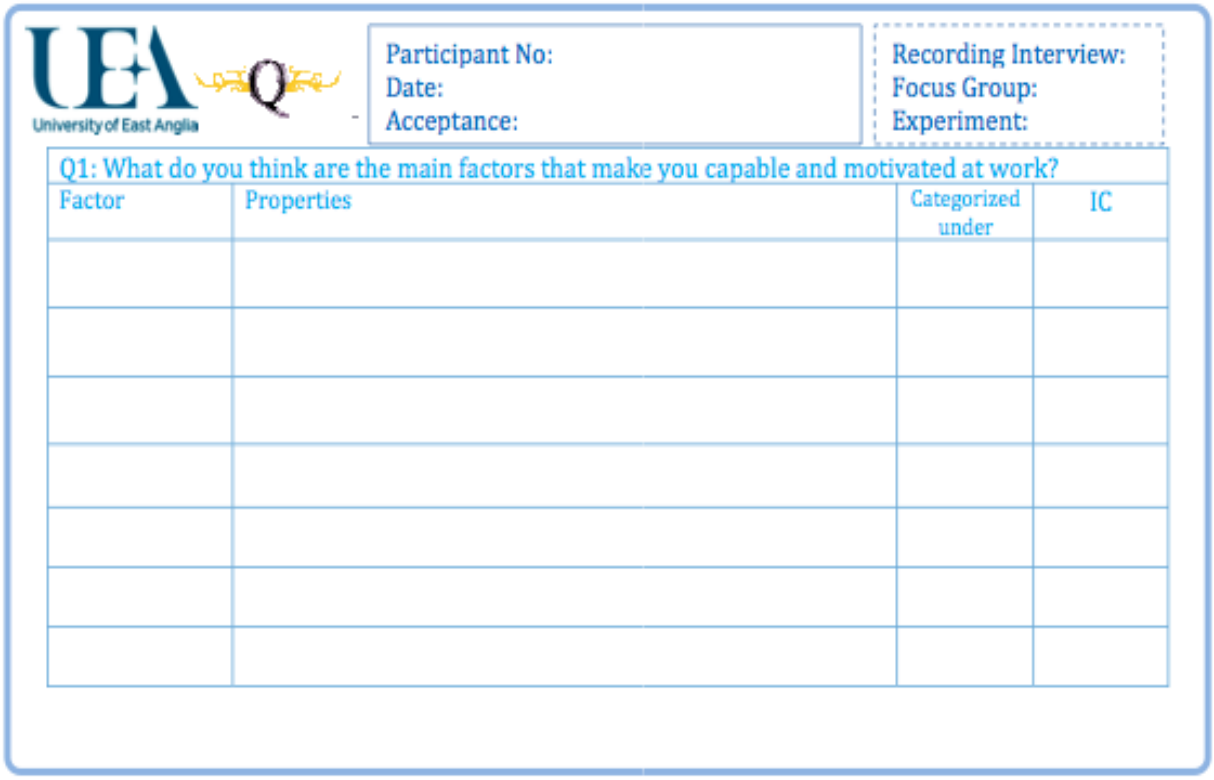
Theme	Is it a factor	Why	How	Participants' answers (qualitative datum)	M. No.
Innovation	1	1	1	-To do work better which will encourage working -Appreciation and incentives from manager -Personal Knowledge development -Overcoming work problems	1
	1	1	0	It makes me different	2
	1	1	0	To develop work, make procedure simpler, need less time	3
	0	0	0	No details	4
	1	1	1	-For continuous development -Management should break the psychological barrier that innovation is a hard task	5
	1	0	0	No details	6
	1	1	0	For developing work and coming up with new ideas	7
	1	0	0	It needs work environment that accepts new ideas	8
	0	0	0	No answer	9
Total	7	5	2		

Appendix (F): Explanatory Study - Question Three Coding and Answers (Round One)

M. No	Code	Factor	Description	Example
1	Self-esteem and Working with professional	I want to achieve things to feel good about myself	Look for knowledge Think innovatively Active Participation in organisation positive attitude towards teamwork	6 months training & working in WorldBank Team work Competition Excellence in doing things Incentives
2	Self-esteem and Working with professional	Trying to be different than other employees	-Achieve quality in service. -Look for knowledge Think innovatively	Working closely with professional people (His Uncle successful businessman with BSc from USA) • advices • encouragement • Support
3	Negative impact of others on her motivation and capabilities	Others employees or manager		She said employees who do not want to work Also manger who does not give chance or does not have a trust on his employee
4	Self-esteem	Self-esteem		Reading books about self-motivation High standard Education • books • group discussions • sharing experience and ideas
5	Self-esteem and Working with professional	I want to be different in my job	Try to bring new ideas to organisation	Working closely with professional people (His Uncle successful man holding MBA from USA) • changed his way of thinking Working with different people (every three months he goes to new place for auditing)

				• New ideas • New experiences • Discussions
6	Self –esteem & Working with professional	To go through new challenges	love work and work hard	Working closely with professional people (He was a close friend to his university instructors who are from UK and US) • New culture • New experiences
7	Working with professional	The more you have knowledge the more you can go forward in your career	work hard to achieve goals	Working in professional work environment (Working in University as TA) (Study BSc in USA) • eValue knowledge • Value thinking
8	Self –esteem & Working with professional	Self-satisfaction	work hard to achieve goals	The need to achieve personal goals by achieving work goals • Adapting to advanced work culture
9	Working with professional	Working with professional	work hard to change	Living in professional work environment (She lived in Japan, Germany, Swiss and UK)

Appendix (G): Data Collection Instrument for the Explanatory Study (Round Two)



University of East Anglia

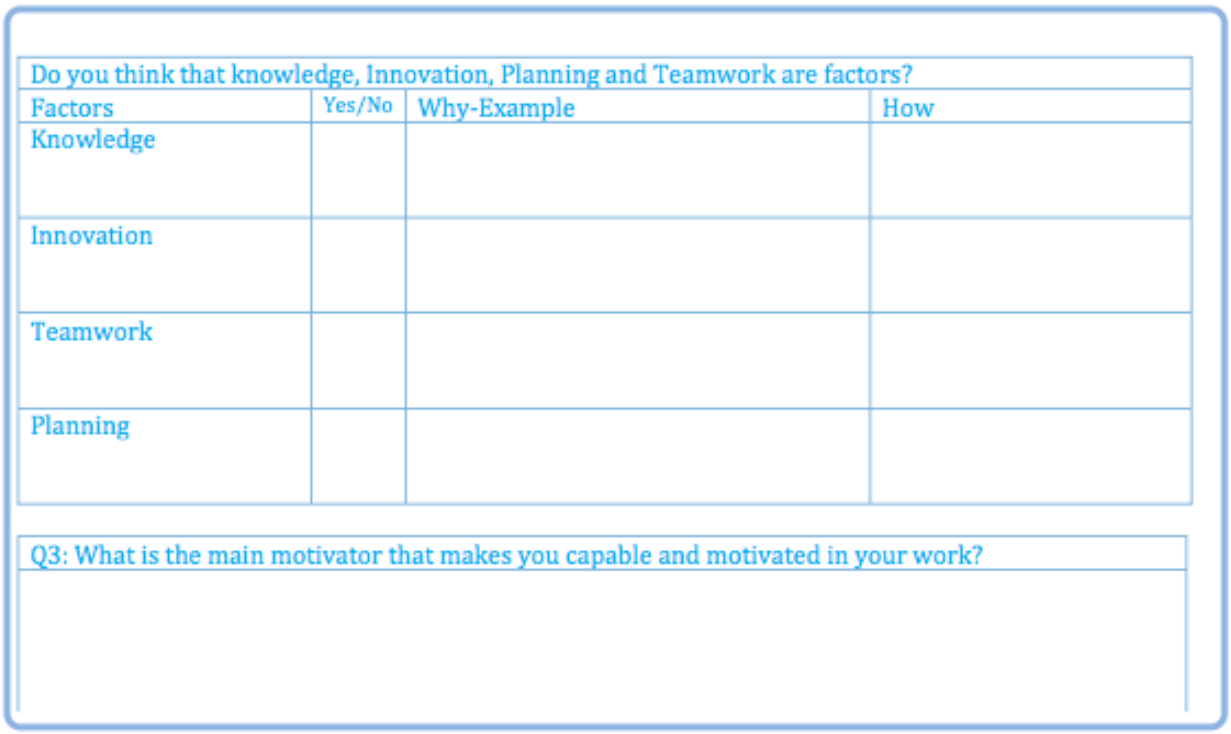
Participant No:
Date:
Acceptance:

Recording Interview:
Focus Group:
Experiment:

Q1: What do you think are the main factors that make you capable and motivated at work?

Factor	Properties	Categorized under	IC

(A) Face of the instrument



Do you think that knowledge, Innovation, Planning and Teamwork are factors?

Factors	Yes/No	Why-Example	How
Knowledge			
Innovation			
Teamwork			
Planning			

Q3: What is the main motivator that makes you capable and motivated in your work?

(B) Back of the instrument

Appendix (H): Explanatory Study - Question One Answers (Round Two)

Round one instance of concept: Leadership (work experience)		
Round two codes	Participants' answers	E. No.
Enable & support	That has no discrimination based on personal relationship	1
Openness	That accept opinions and ideas and work based on them	1,4,13
Enable & support	that remove the misconception that innovation and knowledge is for specialised people only and encourage employees to think and suggest	1,2,13
Work closely with staff	**Who allows open communication** with employees to achieve goals, encourage staff to be positive at work and give their opinion frankly	3,4,8,10
Ownership	**Ownership of work,** everybody select a goal which collectively achieve organisation goal	4,5,8
Enable & support	**vision, mission, goals and planning**	4,5,8

Round one instance of concept: Leadership (personal skills)		
Round two codes	Participants' answers	E. No.
Treatment	Way of treatment: who respect of other employees, caring about them	1,4,6,8,9, 10
Raise the concept of self-esteem	who makes employee feel **his importance** at work and he is **adding value** to work	3,7,13
Appreciation	**Appreciation** at work makes me love work, making me different from other employees	4,5,6,8,11, 13
Trust	**Trust** in employees (**authorities and responsibility**) and support	4,7,8,9
Raise the concept of self-esteem	**Guidance** for the employee	7,8
Raise the concept of self-esteem	**Understanding of employees needs- Collaborative** manager	11,12

Instance of concepts	Participants' answers (qualitative datum)	M. No.
Leader personal skills	Manager knows his employees personally and treat them well	10
Experienced leader	Leadership: determine his employee capabilities by working closely with his employee	11
Leader personal skills	Encouragement, transparency, good treatment	12

Round one instance of concept: Work culture		
Round two codes	Participants' answers	E. No.
Knowledge	**Knowledge Resources**: books and internet	1
Knowledge	**Knowledge tools**: how to know the latest in my field, no time (technology can save time for innovation)	4,6,10
Knowledge	**Training**: to improve knowledge, mind, skills and experience transfer	5,10,11

Round one instance of concept: Work culture		
Round two codes	Participants' answers	E. No.
Innovation	**Innovation tools:** System for thinking between all depts. In org to achieve org goals	5,11
Innovation	**Innovation culture**: that encourage employees to **think and suggest**	2

Round one instance of concept: Work culture		
Round two codes	Participants' answers	E. No.
Experience	**Experience transfer tools**: Transfer experience (Learning at work)	4,5,10, 11,12
Experience	Work culture (work experience)-professional work culture- Work based on scientific and professional basis	7,8,12

Round one instance of concept: Work culture		
Round two codes	Participants' answers	E. No.
Planning	Set goals to be achieved by the employees- Goal-> means->search->experience->knowledge->love work--- Employee needs a goal and then experience from experts and guidance from manager	8,9,12
Planning	Tools and **resources** for carrying out work (such as planning software)	8

Round one instance of concept: Management		
Round two codes	Participants' answers	E. No.
Professional	that give **promotion** based on improvement and commitment at work	2
Professional	That make **rights** and duties (**Job description) work procedures-structure-Workflow** in organisation clear for everybody	3,4,5
Professional	**Energising work environment- encourage ambition**	8,13
Professional	That make **stability** at work for employees	2
Professional	**Encourage work culture principles**	6
Professional	Controlled management	13
Professional	Simple **and clear work system**: One system and one organisational work flow	5,7
Professional	Information tools: info between departments	5,10,12

Round one instance of concept: Evaluation & reward system		
Round two codes	Participants' answers	E. No.
Reward system	Immaterial and material incentives based on work (productivity and performance-customer satisfaction-innovation-collaboration-subjective evaluation)- Goals linked to incentives- Reward and punishment	1,3,4,5, 10,11,13

Round one instance of concept: Management		
Round two codes	Participants' answers	E. No.
Resources	that gives high **salaries**	2,4,13
Resources	Work environment: place-location-equipments-decoration	6

Round one instance of concept: Management		
Round two codes	Participants' answers	E. No.
Communication at work	Tools and resources for carrying out work (such as communication software	8
Communication at work	Communication channels clear for employees with others and management	12

Round one instance of concept: **Employee's work culture & practices**		
Round two codes	Participants' answers	E. No.
Relationship at work	Training courses in how to **work with others**: convince instead of confront- Collaboration between staff member	1,12

Round one instance of concept: **Employee's work culture & practices**		
Round two codes	Participants' answers	E. No.
Importance of the employee's role in the job	Appreciation->Love work	6
Importance of the employee's role in the job	Feeling importance and has value at work and others waiting for you (My work has an impact on community)- Proud of the company and the company is proud of us	9,11

Round one instance of concept: Employee's work culture & practices		
Round two codes	Participants' answers	E. No.
Challenging project\goal	Competition in work	4
Challenging project\goal	Employee trust himself	7
Challenging project\goal	Feeling that I am productive makes me feel good	9

Appendix (I): Explanatory Study - Managers Question Two/Three Answers (Round Two)

M. No	Code	Factor	Description/example
10	Working with professional	Working with professional	Instructor made me know that I have special capability in accounting encouraged me to do MBA
11	Self-esteem	Self-satisfaction	Working as volunteer has a big impact on my skills and ambitions My religion
12	Working with professional	Working with professional	My presence with professional people in university has a big impact on me to be like them

Is it a factor	Why	How	Innovation theme	M NO.
1	0	1	Practical thinking	M10
1	0	1	Culture of innovation that encourage creativity	M11
1	0	1	Activating innovation mechanism at work	M12

Is it a factor	Why	How		M NO.
1	1	0	To solve problem and as a way of thinking	M10
1	0	1	Tools are important	M11
1	0	0	No detail	M12

Is it a factor	Why	How	Teamwork theme	M NO.
1	0	1	You should give each member a responsibility.	M10
1	1	0	More brains better than one.	M11
1	0	0	No detail	M12

Is it a factor	Why	How	Planning theme	M NO.
1	0	0	No detail	M10
1	0	1	Set small goals to achieve challenging goals	M11
1	0	1	Coordinating between manager and employee Culture of planning (everybody does his tasks)	M12

Appendix (K): Explanatory Study - Question Three Answers (Round Two)

Candidate category: Personal objective				
Round two codes	Round one codes	Participants' answers	Participants' answers Example	E No.
Personal objective	Money	Goal: money to live	No example given	1
Personal objective	Working with professional people	People around me in the work and outside work	No example given	2
Personal objective	Self-esteem	-Self-esteem -Serving my country	No example given	3
Personal objective	Self-esteem	Self esteem: to be active member of the community) as my father taught me	My father and mother has very big impact on my work culture and ambitions	4
Personal objective	Self-esteem	Develop myself and gain more experience in my career path to achieve self-esteem	No example given	5
Personal objective	Self-esteem	Self esteem make me feel good	No example given	6
Personal objective	Working with professional people	Ambition to make positive change My when I become manager	work experience with professional people has big impact on my work culture	7
Personal objective	Self esteem	-Self esteem -Give something back to our country and community	No example given	8
Personal objective	Self-esteem	-Serve the community -Achieving self-esteem in a professional work environment	My friend has a big impact on me in terms of his determination to serve the community	9
No goals	No goals	He does not have a clear goal in life	No example given	10
No goals	No goals	No clear goal in the work but she wants to be distinguished from others	No example given	11
Personal objective	Working with professional people	Goal to gain experience in my field	No example given	12
Personal objective	Family goal	Personal goal to live and bring up family	No example given	13

Appendix (L): Explanatory Study - Round Three Answers

Question one answers

Instance of Concepts: Self-esteem		
Round three codes	Round two codes	Participants' Answers
External factor influencing self-esteem	Self-esteem	Role models (I want to be like the other successful people, why others better than me).
	Self-esteem	Appreciation (immaterial, treating me in different way than others, I want to feel that I am important and my work is appreciated.).
	Self-esteem	Encouragements from others (my father, my previous manager, my mother, expert I work with, my family, university instructor, my living experience in Japan).
	Self-esteem	The work (challenging job, feeling that I have value in the company).
Internal factor influencing self-esteem	Self-esteem	Self-esteem (I want to achieve my self-esteem)
	Self-esteem	Personal goals (Helping others, I want to achieve the highest position in my career, Serving the country, Serving community, Giving something back to my country and community, to have a family and good life, honesty and religious believe)

Instance of Concepts: Self-esteem		
Round three codes	Round two codes	Participants' Answers
Professional practices of leadership	**Enable & support/ Openness/ Work closely with staff/ Ownership**	Capability (ability to think in new way for development, continuous development, experienced, Leadership, role model).
		Management (sharing decision making, flexibility, no barriers, putting the right person in the right place, give authorities, give responsibilities, set goals).
		Employees (Goal for employee to work for, know employees capabilities to give them the chance to innovate, work achievements in the name of employees who achieve them, work closely with employees, open communication, utilize skills, communicate regularly with staff, accept opinions, discover employees' talents).
		Culture (commitment to work culture, collaborated, allow ownership of work, embrace change, encourage creativity, motivated, positive at

		work, capabilities not relations are the basis for promotions)
Personal skills /qualities of leadership	**Treatment/** **Raise the concept of self-esteem/** **Appreciation/** **Trust**	Treatment, trust, communication skills, honesty, ability to influence employees' motivation, appreciate, respect, guide, take care of employees, say nice words, good relationship with employees, knows employees personally, family environment, understanding of employees needs, make you feel the importance of your role in work.

Professional work environment coding

Instance of Concepts	Participants' Answers
What should I do?	* Information for employees (career path, duties, rights and goals) * Information about all aspects of organisation (vision, mission, goals, projects, structure, people's & departments' responsibilities, employees experiences, policies, systems, procedures, communication channels, rotations opportunities, promotion opportunities). * Information about organisation culture (innovation, knowledge, planning,collaboration). * Linking information (employee's personal goal with work's goal, Link training with career path). * Information about tools (professional opportunities, training opportunities).
How should I do it?	* Experiences (explore others experiences, experiences exchange, experiences transfer, previous work experiences). * Learning (training about employee's duties, skills, on job training, learning by doing, how to transform goal into action plans, attendance of lectures). * Teamwork (collaboration between employees, periodically meeting). Research (knowledge). * Guidance (consultation service, innovation team, knowledge team). * Tools (system for thinking., Tools and resources for carrying out work, sharing-knowledge, ask others, more time for improving ourselves, , tools for learning, tools for promoting thinking, how I get the experience, lack of knowledge and its tools, ideas and problems sharing, how to know the latest in my field).
Evaluation system	Evaluation system: appreciation based on excellence and work achievements, achievements linked to career path, Link training with career path, evaluation based on performance, reward system, promotion based on improvement and commitment at work, reward based on achievements.

Appendix (M): Data Collection Instrument for the Quantitative Study

University of East Anglia

Participant No: M5
Date: 27-4-2009

Focus Group:
Experiment:

What do you think are the main factors that make you capable and motivated at work?

Prof WEnv(What)	Prof WEnv	Self-Est(External)	Leadership (Prsn)
Everybody understand and appreciate what he is doing and management supports him and gives him the resources he needs (3) (B)	Work environment:, Work facilities, Employee proud that he is working with his manager, Salary (5) (M)	Appreciation based on excellence and work achievement, Feeling that he has a value in the company (1) (M)	No barriers between manager and his employees, Relationship with employees, Employee feels that management is taking care of him (7) (M)
Leadership (Prof)	**Prof WEnv(How) + Self**	**Leadership (Prof) + Self (Ext)**	**Prof WEnv(What) + Self-Est (Ext)**
Culture of the top Management: Participating in decision making (Discussion) (6) (B)	Training courses, Changing work routine, Meeting new people with new experience and ideas, Discussions (W) (C)	Put employee in charge of a certain work. (6) (B)	Clear goals communicated to the employees about his career progress (2) (B)

(1) Question one

Do you think that knowledge, Innovation, Planning and Teamwork are factors? Why? Example? How?

Factors	Yes/No	Why-Example	How
Knowledge	Yes	It makes him capable to do it make him love work & work better	organization should encourage capacity of employee & make him aware of the development in the world
Innovation	Yes	It makes me recognized by others & others hear my idea,	System for monthly meeting to discuss ideas & reward it
Teamwork	Yes		The availability of experts & variance in people & select right people
Planning	Yes	If it is not Available he will be lost so his efforts will be discarded	clear Responsibilities & Availability to carry them out

Q3: What is the main motivator that makes you capable and motivated in your work?

- Self-esteem, I want to be different in my job
- My uncle who is working in the cabinet and holding MBA from USA changed my way of thinking
- I graduated I put to myself a goal to achieve which is to work in the accounting authority
- every three months I go to new place to audit them which means I get to know new people with different experience and ideas

Participant No: M5 M. K

(2) Question two and question three

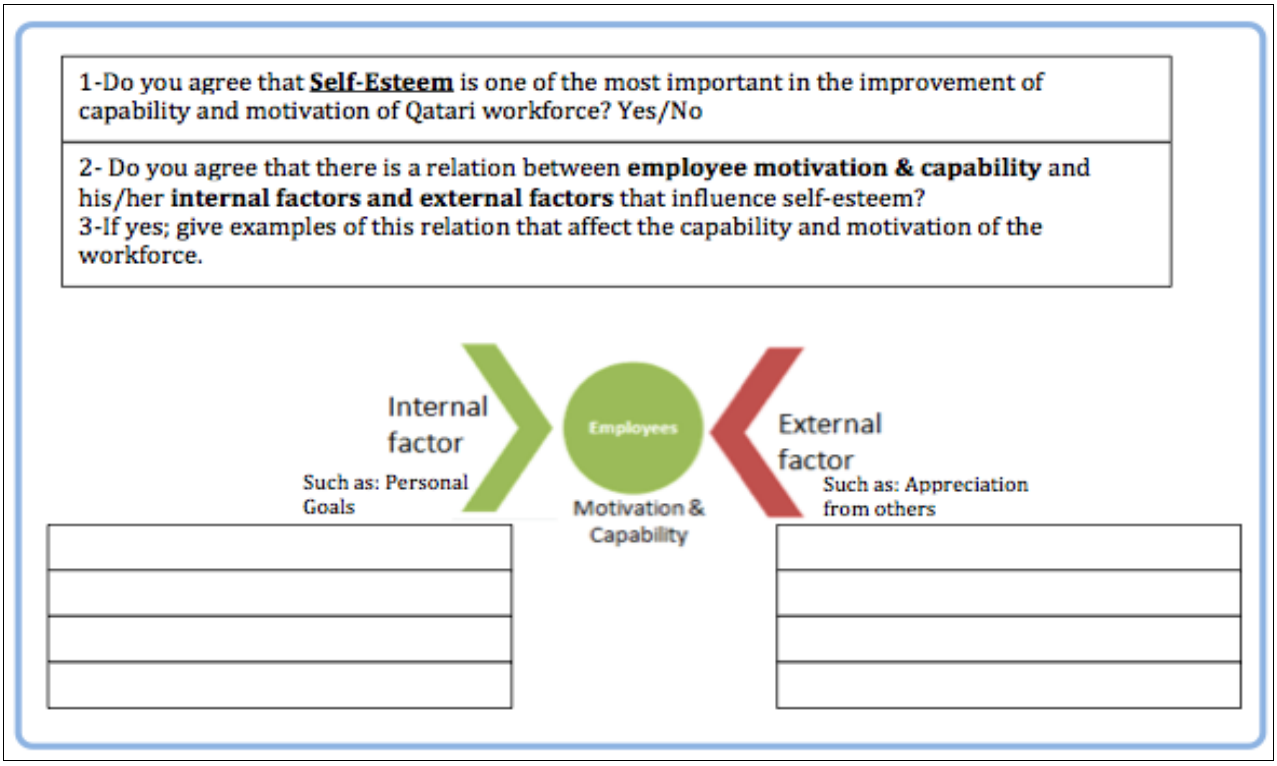
Appendix (N): Phase One, Qualitative Study Analysis

Role						
Instance of concept	Dimension		Instance of concept	Dimension	Participants' Answers	Int. No.
Self-esteem	Work	Raise	leadership	Work	Manager Gives employees responsibilities	M19
Self-esteem	Personal	Satisfy	leadership	Personal	Manager way of treatment with his/her employees	M26
Self-esteem	Work	Raise	leadership	Work	Manager put trust on me and giving me authority	E8
Self-esteem	Personal	Satisfy	leadership	Personal	Manager who cares about me and treat me well	E8
Self-esteem	Work	Raise	leadership	Work	Manager dialogue with employee about the work & motivate him	E10
Self-esteem	Personal	Satisfy	leadership	Personal	manager treatment with employees	M26
Self-esteem	Work	Raise	leadership	Work	ability to know his employees capabilities	M26
Self-esteem	Work	Satisfy	leadership	Personal	Manager gives employees authority so as employee can achieve self-esteem	M26
Self-esteem	Personal	Satisfy	leadership	Personal	manager ability to influence their employee motivation	M21
Self-esteem	Personal	Satisfy	leadership	Personal	Leader who communicate regularly with his staff	E19
Self-esteem	Personal	Satisfy	leadership	Personal	Leader makes employee trust himself and then love the work	E19
Self-esteem	Personal	Satisfy	leadership	Personal	Leaders know skills to treat employee	E21
Self-esteem	Personal	Satisfy	leadership	Personal	Leadership (trust between him and employee -communication with him-work closely with him-no barriers-he accepts idea)	M17
Self-esteem	Work	Raise	leadership	Work	Giving responsibility to employees	M17
Self-esteem	Work	Raise	leadership	Work	Decision making open to all employees	M09
Self-esteem	Personal	Satisfy	leadership	Personal	Management treats employees as family	E09

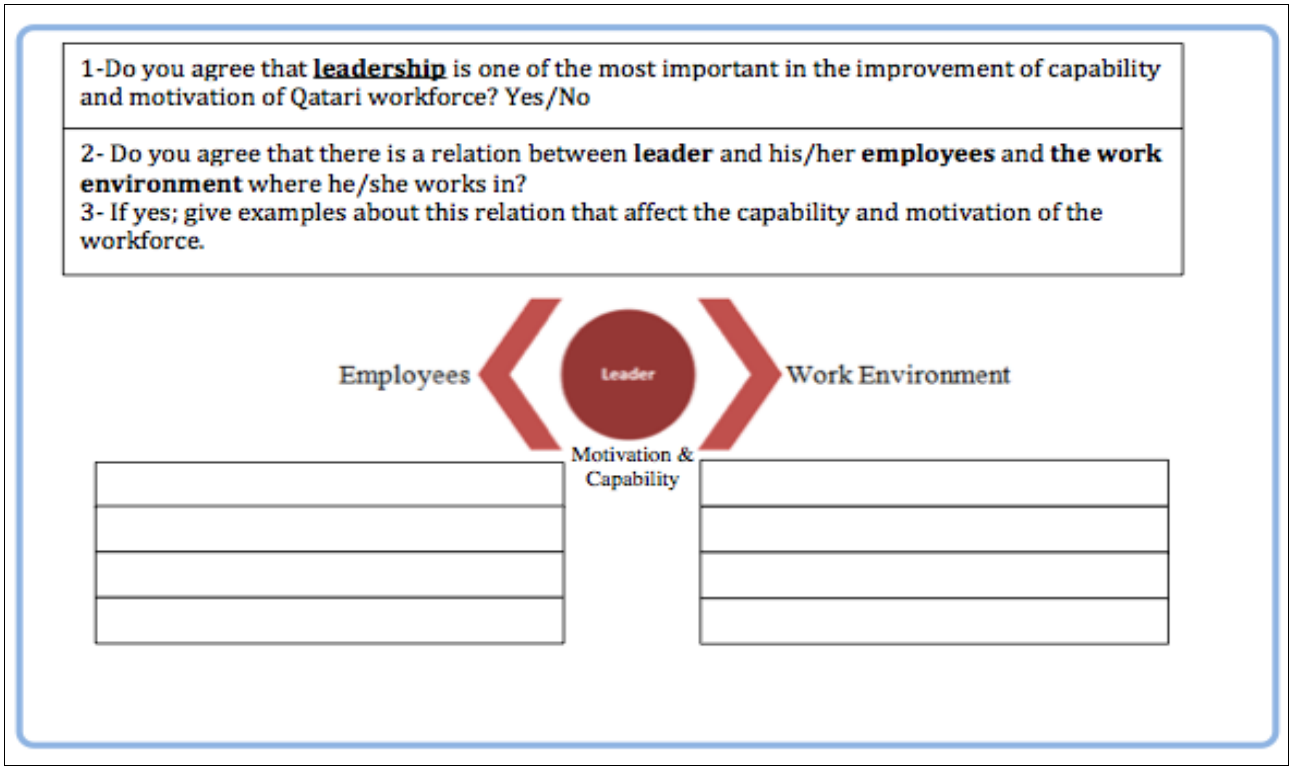
Role						
Instance of concept	Dimension		Instance of concept	Dimension	Answers	Int. No.
Self-esteem	Work	Objective	Prof Work Env.	(evaluation system)	Evaluation system (reward and punishment)	M08
Self-esteem	Work	Objective	Prof Work Env.	(evaluation system)	Work culture (evaluation system- reward and punishment)	M17
Self-esteem	Work	Challenge	Prof Work Env.	How	Challenging work environment	M14
Self-esteem	Work	Objective	Prof Work Env.	what	Plan (career Path- Challenge)	E19
Self-esteem	Work	Objective	Prof Work Env.	what	Career development plan- goal for employee to work for-Job description	M26
Self-esteem	Work	opportunity	Prof Work Env.	How	Ability to self-evaluate employee capabilities to fix gaps	M26
Self-esteem	Work	opportunity	Prof Work Env.	How	Experience: how I get the experience (I do not know who to ask)	E10
Self-esteem	Work	Objective	Prof Work Env.	what	Clear goals communicated to employees about his career progress	M05
Self-esteem	Work	opportunity	Prof Work Env.	what	Everybody understand and appreciate what he is doing and management support him and gives him the resources he needs	M05
Self-esteem	Work	Objective	Prof Work Env.	what	Communication channels clear for employees with others and with manager	E12
Self-esteem	Work	opportunity	Prof Work Env.	How	Experience from experts	E12
Self-esteem	Work	Objective	Prof Work Env.	what	Information required for work is clear for all employees	E12
Self-esteem	Work	Objective	Prof Work Env.	what	Making employee know the potential of the work	M4

Work dimension						
Instance of concept	Dimension	Role	Instance of concept		Answers	Int. No.
leadership	Work	Allowing	Prof Work Env.	how	Training and education	M02
leadership	Work	Allowing	Prof Work Env.	how	Learn from other experiences	M25
leadership	Work	Allowing	Prof Work Env.	what	-Clear workflow in organisation -Job Description	E04
leadership	Work	Allowing	Prof Work Env.	what	Target Position with the tasks they have to do and competencies the org wants them to achieve	M09
leadership	Work	Allowing	Prof Work Env.	what	Well-organised Organisation (System, structure,p rocedures, work plan goals, every employee knows what he should do	M08
leadership	Work	Supporting	Prof Work Env.	how	Training (Link training with career path, give employee chance to transform what he learned to practice)	M08
leadership	Work	Supporting	Prof Work Env.	what/ How	Work culture(through org values)-support teamwork spirit-scientific research)	M17
leadership	Work	Supporting	Prof Work Env.	what/ How	Work environment (training-Trust-info about organisation goals)	M17
leadership	Work	Allowing	Prof Work Env.	how	Learn from other experiences	E21
leadership	Work	Supporting	Prof Work Env.	how	Training	E24
leadership	Work	Allowing			One system and organisational work flow	E5
leadership	Work	Allowing	Prof Work Env.	what	Vision, mission and goals and planning	E5
leadership	Work	Supporting	Prof Work Env.	how	System for collaborative thinking between all dept in organisation to achieve org goal	E5
leadership	Work	Allowing	Prof Work Env.	what	Management System	M21
leadership	Work	Allowing	Prof Work Env.	what	Job description	M19
leadership	Work	Allowing	Prof Work Env.	what	Career development plan- goal for employee to work for-Job description	M26
leadership	Work	Allowing	Prof Work Env.	what	Manager putting the right person in the right place	M11
leadership	Work	Allowing	Prof Work Env.	what	Clear goals communicated to employees about his career progress	M05
leadership	Work	Allowing	Prof Work Env.	what	evaluation system credible and its results should be taken seriously	M10

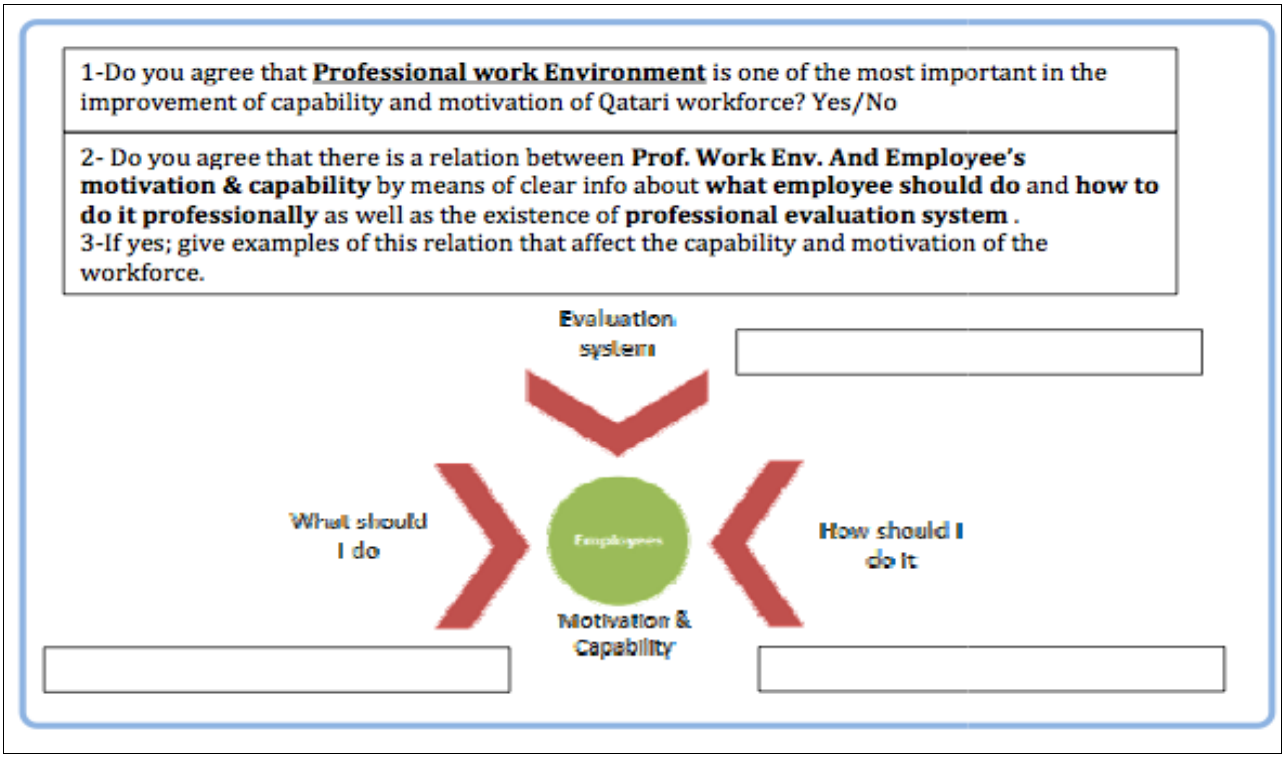
Appendix (O): Phase Two, Data Collection Instrument (Qualitative)



(1)



(2)


1-Do you agree that Professional work Environment is one of the most important in the improvement of capability and motivation of Qatari workforce? Yes/No
2- Do you agree that there is a relation between Prof. Work Env. And Employee's motivation & capability by means of clear info about what employee should do and how to do it professionally as well as the existence of professional evaluation system .
3-If yes; give examples of this relation that affect the capability and motivation of the workforce.
Evaluation system
What should I do
How should I do it
Motivation & Capability

(3)

Appendix (P): Phase Two, Data Collection Instrument (Quantitative)

Leadership has been chosen as a main factor that affect s capability and motivation of Qatari workforce.

The following table represents answers form participants explaining how leadership affects employees' capability and Motivation.

- Choose those that you most agree with.

Leadership	
Professional practices of leadership	A- Capability (ability to think in new way for development[1], continuous development[2], experienced[3], Leadership[4], role model[5]). B- Management (sharing decision making[1], flexibility[2], no barriers[3], putting the right person in the right place[4], give authorities[5], give responsibilities[6], set goals[7]). C- Employees (Goal for employee to work for[1], know employees capabilities to give them the chance to innovate[2], work achievements in the name of employees who achieve them[3], work closely with employees[4], open communication[5], utilize skills[6], communicate regularly with staff[7], accept opinions[8], discover employees' talents[9]). D- Culture (commitment to work culture[1], collaborated[2], allow ownership of work[3], embrace change[4], encourage creativity[5], motivated[6], positive at work[7], capabilities not relations are the basis for promotions[8])
Personal skills/qualities of leadership	E- Treatment[1], trust[2], communication skills[3], honesty[4], ability to influence employees' motivation[5], respect[6], guide[7], take care of employees[8], say nice words[9], good relationship with employees[10], knows employees personally[11], family environment[12], understanding of employees needs[13], make you feel the importance of your role in work[14], appreciate[15]).

(1)

Professional work environment	
What should I do?	A- Information for employees (career path[1], duties[2], rights[3] and goals[4]) B- Information about all aspects of organization (vision[1], mission[2], goals[3], projects[4], structure[5], people's & departments' responsibilities[6], employees experiences[7], policies[8], systems[9], procedures[10], communication channels[11], rotations[12] opportunities[13], promotion opportunities[14]). C- Information about organization culture (innovation[1], knowledge[2], planning[3], collaboration[4]). D- Linking information (employee's personal goal with work's goal[1], Link training with career path[2]). E- Information about tools (professional opportunities1, training opportunities2).
How should I do it?	F- Experiences (explore others experiences[1], experiences exchange[2], experiences transfer[3], previous work experiences[4]). G- Learning (training about employee's duties[1], skills[2], on job training[3], learning by doing[4], how to transform goal into action plans[5], attendance of lectures[6]). H- Teamwork (collaboration between employees[1], periodically meeting[2]). I- Research (knowledge[1]). J- Guidance (consultation service[1], innovation team[2], knowledge team[3]). K- Tools (system for thinking[1]., Tools and resources for carrying out work[2], sharing-knowledge[3], ask others[4], more time for improving ourselves[5],, tools for learning[6], tools for promoting thinking[7], how I get the experience[8], lack of knowledge and its tools[9], ideas and problems sharing[10], how to know the latest in my field[11]).

Evaluation system	
Evaluation system	L- Evaluation system (appreciation based on excellence and work achievements[1], achievements linked to career path[2], Link training with career path[3], evaluation based on performance[4], reward system[5], promotion based on improvement and commitment at work[6], reward based on achievements[7]).

(2)

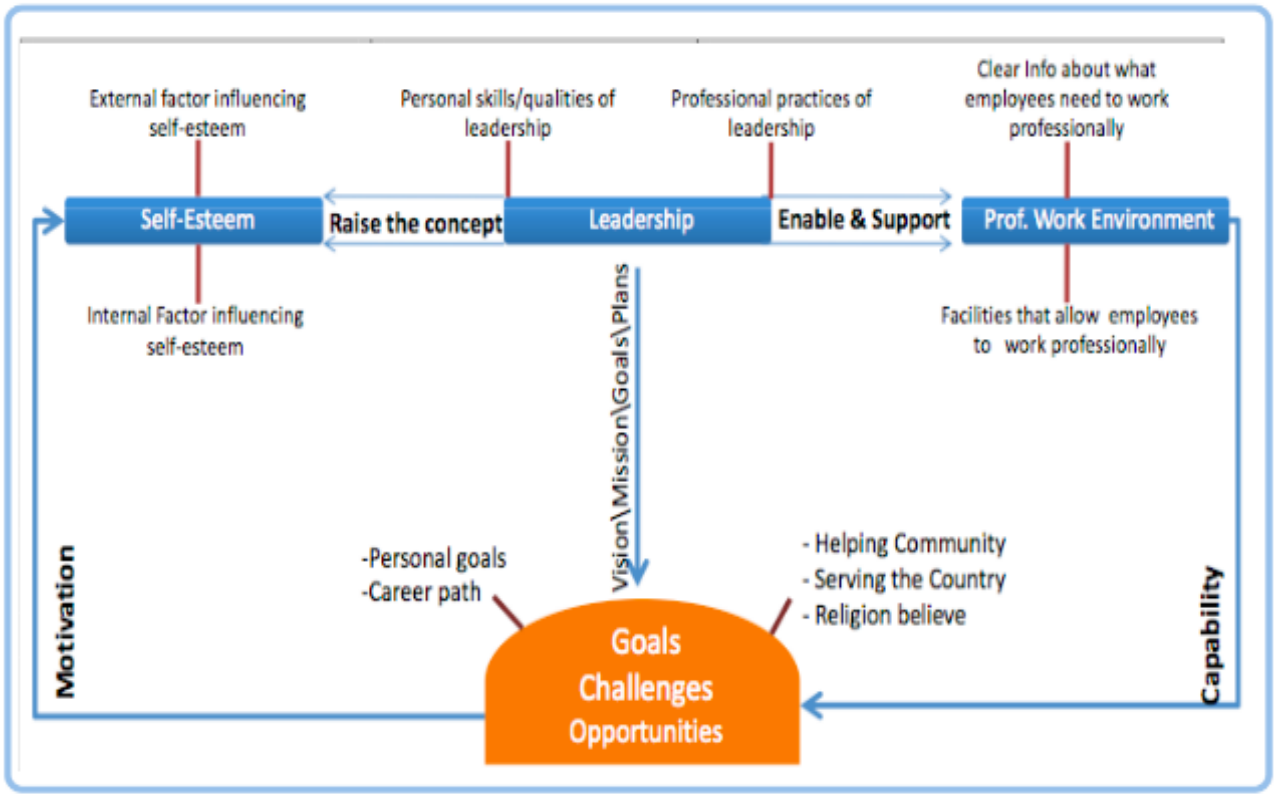
Self-Esteem has been chosen as a main factor that affects capability and motivation of Qatari workforce.

The following table represents answers form participants explaining how Self-esteem affects employees' capability and Motivation.

- Choose those that you most agree with.

Self-Esteem	
External factor influencing self-esteem	A- Role models (I want to be like the other successful people[1], why others better than me[2]). B- Appreciation (immaterial incentives[1], treating me in different way than others[2], I want to feel that I am important and my work is appreciated[3].). C- Encouragements from others (my father[1], my previous manager[2], my mother[3], expert I work with[4], my family[5], university instructor[6], my living[7]) D- The work (challenging job[1], feeling that I have value in the company[2]).
Internal factor influencing self-esteem	E- Self-esteem (I want to achieve my self-esteem1) F- Personal goals (Helping others[1], I want to achieve the highest position in my career[2], Serving the country[3], Serving community[4], Giving something back to my country and community[5], to have a family and good life[6], honesty[6] and religious believe[7])

(3)



(4)

		Participant No:		Date:	
leadership	1	Yes		No	
	2	Emp		Work Env.	
	3	Emp			
		Work Env.			
	A. 12345 B. 1234567 C.123456789 D.12345678 E.123456789 10 11 12 13 14 15				
Self-Esteem	1	Yes		No	
	2	Internal		External	
	3	Internal			
		External			
	A. 12 B. 123 C. 1234567 D. 12 E. 1 F. 1234567				
Professional Work Environment	1	Yes		No	
	2	What	How	Eval	
	3	What			
		How			
		Evaluation			
	A. 1234 B. 123456789 10 11 12 13 14 C. 1234 D. 12 E. 12 F.1234 G. 123456 H.12 I.1 J. 123 K. 123456789 10 11 L. 1234567				
Is the model effective in achieving the aim?		(Demo) Is the System practical?			

(5)

		Participant No: 4		Date: 16-5-2016	
leadership	1	Yes		No	
	2	Emp	✓	Work Env.	✓
	3	Emp	coaching		
		Work Env.	Planning, organizing, job description		
	A. 12345 B. 1234567 C. 123456789 D. 12345678 E. 123456789 10 11 12 13 14 15				
Self-Esteem	1	Yes		No	
	2	Internal	✓	External	✓
	3	Internal	personal goal, ambition, challenge		
		External	manager as role model		
	A. 12	B. 123	C. 1234567	D. 12	E. 1 F. 1234567
Professional Work Environment	1	Yes		No	
	2	What	✓ How	✓ Eval	✓
	3	What	job description		
		How	Experience and knowledge sharing		
		Evaluation	objective-based		
	A. 1234 B. 123456789 10 11 12 13 14 C. 1234 D. 12 E. 12 F. 1234 G. 123456 H. 12 I. 1 J. 123 K. 123456789 10 11 L. 1234567				
Is the model effective in achieving the aim?	✓		(Demo) Is the System practical?	✓	

(6)

Appendix (Q): Experimental Study, Instrument of Evaluating Social subsystem and Employee's Engagement

Evaluating Employee Engagement

1. Objectives and aspiration	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
1.1 we can see senior management is committed to institutional goals	5	4	3	2	1
1.2 I know what's going on at my institution and my department	5	4	3	2	1
1.3 there are clear consequences for people who act against our values	5	4	3	2	1
1.4 I understand our institutional values	5	4	3	2	1
1.5 senior management live these institutional values	5	4	3	2	1
1.6 I believe in what my institution is trying to achieve in terms of public services	5	4	3	2	1

2. Accountabilities and collaboration					
2.1 I know what is expected of me in my job	5	4	3	2	1
2.2 I understand how my work contributes to the success of the institution	5	4	3	2	1
2.3 I have what I need to o my job properly	5	4	3	2	1
2.4 our processes make it easy to work well with other departments	5	4	3	2	1
2.5 some of the things that I am held accountable for are shared responsibilities	5	4	3	2	1
2.6 I get the chance to use my skills and abilities in my job	5	4	3	2	1
2.7 at work my opinions seem to count	5	4	3	2	1
2.8 people in my depart trust and support each other	5	4	3	2	1
2.9 I have strong friendship at work	5	4	3	2	1
2.10 people in my department do their best for my institution	5	4	3	2	1

3. Performance management and recognition					
3.1 management acts fast if our department's performance slips	5	4	3	2	1
3.2 poor individual performance is not tolerated in this institution	5	4	3	2	1
3.3 at this institution compensation is clearly tied to performance	5	4	3	2	1
3.4 the career opportunities here are attractive to me	5	4	3	2	1
3.5 the compensation at this institution encourages people to do their best	5	4	3	2	1
3.6 teams who perform well are recognized for it	5	4	3	2	1

4. People manager capabilities and interactions					
4.1 my manager clearly communicate the goals for my department	5	4	3	2	1
4.2 I receive useful and timely feedback on my performance	5	4	3	2	1
4.3 I receive the help I need to learn and grow professionally	5	4	3	2	1
4.4 my manager is a good teacher/mentor to me	5	4	3	2	1
4.5 decisions that affect me are explained to me	5	4	3	2	1
4.6 my manager cares about my well-being	5	4	3	2	1
4.7 my manager is frank when dealing with others	5	4	3	2	1
4.8 my manager recognizes and comments when I do good work	5	4	3	2	1
4.9 my manager is open to receiving feedback from me	5	4	3	2	1
4.10 my manager encourages us to work with other departments	5	4	3	2	1

5. Overall engagement					
5.1 I am proud to work for this institution	5	4	3	2	1
5.2 overall, I am satisfied working here	5	4	3	2	1
5.3 I would recommend this institution to friends as a great place to work	5	4	3	2	1

Appendix (R): Experimental Study, Data Collection Questionnaire (Employee)

Evaluation: By employees

Organization No.	Manager No.	Employee No.

Pre-Evaluation Phase

1.1		1.4		2.1		2.4		2.7		2.10		3.3		3.6		4.3		4.6		4.9		5.2	
1.2		1.5		2.2		2.5		2.8		3.1		3.4		4.1		4.4		4.7		4.10		5.3	
1.3		1.6		2.3		2.6		2.9		3.2		3.5		4.2		4.5		4.8		5.1			

Q	Phase1	Phase2	Phase3	Phase4	Q	Phase 1	Phase2	Phase3	Phase4	Q	Phase 1	Phase2	Phase3	Phase4
1.1					2.6					4.2				
1.2					2.7					4.3				
1.3					2.8					4.4				
1.4					2.9					4.5				
1.5					2.10					4.6				
1.6					3.1					4.7				
					3.2					4.8				
2.1					3.3					4.9				
2.2					3.4					4.10				
2.3					3.5					5.1				
2.4					3.6					5.2				
2.5					4.1					5.3				

(1) The instrument

Evaluation: By employees

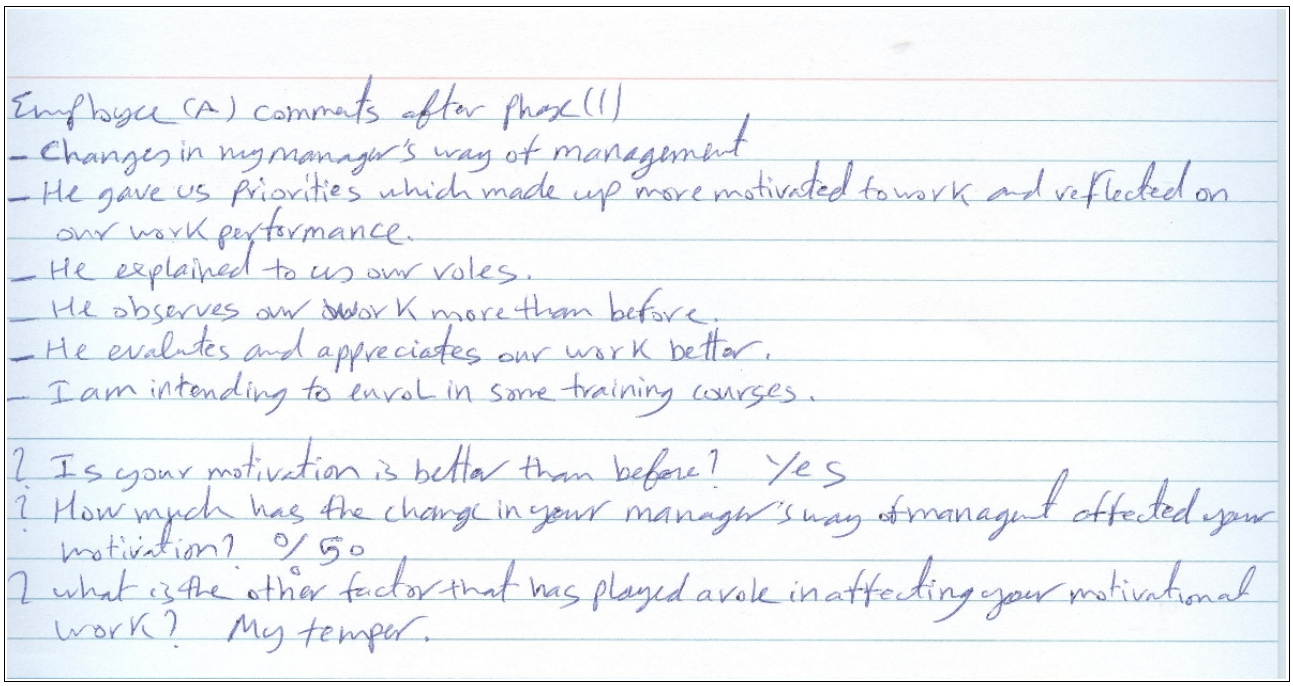
Organization No. 2	Manager No.	Employee No. A

Pre-Evaluation Phase

1.1	5	1.4	4	2.1	2	2.4	5	2.7	4	2.10	4	3.3	1	3.6	4	4.3	4	4.7	3	4.10	5
1.2	4	1.5	3	2.2	3	2.5	3	2.8	5	3.1	4	3.4	5	4.1	5	4.4	5	4.8	4	5.1	4	5.3	
1.3	2	1.6	4	2.3	2	2.6	5	2.9	5	3.2	2	3.5	4	4.2	2	4.6	5	4.9	2	5.2	3	4	
																4.5	5				

Q	Phase1 2-2-4-10	Phase2	Phase3	Phase4	Q	Phase 1	Phase2	Phase3	Phase4	Q	Phase 1	Phase2	Phase3	Phase4
1.1	5				2.6	5				4.1	5			
1.2	4				2.7	4				4.2	(4)			
1.3	2				2.8	5				4.3	4			
1.4	4				2.9	5				4.4	5			
1.5	3				2.10	4				4.6	5			
1.6	4				4.5	5				4.7	(4)			
					3.1	4				4.8	4			
2.1	(4)				3.2	2				4.9	(4)			
2.2	(4)				3.3	(2)				4.10	5			
2.3	2				3.4	5				5.1	4			
2.4	(4) -				3.5	4				5.2	3			
2.5	(4)				3.6	4				5.3	4			

(2) Pre-test and post-test



Employee (A) comments after phase (1)
- Changes in my manager's way of management
- He gave us priorities which made up more motivated to work and reflected on our work performance.
- He explained to us our roles.
- He observes our work more than before.
- He evalutes and appreciates our work better.
- I am intending to enrol in some training courses.

? Is your motivation is better than before? Yes
? How much has the change in your manager's way of managent affected your motivation? 0/50
? what is the other factor that has played a role in affecting your motivational work? My temper.

(3) 'Leadership awareness IT function' experiment's interview answers

Appendix (S): Experimental Study, Data Collection Instrument (Managers)

Evaluation: Manager evaluates employees' abilities to achieve organizational goals

Organization No.	Manger No.	Date:

What are the organizational goals you want your employees to achieve?(Creteria)		Evaluation/10		
		A	B	C
1				
2				
3				
4				
5				
6				
7				
8				
9				

Phase 1:	Phase 2:

Goals	Emp A				Emp B				Emp C			
Phase 1	1	3	5	7	1	3	5	7	1	3	5	7
	2	4	6	8	2	4	6	8	2	4	6	8
Phase 2	1	3	5	7	1	3	5	7	1	3	5	7
	2	4	6	8	2	4	6	8	2	4	6	8

(1) Evaluating employees' ability to achieve work objective before and after IT tool intervention

Evaluation: Manager evaluate employees' abilities to achieve organizational goals

Organization No.	Manger No.	Date:

Emp	Phs	What organizational goals did your employees achive after impleminting Phase ( ) (Indicators)

(2) Details of work objectives that employees better achieve after the IT tool intervention

Evaluation: Manager evaluate employees' Capability

Organization No.	Manger No.	Date:

	What are the capabilities you want your employees to have?(Creteria)	Evaluation/10		
		A	B	C
1				
2				
3				
4				
5				
6				
7				
8				
9				

Phase 1:	Phase 2:

Capability	Emp A				Emp B				Emp C			
Phase 1	1	3	5	7	1	3	5	7	1	3	5	7
	2	4	6	8	2	4	6	8	2	4	6	8
Phase 2	1	3	5	7	1	3	5	7	1	3	5	7
	2	4	6	8	2	4	6	8	2	4	6	8

(3) Evaluating employees' capabilities before and after the IT tool intervention

Evaluation: Manager evaluate employees' Capability

Organization No.	Manger No.	Date:

Emp	Phs	What capabilities did your employees get after impleminting Phase ( ) (Indicators)

(4) Details of capabilities that employees improved after the IT tool intervention

Evaluation: Manager evaluate employees' Motivation

Organization No.	Manger No.	Date:

	What are the forms of motivation you want in your employees (Creteria)	Evaluation/10		
		A	B	C
1				
2				
3				
4				
5				
6				
7				
8				
9				

Phase 1:	Phase 2:

Capability	Emp A								Emp B								Emp C							
Phase 1	1		3		5		7		1		3		5		7		1		3		5		7	
	2		4		6		8		2		4		6		8		2		4		6		8	
Phase 2	1		3		5		7		1		3		5		7		1		3		5		7	
	2		4		6		8		2		4		6		8		2		4		6		8	

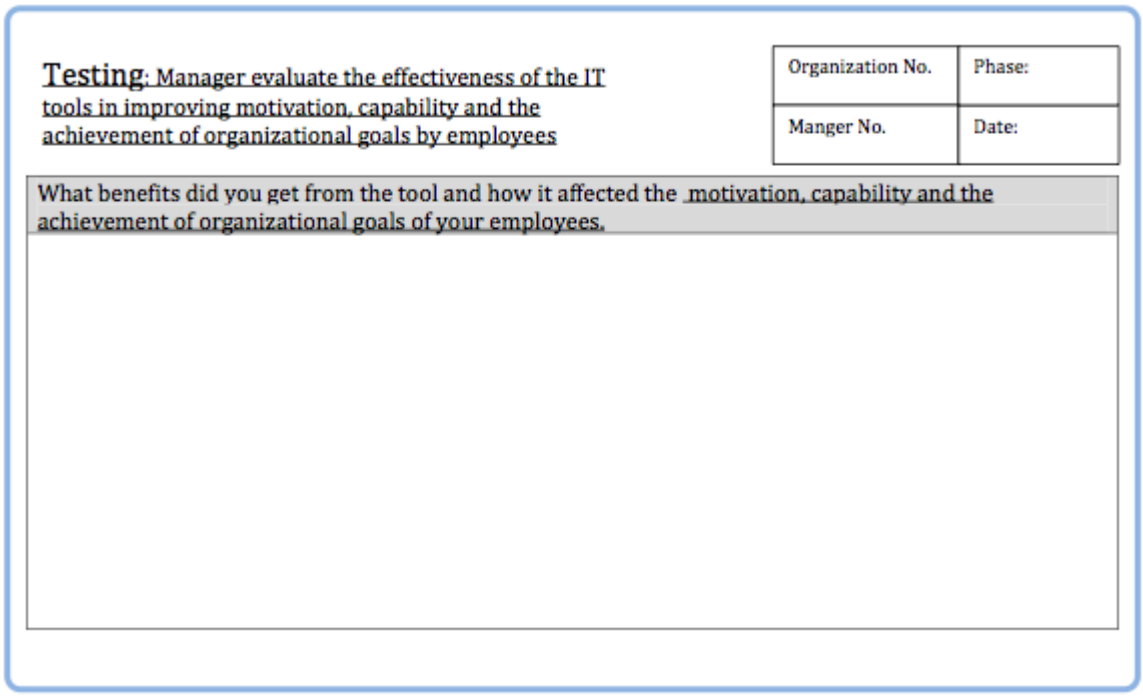
(5) Evaluating employees' motivation before and after IT the tool intervention

Evaluation: Manager evaluate employees' Motivation

Organization No.	Manger No.	Date:

Emp	Phs	What are the forms of motivation did your employees get after impleminting Phase ( ) (Indicators)

(6) Forms of motivation that employees improved after the IT tool intervention



Testing: Manager evaluate the effectiveness of the IT tools in improving motivation, capability and the achievement of organizational goals by employees

Organization No.	Phase:
Manger No.	Date:

What benefits did you get from the tool and how it affected the motivation, capability and the achievement of organizational goals of your employees.

(7) Manager's view of the actual impact of the IT tool on the workforce

Appendix (T): Experimental Study, Employee Self-Esteem Assessment Instrument

Rosenberg Self-Esteem Scale (Rosenberg, 1965)

The scale is a ten item Likert scale with items answered on a four point scale - from strongly agree to strongly disagree. The original sample for which the scale was developed consisted of 5,024 High School Juniors and Seniors from 10 randomly selected schools in New York State.

Instructions: Below is a list of statements dealing with your general feelings about yourself. If you strongly agree, circle **SA**. If you agree with the statement, circle **A**. If you disagree, circle **D**. If you strongly disagree, circle **SD**.

1.	On the whole, I am satisfied with myself.	SA	A	D	SD
2.*	At times, I think I am no good at all.	SA	A	D	SD
3.	I feel that I have a number of good qualities.	SA	A	D	SD
4.	I am able to do things as well as most other people.	SA	A	D	SD
5.*	I feel I do not have much to be proud of.	SA	A	D	SD
6.*	I certainly feel useless at times.	SA	A	D	SD
7.	I feel that I'm a person of worth, at least on an equal plane with others.	SA	A	D	SD
8.*	I wish I could have more respect for myself.	SA	A	D	SD
9.*	All in all, I am inclined to feel that I am a failure.	SA	A	D	SD
10.	I take a positive attitude toward myself.	SA	A	D	SD

Scoring: SA=3, A=2, D=1, SD=0. Items with an asterisk are reverse scored, that is, SA=0, A=1, D=2, SD=3. Sum the scores for the 10 items. The higher the score, the higher the self esteem.

The scale may be used without explicit permission. The author's family, however, would like to be kept informed of its use:

The Morris Rosenberg Foundation
c/o Department of Sociology
University of Maryland
2112 Art/Soc Building
College Park, MD 20742-1315

References

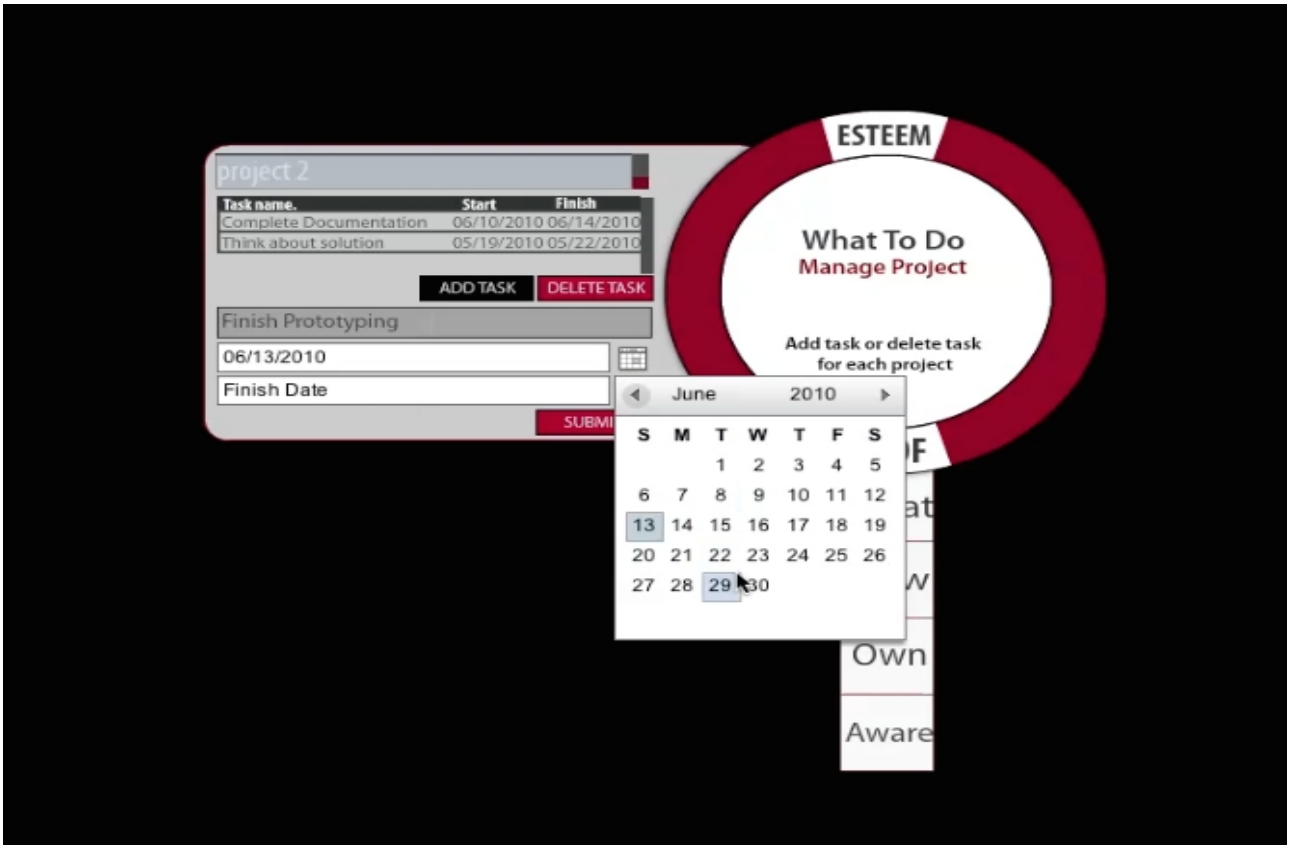
References with further characteristics of the scale:

Crandal, R. (1973). The measurement of self-esteem and related constructs, Pp. 80-82 in J.P. Robinson & P.R. Shaver (Eds), **Measures of social psychological attitudes. Revised edition**. Ann Arbor: ISR.

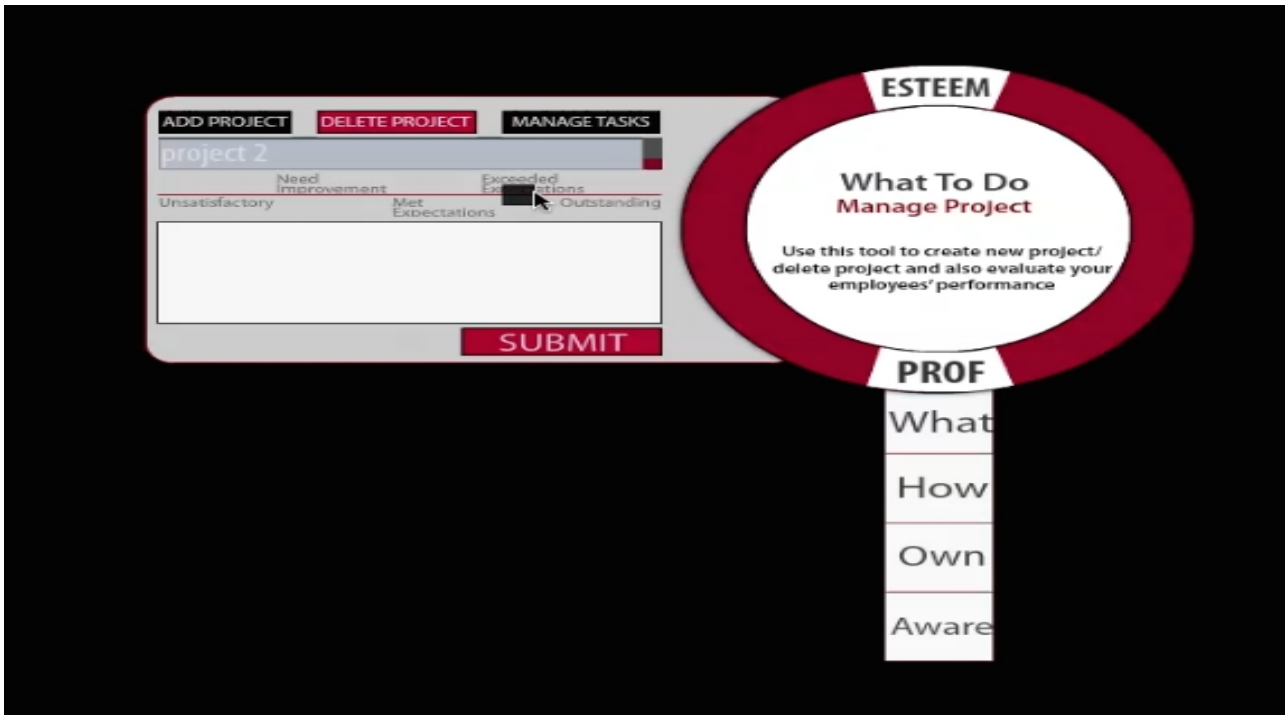
Appendix (U): Screen Shots of the IT tool (Manager Edition)

(1) Raise the self-esteem function

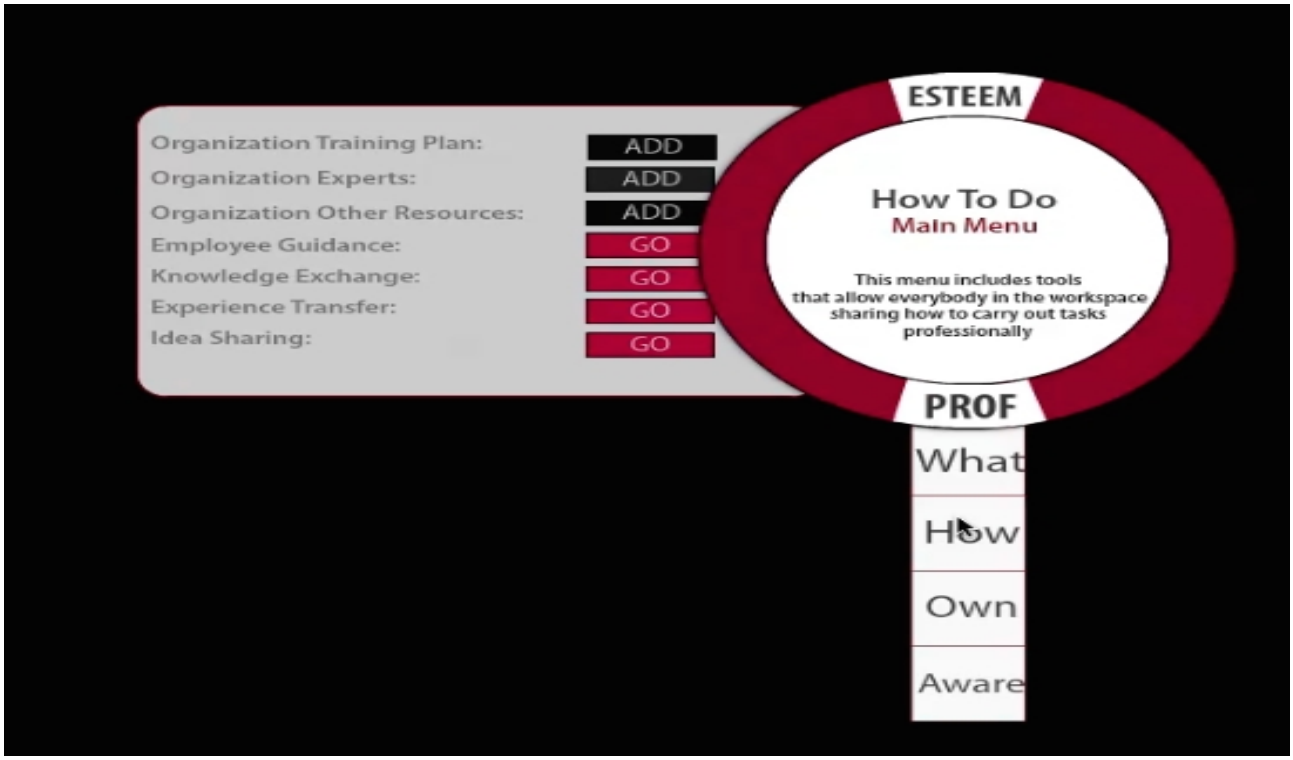
(2) 'What to do' main screen (Project management IT function)



(3) Project management IT function (Adding tasks to projects)



(4) Project management IT function (Evaluating tasks)

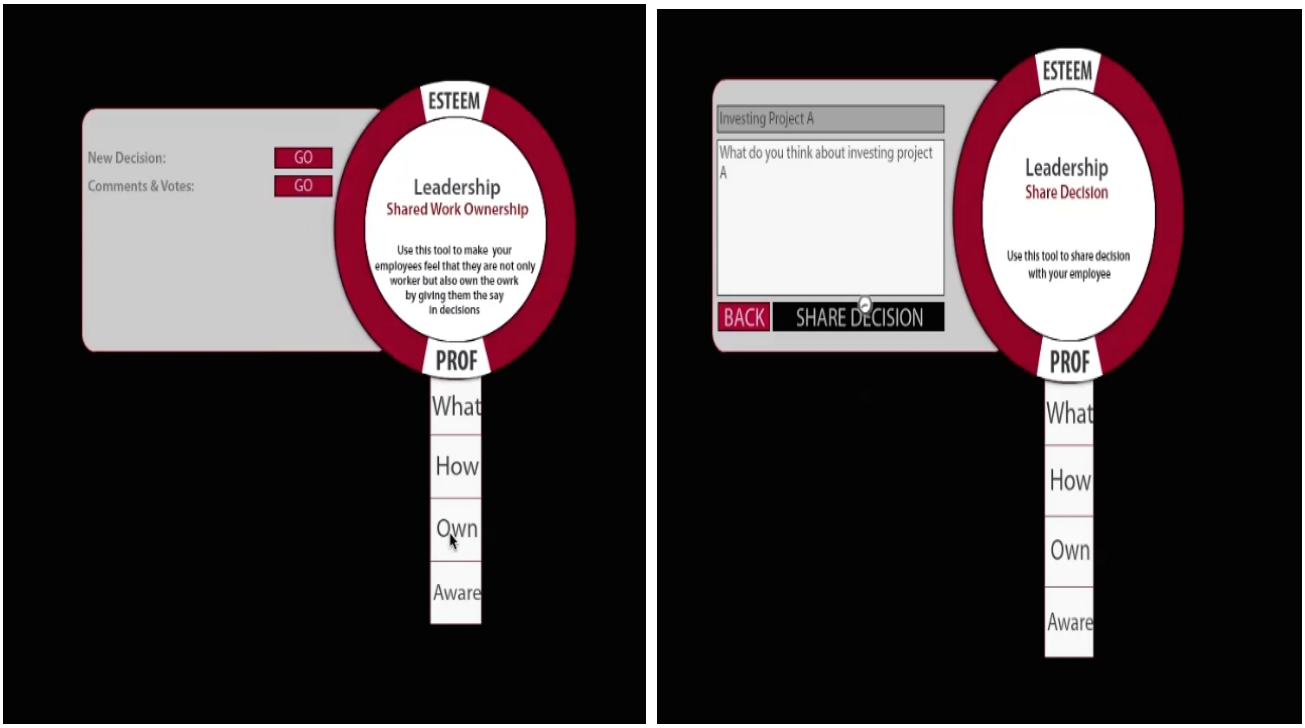


(5) 'How to do' main screen (Guidance and professional IT function)

(6) Sharing ideas function

(7) Sharing knowledge function

(8) Sharing experience function

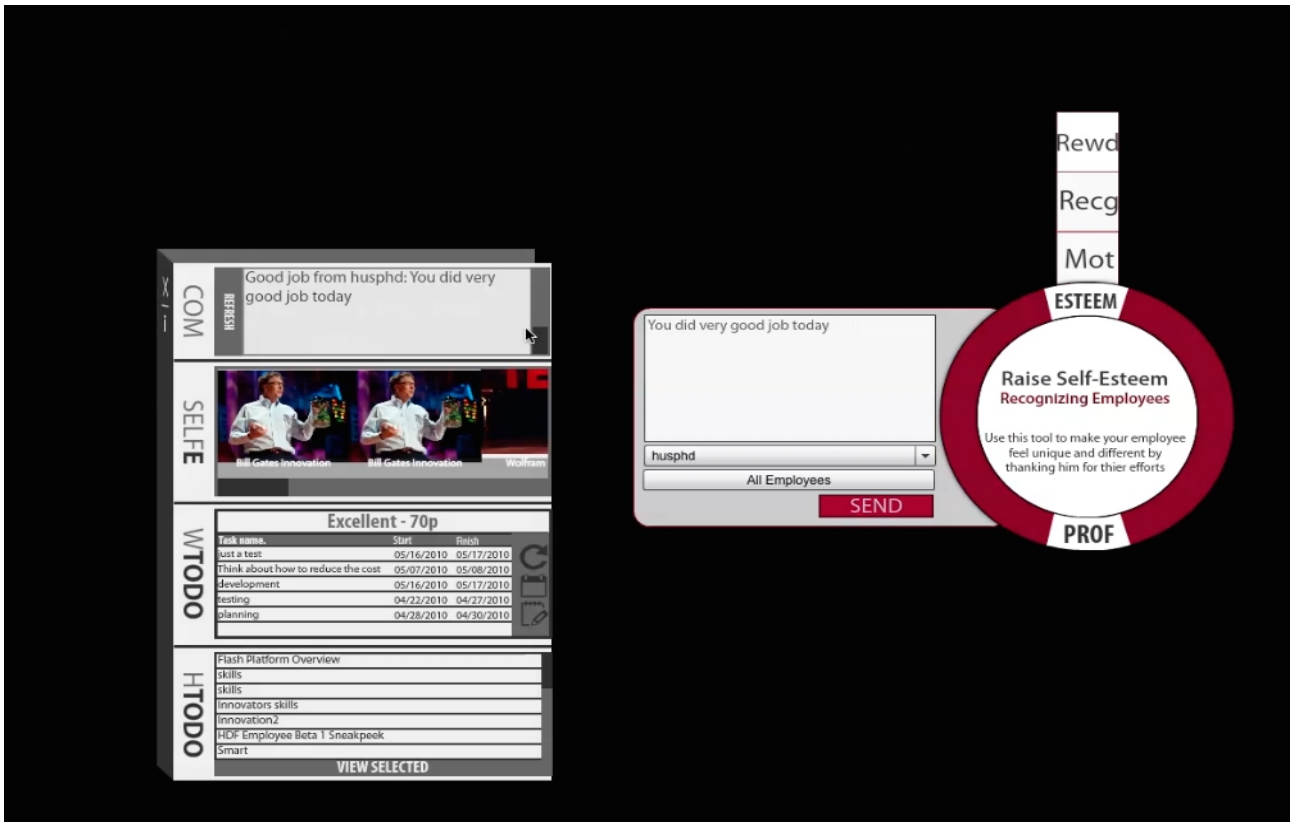


(9) Ownership function

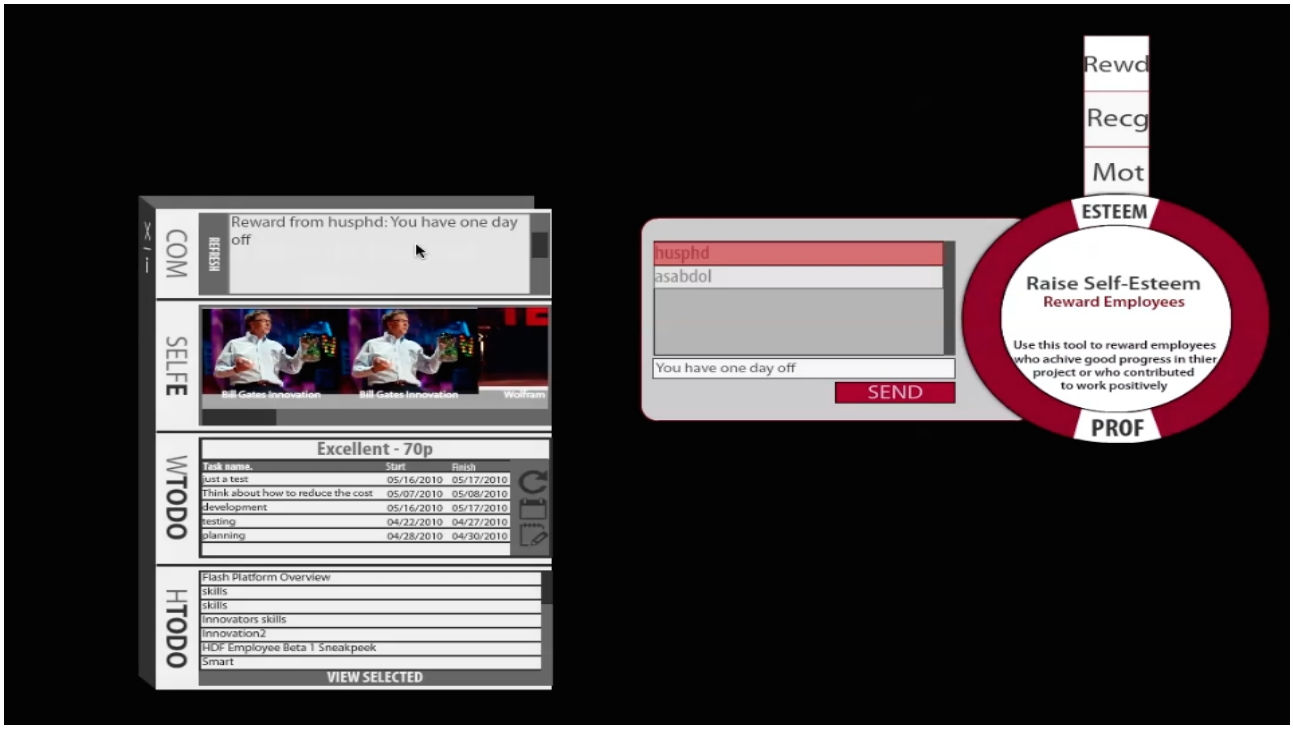
(10) Awareness function for managers

Appendix (V): Screen Shots of the Pilot IT tool (Employee Edition)

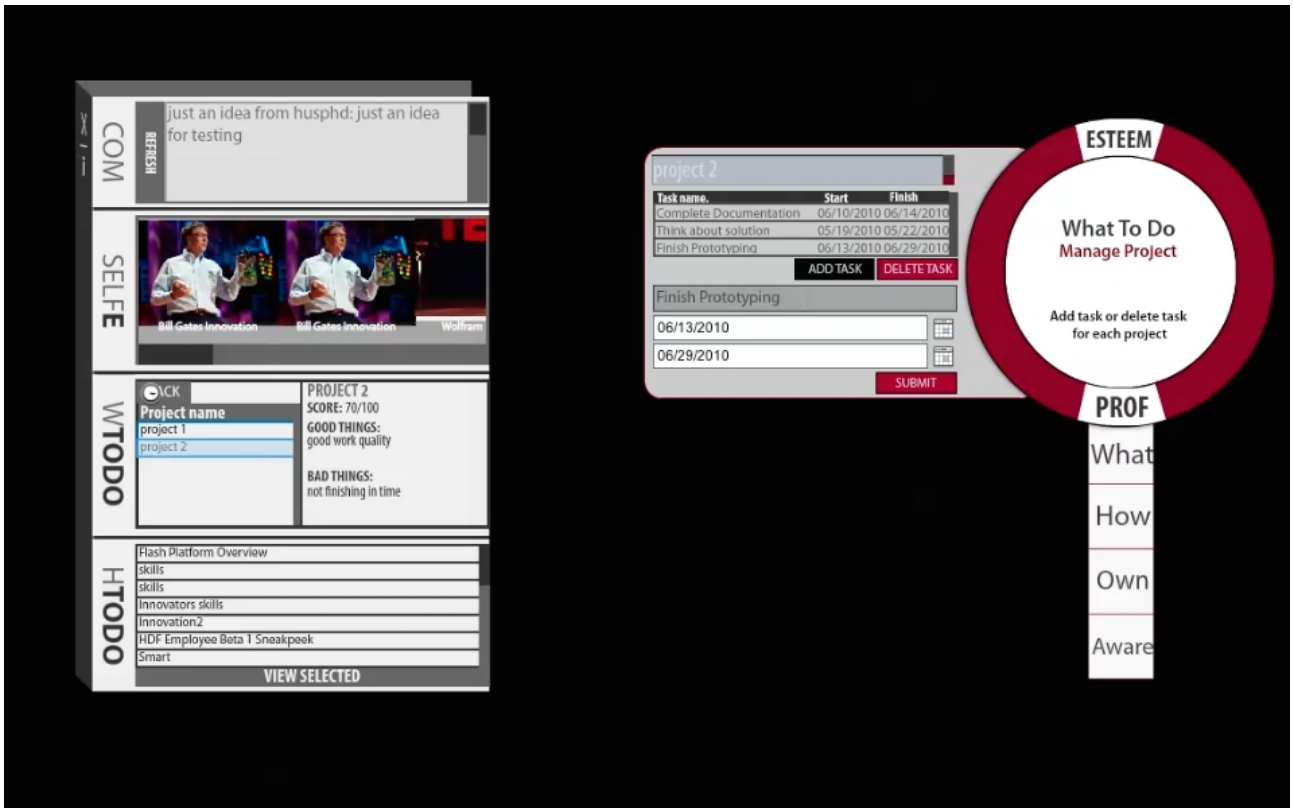
(1) Communication function (Raise self-esteem)



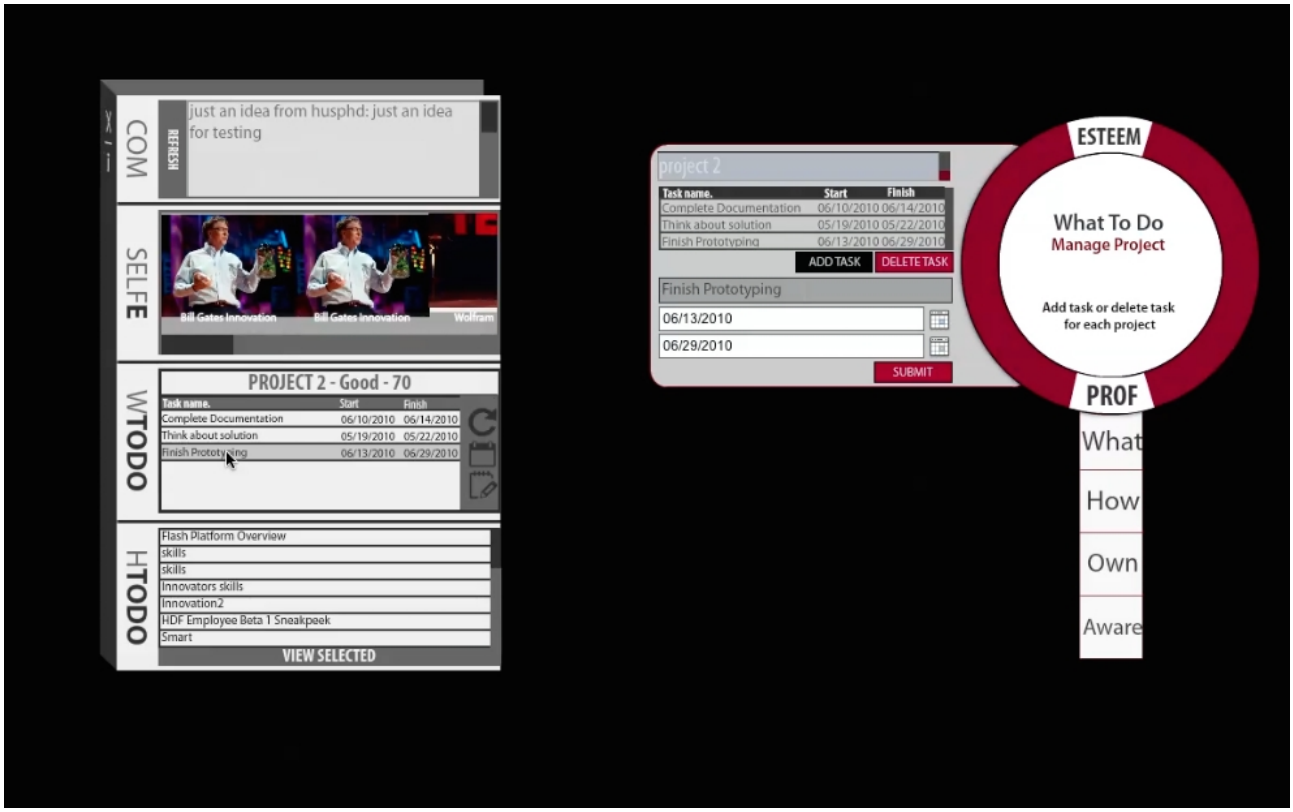
(2) Communication function (Recognition)



(3) Communication function (Reward)

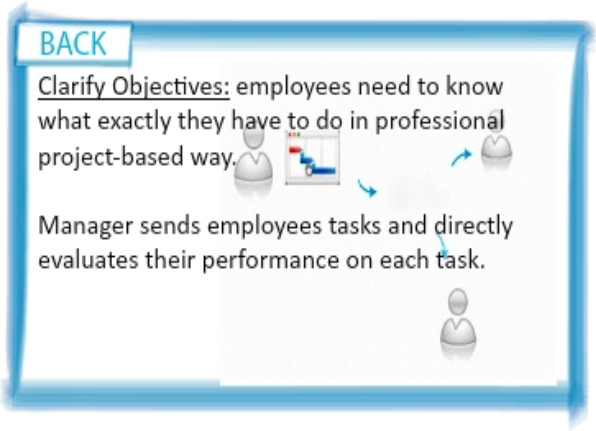


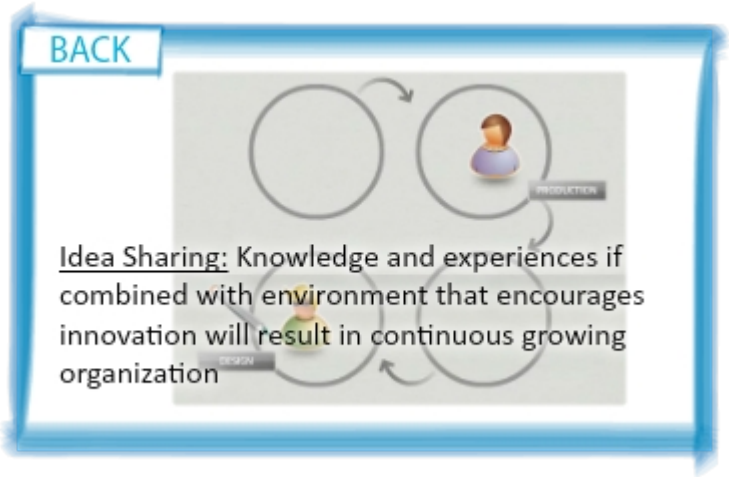
(4) Employee project management function

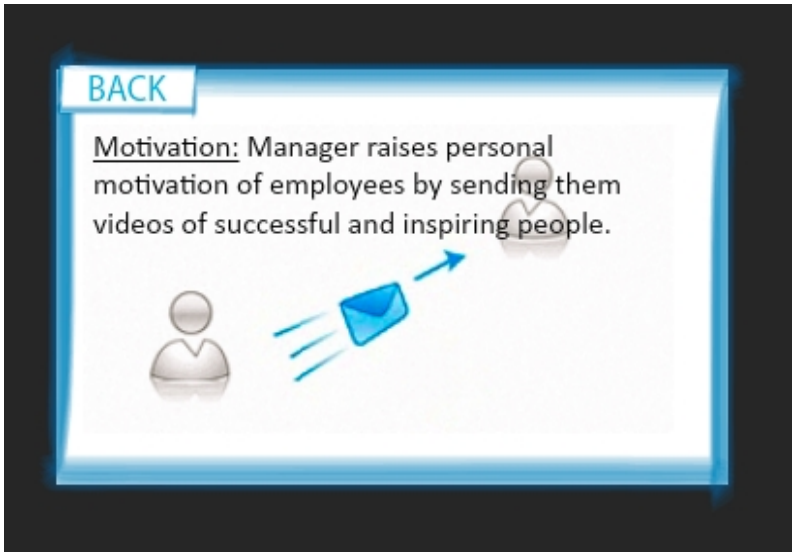


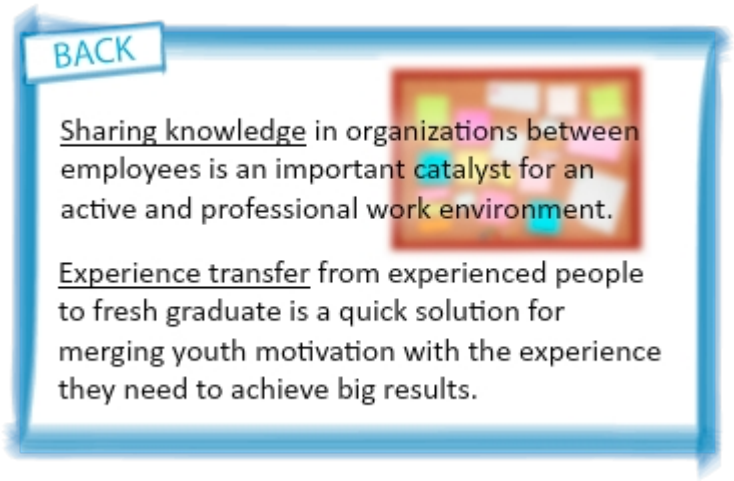
(5) Employee project management function and evaluation

Appendix (W): Leadership Awareness IT Function

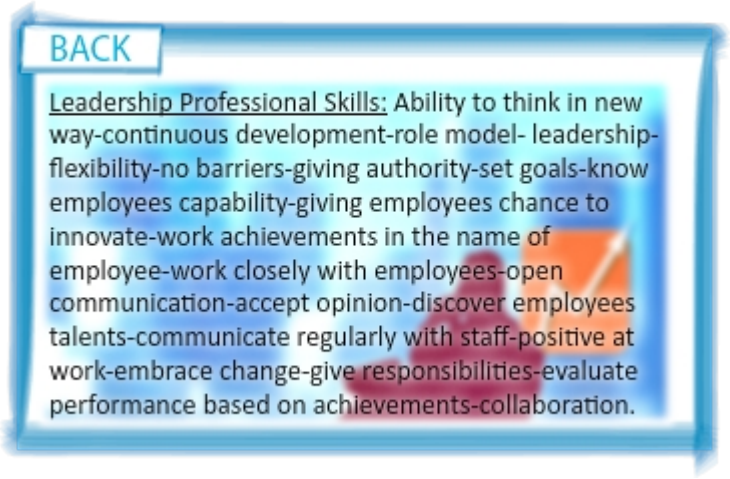


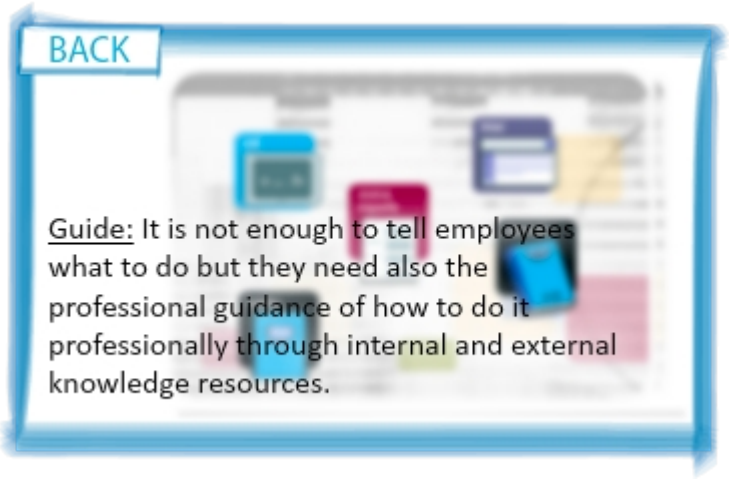


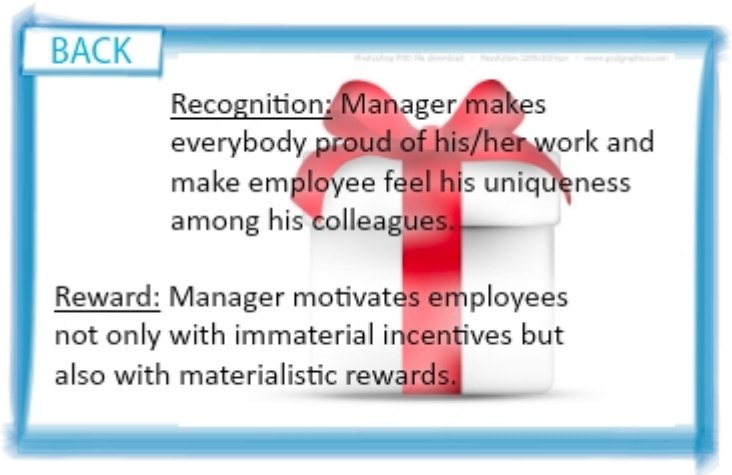

BACK
Motivation: Manager raises personal motivation of employees by sending them videos of successful and inspiring people.


BACK
Sharing knowledge in organizations between employees is an important catalyst for an active and professional work environment.
Experience transfer from experienced people to fresh graduate is a quick solution for merging youth motivation with the experience they need to achieve big results.


BACK
Leadership personal skills:
Good treatment-Trust-Honesty-Respect-Nice words-family environment-understanding employee's needs-Take care of employee.


BACK
Leadership Professional Skills: Ability to think in new way-continuous development-role model- leadership-flexibility-no barriers-giving authority-set goals-know employees capability-giving employees chance to innovate-work achievements in the name of employee-work closely with employees-open communication-accept opinion-discover employees talents-communicate regularly with staff-positive at work-embrace change-give responsibilities-evaluate performance based on achievements-collaboration.


BACK
Guide: It is not enough to tell employees what to do but they need also the professional guidance of how to do it professionally through internal and external knowledge resources.


BACK
Recognition: Manager makes everybody proud of his/her work and make employee feel his uniqueness among his colleagues.
Reward: Manager motivates employees not only with immaterial incentives but also with materialistic rewards.


BACK
Ownership: People work better if they feel the ownership of what they work on.

Appendix (X): IT Tool (Version Three) Samples and Templates

(1) Proposed approach to transform leadership skills into plan for developing workforce

رابعا: وفر لهذا الهدف الأدوات المحترفة التي يحتاجها ليتحقق بإحتراف من خلال توفير بعض أو كل التالي:

1- الخبرات ...و أليات واضحة تحدد طريقة نقلها إلى الأقل خبرة

2- التدريب على استغلال مصادر المعرفة المتاحة في العمل

3- مصادر للمعرفة

4- ادوات تحفز التفكير و الأبداع

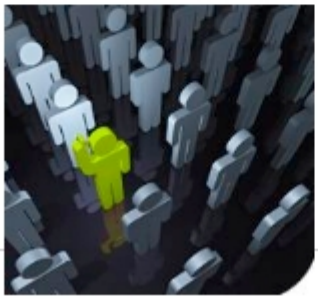
5- أدوات تشجع العمل في فرق عمل

خامسا: قدم تعليقاتك و رايك بشكل مباشر أثناء قيام الموظف بتحقيق الهدف...سوف يشعر الموظف باهمية مايقوم به عندما تفعل ذلك...مما يجعله يبذل قصارى جهده ليكون على قدر المسئولية

سادسا: لا تترك هذا الهدف ينتهي بدون كلمة ثناء أو مكافأة أو حتى تعليق...عدم قيامك بهذا الأمر مباشرة بعد الأنتهاء من الهدف يجعل الموظف في وضع معنوي منخفض يجعله يشعر انه غير قادر على تحقيق ذاته

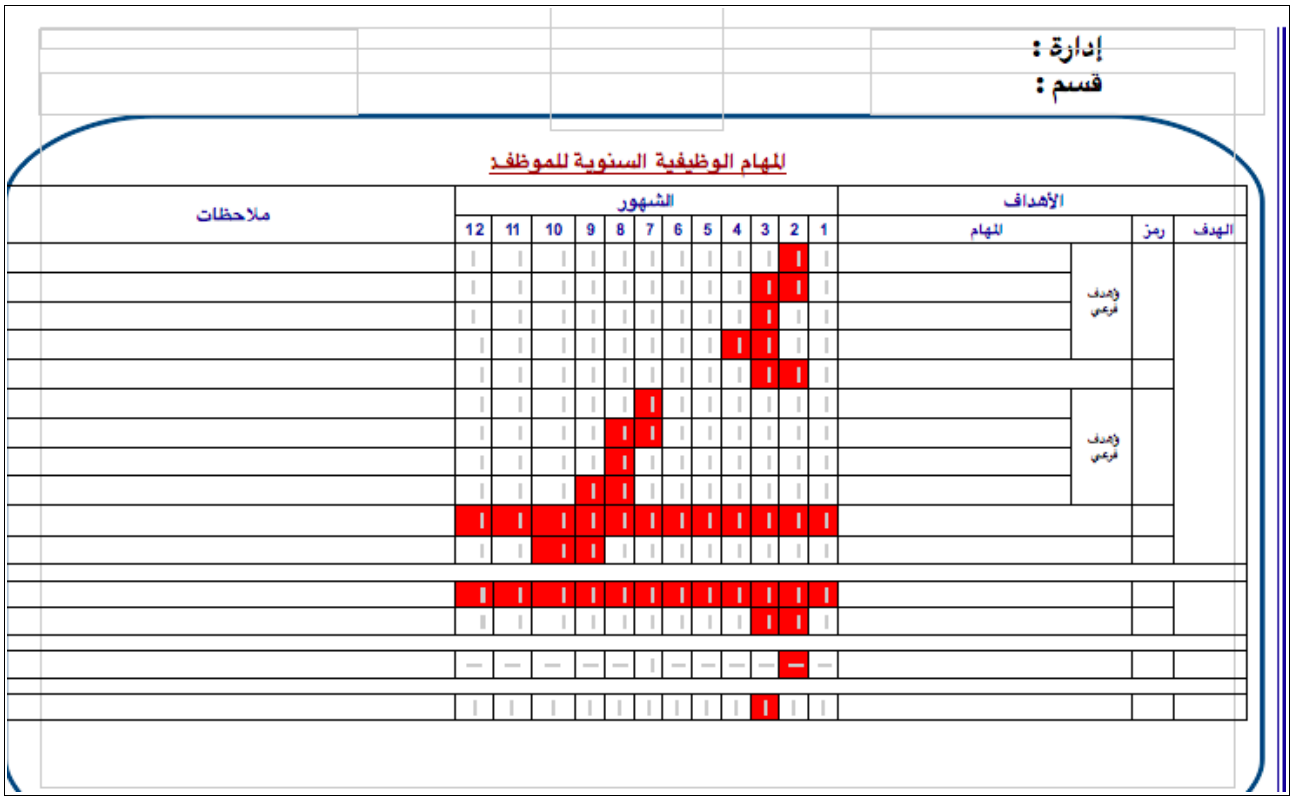
من خلال نظام تقييم عادل و دقيق

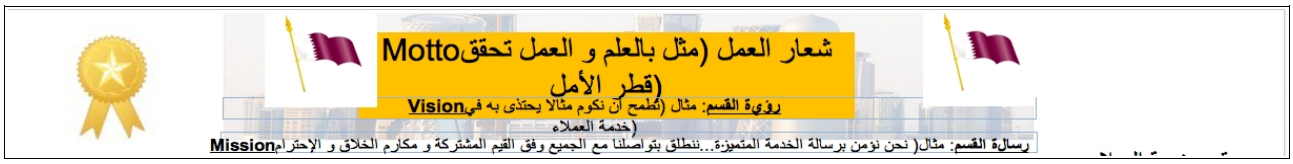
عترف بانجاز هذا الموظف امام الأخرين و أشعرة بأنه مميز

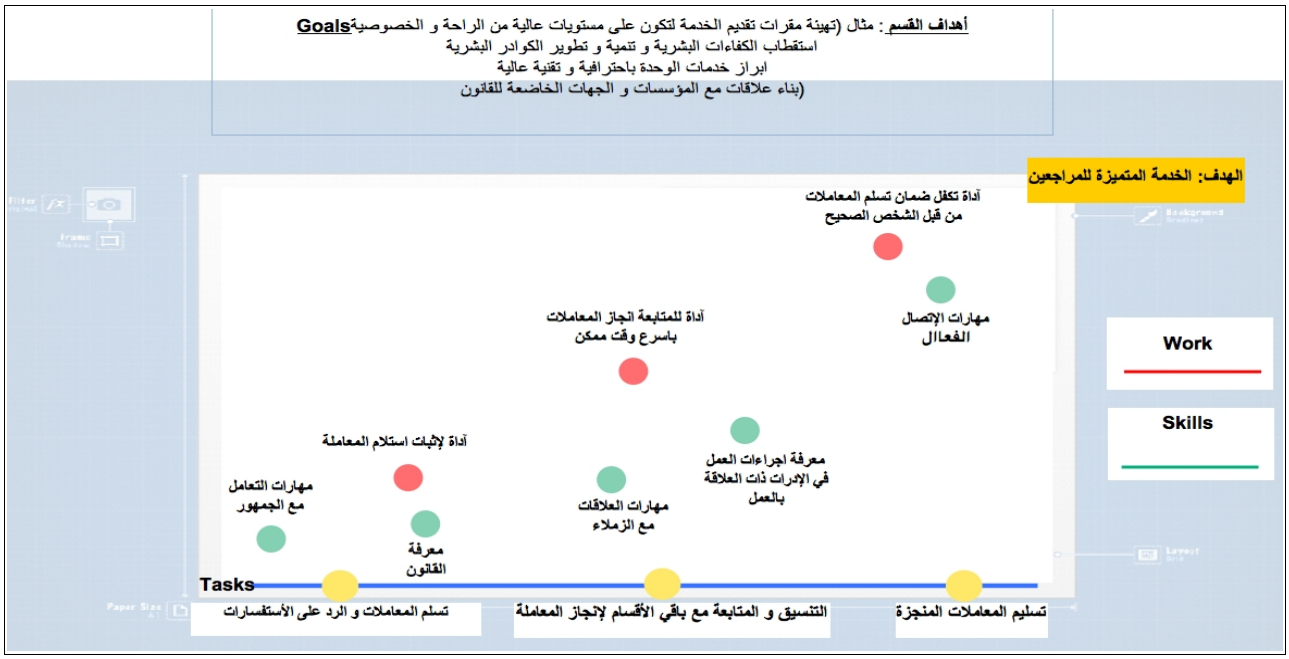


(1) (Cont.) Proposed approach to transform leadership skills into plan for developing workforce

(2) Samples and templates for motivating, appreciating and recognising employees work

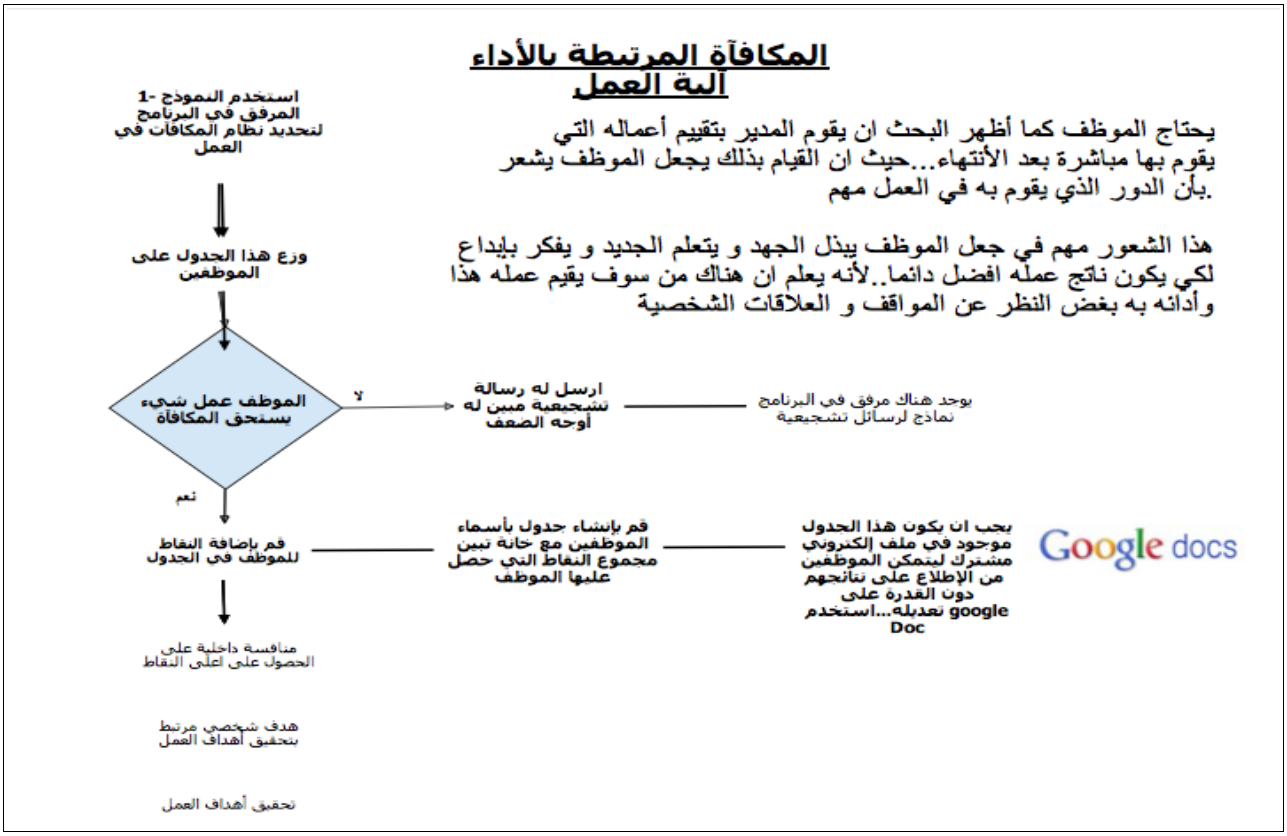






(3) Template and Sample for a Work Plan

المكافاة	عدد النقاط
تحصل على استئذان نصف يوم	250
تحصل على يوم إجازة إدارية	750
كتاب شكر	500
للموظف المثالي	600
هدية قيمة	1000



(4) Sample Reward System

Appendix (Y): The Survey

As a manager who is working to develop Qatari employees' motivation and capability at your organization; your contribution is vital in this research which is trying to understand this concept for Qatari employees and the tools that can help improving it. All answers are anonymous and confidential. Thank you

*** In your organization, do you have low motivated employees?**

- Yes
- No

*** In your organization, do you have incapable employees who aren't able to achieve thier assigned objectives & goals?**

- Yes
- No

*** Please rate how strongly you agree or disagree with each of the following statements regarding managers' awarness and skills at your organization:**

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Managers' awareness about their role in the organization (in terms of creating professional work environment in the workplace) is high					
Managers have Professional Skills (Such as: Planning, Creative thinking, Adopting to change and communication skills)					
Managers have Personal Skills (such as: Trust, Honesty, Respect and Understanding employees' needs)					
Managers' awareness about the needs of their employees to achieve thier self-esteem is high					

*** Please rate how strongly you agree or disagree with each of the following statements regarding managers' awarness and skills at your organization:**

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Managers' awareness about their role in the organization (in terms of creating professional work environment in the workplace) is high					
Managers have Professional Skills (Such as: Planning, Creative thinking, Adopting to change and communication skills)					
Managers have Personal Skills (such as: Trust, Honesty, Respect and Understanding employees' needs)					
Managers' awareness about the needs of their employees to achieve thier self-esteem is high					

*** Please answer the following questions (Do you have it, Do use it, is it important for improving motivation and capability of employees) for the following tools (Planning, Teamwork, Knowlege, Evaluation System & Reward System) with regard to your organization: (Choose all that match)**

	I have it	I have it & I use it	It is important for Motivation & Capability	It is NOT important for Motivation & Capability
Long-term plan for the wok which is easy-to-understand	☐	☐	☐	☐
Clear objectives & follow up forms & proceduresfor each employee	☐	☐	☐	☐
Teamwork tool to assist in the collaboration between employees in a project	☐	☐	☐	☐
knowledge, experiences, ideas sharing Tools	☐	☐	☐	☐
Project-based evaluation tool for employees (where an employee has clear tasks related to a project and he evaluated based on his work on them)	☐	☐	☐	☐
A reward system that rewards on achievements when occurs NOT waiting till the end of the evaluation period (Ex: every 6 months OR every year)	☐	☐	☐	☐

*** Do you think one of the following approaches effective in making Manager aware of important personal & professional skills:**

	No, Not effective	Yes, effective	Yes effective, and If I have it, I will use it
Computer's Desktop Background: image contains the most important leadership skills become a desktop background (These skills are acquired by interviews with Qatari employees and managers)	○	○	○
A Voice Reminder from computer speakers:it gives a manager advices of what he can do to improve employees' motivation	○	○	○
Reading Pdf Document: of the most important leadership skills as described in a professional study carried out by a well-known organization	○	○	○
Reading Pdf Document: explains (step-by-step) how a manager can make a work environment ready for improving motivation and capability of employees	○	○	○
Short Video: Experienced managers talking about how their skills and leadership helped developing the work to achieve goals	○	○	○

*** Could an online survey tool sent by a manager to his employees with questions about thier openions and needs help a manager to better understand his employees?**

(If you do not know what an online survey is then click here for an example: Form Site)

- ○ Yes, and I will use it if I have it
- ○ Yes, but I will NOT use it if I have it
- ○ No, it does NOT help manager understand employees' needs

*** Could a self-learning internet resources help managers to develop their skills? (Choose all that match)**

(If you have not used a self-learning internet resources before...you can check the followings: Free Managment Library and Financial Times free management resources)

- ☐ Can help developing their skills
- ☐ Can help them developing their work
- ☐ If I have these resources, I will use it
- ☐ If I have these resources, I will NOT use it

Look below at these samples of motivation letters. Is this an effective tool for helping employees achieving self-esteem by showing appreciation of their achievements even if it is small?

- ○ Yes, and I will use them if I have them
- ○ Yes, but I will NOT use it if I have it
- ○ No, it does NOT help achieving self-esteem of employees

I-Look at these samples of motivation letters. Are these effective for helping achieving self-esteem of Emp?

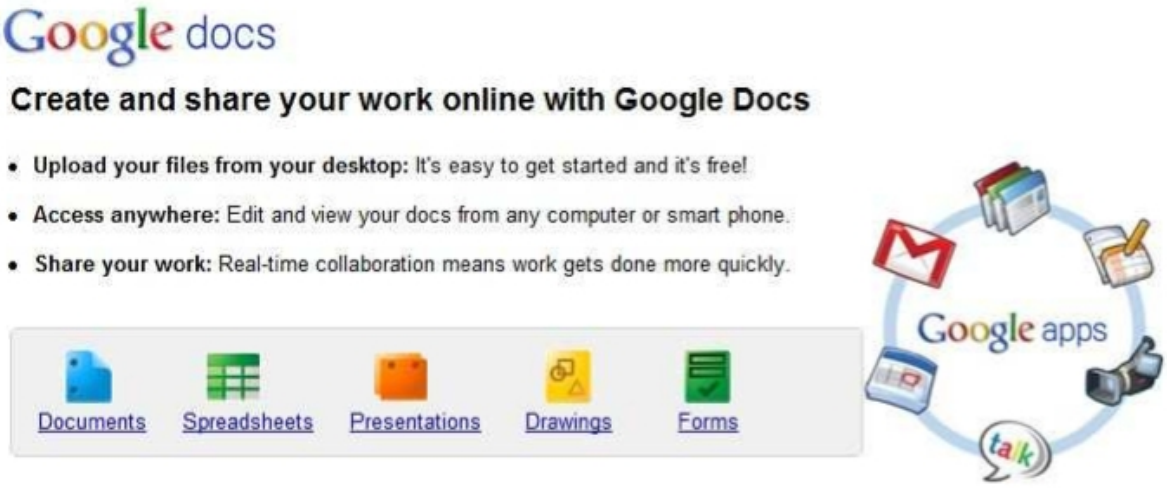
*** Look below at this sample work plan for an employee. Is this an effective tool for creating Professional Work Environment by clearly shows employee what he/she have to do in the work?**

- Yes, and I will use it if I have it
- Yes, but I will not use it if I have it
- No

Look below at these tools (Google tools). Are these effective tools for creating Professional Work Environment by providing some tools that help in practicing How to do work professionally (such as work collaboration and idea sharing tools)?

If you do not know these tools you can watch this short video about these tools: www.google.com

- Yes, but I will not use it
- Yes, and I will use it
- No



*** Look below at this performance evaluation tool. Is this an effective tool for both Recognizing and Rewarding Employees' Achievements?**

(the idea of this tool is: giving points to employees who do good work. these points then accumulated and exchanged with prizes such as: An appreciation letter from the manager or a valuable prize).

- Yes, and I will use it if I have it
- Yes, but I will NOT use it if I have it
- No

*** Do you think IT ONLY in such a way can help organizations Achieve their Goals by Improving Motivation and Capability of Qatari Workforce?**

- Yes, IT only in this way can help Improving Motivation and Capability
- No. because it also requires professional work environment to be exist in the workplace
- No, because it also requires leadership awarness & skills to be practiced by managers
- No, because it needs both Prof. work environment and leadership skills
- Other Reasons...Please mention below