TURK FINANCE AND ECONOMICS RESEARCH

The Effect of Industry 4.0 on Organizational Performance in Mogadishu

Volume 1 Issue 1
July 2021

Received: 25.01.2021
Accepted: 10.04.2021

Manal Mohamed ABDULLE[1]

Pınar BAŞAR[2]

ABSTRACT

The purpose of this study is to examine the effects of Industry 4.0 dimensions of technology companies in Somalia-Mogadishu on organizational performance. There are many technology companies established in Mogadishu. Most of them are based on Mobile network and Technology. Mogadishu, which gains more importance every year, can use organizational performance effectively, keep up with the world and take steps to develop the country with the integration of Industry 4.0 with the increase in the use of information technologies. In accordance with the research conducted 187 employees working in 14 enterprises in Somalia-Mogadishu to determine or reveal the effects of the information technology on organizational productivity and as a result it was concluded that Industry 4.0 technology dimensions have an impact on organizational performance. The results have significant implications both for the literature and in the existence organizations in Mogadishu. According to results; There is a positive and significant relationship between the E4.0 dimensions and product quality, efficiency in decision making in enterprises, work quality and job security of employees, product production and delivery in enterprises, the efficiency of the enterprise, the competitiveness of the enterprise, image of the company in the market and energy efficiency in enterprises. So it can be said that E40 technology dimensions affect the quality of the organization of enterprises in a positive way.

Key Words: Industry 4.0, Organizational Performance, Technology Companies Mogadishu.

Jel Codes: O33

Introduction

The source and backbone of the development and growth of countries is production. A strong production in a country can mean that its economy is also strong. In order for countries to be strong, they need to give importance to production, closely follow the changes and developments in production, adapt

[1] Istanbul Ticaret University, mm2598074@gmail.com
[2] Istanbul Ticaret University, pbasar@ticaret.edu.tr

Volume 1 Issue 1
July 2021

Received: 25.01.2021
Accepted: 10.04.2021

to changes in order to compete, and evaluate the new technological opportunities that emerge (Şaşmaz and Yayla, 2018: 249-268).

The change and renewal of the enterprises in the face of new and different production approaches that are emerging becomes a necessity. Accordingly, countries have started to take various measures to follow and implement modern production approaches. Industry 4.0 (E4.0) or the Fourth Industrial Revolution is the basis of the measures taken. It is clear that E4.0 will create changes in enterprises, organizational structures, work flows, production patterns, supply chain and customer expectations.

This article aims to critically reveal the impact of Industry 4.0 on organizational efficiency in Mogadishu-Somalia. Based on the importance of this study it attempts to explored the technology and productivity in Mogadishu, this study was contribute literature the existence organizations in Mogadishu and also this study was provided recommendations to improve the social activity in Mogadishu, and if there was any relationship between the information technology on organizational productivity and organizational performance in Mogadishu.

In the first part of the study; The purpose of the study, the importance of the study, the research model, hypotheses and data collection methods were determined. In the second part of the study; The concept of Industry 4.0 and its historical development are mentioned and the components of Industry 4.0 are mentioned. In the third part of the study, the results of the research conducted on technology companies in Mogadishu were analyzed using some statistical

Volume 1 Issue 1
July 2021

Received: 25.01.2021
Accepted: 10.04.2021

methods in the SPSS program. In the last part of the study, the results were written according to the findings related to the study and suggestions were given.

Literature Review

Globalization, which is a fundamental change process based on the economy by taking the world under its influence over time (Giddens, 2003); It manifests itself with the rapid, easy and effective integration of the market, economy and people (Benk & Akdemir, 2004). The industrial revolution, which started to be observed in the 1800s and developed in parallel with the globalization, which was clearly felt in the 1900s (Kızılçelik, 2004), has been the driving force in the developments to be experienced socially and in the sector (Karakuş, 2020). The replacement of manpower by machine / electronic power and the automatic remote management of production processes can be expressed as "Industry 4.0". To sum up; It can also be called the coordination of machines through computers and internet (EBSO, 2015, p.7).

The concept of Industry 4.0 was first introduced at the Hannover Fair in Germany in 2011 (Özdoğan, 2018; Schwab, 2017). Its infrastructure is based on older history. This shows that it is actually different from other industrial revolutions. With E4.0, objects can be coordinated remotely, situations where manpower and intelligence are insufficient can be resolved in a short time with these technological developments.

If E4.0 technologies are to be mentioned; Digitalization in production begins with the creation of production simulation in the virtual world and the communication of each object with the internet. As production becomes digital,

Volume 1 Issue 1
July 2021

Received: 25.01.2021
Accepted: 10.04.2021

the amount of data collected will increase, and data security and storage space will be one of the important issues for businesses. The most common connection of objects with each other will be through sensor, RFID, barcode systems. Later, advanced technology applications will be provided by robotic systems and advanced automation systems in digitalized factories.

These pioneering technologies that make up Industry 4.0 dimensions or sub-dimensions; digitalization is seen as big data and cloud computing systems and cyber security, interaction, internet of things and sensor technologies, factories of the future, additive manufacturing, advanced robotic systems, automation and control systems (Frank et. al., 2019)

Industry 4.0 and the Internet of Things are interconnected concepts. Internet of Things (IoT) concept, which is considered as one of the main dimensions of Industry 4.0, was first used by Kopetz in 2011, and it was defined as collecting and managing data from different units and sources in the business. With the internet of things, the control and management of production processes are accelerated by the use of the internet, and the data management is accelerated without the need for any other connection. It plays an effective role in the use of the data received in the cyber physical system by making use of the big data system (Alçın, 2016).

As a generalization, the internet of things; It can be defined as the daily connection of physical objects to each other with the internet, the communication of human, machine and information systems with each other in this system with generative logic and the transition to the smart factory application logic. In

Volume 1 Issue 1
July 2021

Received: 25.01.2021
Accepted: 10.04.2021

addition, a different definition is made as "a world in which physical objects are integrated with information technologies in the internet network and are active participants in business processes" (Pereira & Romero, 2017).

Internet of Things is an important step for Industry 4.0 as it forms the basis of smart factories, smart products and smart service applications (Dengiz, 2017). Internet computers do not only connect with each other, but nowadays they can communicate with each other between factories, products and production systems.

Industry 4.0 applications have several key dimensions. The first of these is Cyber physical systems. Cyber physical systems, one of the basic dimensions of Industry 4.0 applications, are the system that carries the physical movements of objects to the cyber system via the internet with the help of sensors (Soylu; 2018).

Cyber physical systems that integrate the physical world and the virtual world are the modeling of physical productions in the computer environment and the visualization of production processes in a virtual environment (Hermann et al.2016). When the Cyber Physical System is implemented, it will play an important role in the production system. Because, thanks to the cyber-physical system, all levels of production (smart products, machines, factories) will be interconnected (Pereira & Romero, 2017).

One dimension is Big Data and Cloud System. All of the tools required for the implementation of Industry 4.0 must be interconnected. Vehicles connected to the Internet need large servers as they will perform many data transfers. Big data

Volume 1 Issue 1
July 2021

Received: 25.01.2021
Accepted: 10.04.2021

is needed in order to set up the system parallel to the server needs and to perform its applications and controls (Alçın, 2016).

Since huge amounts of information and data flow will be serially from various transaction points at the same time, the problem of managing big data and processes that will occur (Fırat & Fırat, 2017) Big data, which is the idea to analyze data at a large scale, is increasingly involved in research as an increasingly important issue with developing technologies. Advances in computer and information systems, and the increasing amount of data collected, still allow them to be stored. In smart systems, cyber physical system and internet use of objects can be created and computer data stored in the same system can also be transferred to physical systems (Alçın, 2016).

One of the other important dimensions of Industry 4.0 is 3D printers. It has an important place for businesses to use Industry 4.0 technology. 3D technology enables businesses to produce without stock, thus reducing inventory costs. With the production plan recorded on the computer, any number of production can be carried out quickly with 3D technology when desired (EBSO, 2015).

In smart production systems, production is digitalized by integrating all stages of production in physical and virtual environments simultaneously. So; With advances in artificial intelligence, 3D printers, robotics, biological, nano and space technologies, systems in which objects communicate with other objects in the production flow are intelligent production systems (Aksoy, 2017). 3-D printers make the desired special productions via internet connection. Production schemes and technical drawings of the products available in the production

Volume 1 Issue 1
July 2021

Received: 25.01.2021
Accepted: 10.04.2021

system are transferred to 3-D printers over the system. In this way, the production process and technical information are known.

Artificial intelligence robots are among the representatives of Industry 4.0. Smart robots and robotic systems are very useful in the design, production and assembly stages of production systems (Salkın et al.2018). The use of robots instead of people in some heavy work ensures that people stay away from work situations that may pose a danger such as high temperatures, heavy loads, and toxic gases, and the risk of occupational safety is reduced (Aksoy, 2017). As current production technologies develop and robots are widely used in production systems, it is seen that robots are used in most production processes that require manpower. Robots are more preferred especially for jobs with high repetition amount.

VR technology, one of the main dimensions of Industry 4.0, provides great benefits for businesses. Virtual reality is a technology that brings together the physical world and the computer environment (animations, codes, images) and provides users with intuitive experiences. It provides simultaneous creation of real and virtual images by transferring real-world images to the virtual world. This virtual reality can be provided by sound, video or image. Its purpose is to increase the perception and interaction of users in the real world with their experiences in the virtual world (Nunes et al.2017).

Volume 1 Issue 1
July 2021

Received: 25.01.2021
Accepted: 10.04.2021

2.1 Organizational Performance

The performance of an organization is the result of its output or activities at the end of a certain period. This result is interpreted as the degree of achievement of the goals set by the company. In this case, organizational performance is the interpretation of the efforts spent for the realization of business objectives (Shahzad et. al, 2012).

Organizational Performance has many dimensions. Organizations evaluate outputs or results according to different dimensions of performance (Benligiray, 1999:8). However, performance measurement is difficult in businesses with an open system. Although, based on criteria such as the performance of a certain profit center, profitability, and market share; Although the performance of a particular business process can be evaluated with criteria such as the error rate, the ratio of units delivered on time to total units, it is difficult to clearly determine how much each individual contributes to these measurable performance indicators (Kılınç and Akkavuk, 2001).

When the recent literature on organizational performance and its dimensions are examined, it is seen that the performance dimensions discussed are those specified in the following studies. Organizational performance dimensions can vary for each sector. As general organizational performance dimensions; (McGivern and Tvorik, 2017).

The Effect of Industry 4.0 on Organizational Performance in Mogadishu

Volume 1 Issue 1
July 2021

Received: 25.01.2021
Accepted: 10.04.2021

- Efficiency and Quality,
- Financial Performance,
- Financial Results
- Market value of the company,
- Market share,
- Increase in sales,
- Development of goods and services,
- Efficiency,
- Future investments.
- Management of resources,
- Creative and innovative products,
- The dimension of innovation,
- Customer size,
- Employee size

Methodology

Research Model

E4.0 technology dimensions, which constitute the main subject of this research, constitute the independent variables of the research. The dependent variable of this research is the organizational performance measurement criteria in order to determine the effects of enterprises using E4.0 technologies on organizational performance. The model of the study is given in Figure 1.1.

The Effect of Industry 4.0 on Organizational Performance in Mogadishu

Volume 1 Issue 1
July 2021

Received: 25.01.2021
Accepted: 10.04.2021

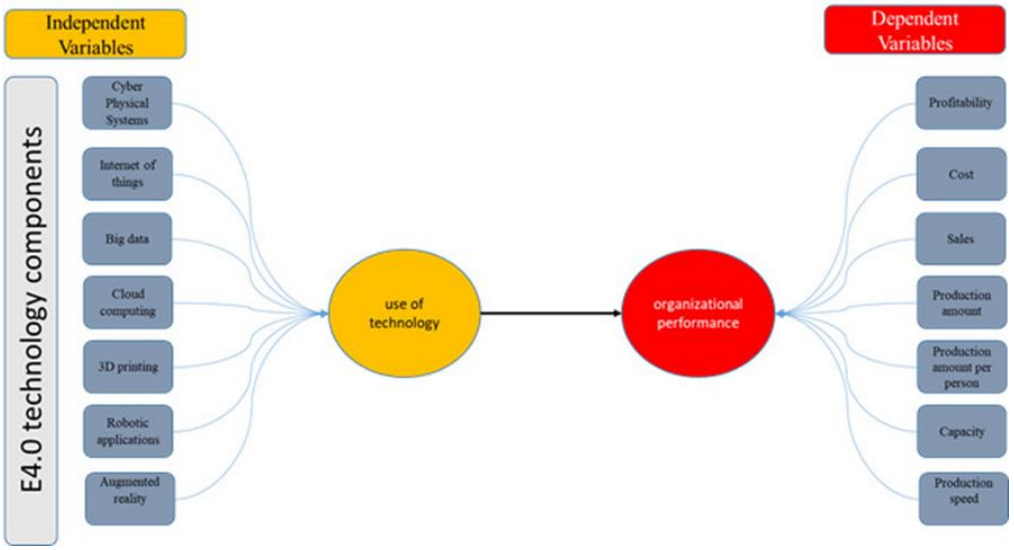

Figure 1 Research Model

3.2. Research Hypotheses

For the purpose of research, the main and sub-hypotheses established are stated as follows.

Main Hypotheses

H_1: E4.0 technology dimensions have an impact on organizational performance.

Sub Hypotheses

H1: E4.0 technology dimensions have an impact on the profitability of the organization.

$H1_2$: E4.0 technology dimensions have an impact on the costs of the organization.

$H1_3$: E4.0 technology dimensions have an impact on the sales of the organization.

$H1_4$: E4.0 technology dimensions have an impact on the production amount of the organization.

$H1_5$: E4.0 technology dimensions have an impact on the production amount per person of the organization.

The Effect of Industry 4.0 on Organizational Performance in Mogadishu

Volume 1 Issue 1
July 2021

Received: 25.01.2021
Accepted: 10.04.2021

$H1_6$: E4.0 technology dimensions have an impact on the capacity of the organization.

$H1_7$; E4.0 technology dimensions have an impact on the production speed of the organization.

$H1_8$; E4.0 technology dimensions have an impact on the product quality of the organization

3.3. Data Collection Method

This research was modeled as survey research from quantitative tools and the survey form developed by Duman (2020) was used. It was carried out on 187 number of employees in 14 companies in different sectors established in Somalia..The survey technique was used to collect data in the research. The questionnaire form used in the study consists of three parts. In the first part, corporate information about businesses is included.

The second part of the questionnaire form has been prepared to measure the E4.0 maturity levels of the enterprises. The questions in this part of the questionnaire form belong to the researchers. Whether businesses have E4.0 visions and goals, when they started to use E4.0 technologies, and the level of use of E4.0 technologies are among the first questions asked.. Questions were then asked with a fiver likert scale, which questioned whether the basic stages of seven Technologies, which are E4.0 technology dimensions, were applied in the enterprise.

The questions in the third part of the questionnaire form were asked in order to measure the organizational performance. In order to measure the performance values of businesses on E4.0, the questions asked in this section belong to the researchers.

Volume 1 Issue 1
July 2021

Received: 25.01.2021
Accepted: 10.04.2021

In order to measure dependent variables such as profitability, cost, sales, production amount, production per capita, capacity and production rate, which constitute quantitative dimensions of organization performance, enterprises were asked to respond to increase and decrease changes at percentage intervals depending on their use of E4.0 technologies.

3.4. Data Analysis

First, the reliability analysis of the whole questionnaire was conducted by excluding the information showing the corporate information of the enterprises.

Table 3.1. Reliability Analysis

Reliability Analysis	Number of questions	Alpha Value
E4.0 and Organizational Performance Scale	60	0.961
E4.0 Scale	42	0,955
Organizational Performance Scale	18	0,833

When the reliability analysis results were examined, the reliability of E4.0 and the questions asked to measure organization performance was 0.961. Cronbach's Alpha value higher than 0.7 is an indication of high reliability.

Table 3.2. KMO and Barlett Sphericity Test Analysis

KMO and Barlett Test	
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	0,939
Bartlett's Test of Sphericity Approx. Chi-Square	6442,518
Df	435

The Effect of Industry 4.0 on Organizational Performance in Mogadishu

Volume 1 Issue 1
July 2021

Received: 25.01.2021
Accepted: 10.04.2021

Sig.	0

According to the KMO and Bartlett's Test results, which show the construct validity of the questionnaire forms, a value of 0.939 was found for the validity of the questionnaire questions and it was concluded that it was valid at a good level. In addition, it is seen that the sigma value is significant at the 0.000 level.

The SPSS 21 program was used for analysis of research data. In the questions part of the questionnaire, percentage-frequency methods were used for analysis, mean and standard deviation methods and percentage-frequency methods were used for the analysis of items of the scales, and regression and correlation analysis were used to test the hypotheses.

4. Findings

4.1 Findings Related to Corporate Information of Enterprises.

These enterprises established between 1943-2014, were managed by professional managers. According the employees, most of whom were workers, participating in this study, most of the enterprises were private businesses, had an average turnover of more than 25 million TL, had 50-249 employee or 250 employees and above. According the employees, 25.7% of the enterprises operated in the media sector and 23% of them in the telecommunication sector.

4.2. Findings Related to E4.0 Maturity Levels of Enterprises

According the employees, enterprises transitioned to E4.0 technologies in between 2010-2014 years, most of them were experienced in E4.0 technologies and had defined strategic R&D, innovation targets and also E4.0 Targets.

Volume 1 Issue 1
July 2021

Received: 25.01.2021
Accepted: 10.04.2021

According to employees participating in this study, Cloud Computing component was the most applied component in businesses and 3D Printer component was the least applied component in businesses among the E4.0 technology dimensions. Also, with regard to the basic applications of each E4.0 technologies and their sub-variables, Cyber-Physical Systems was the most realized component in businesses and 3D Printer component and Robotic Applications were the least realized dimensions in businesses.

4.3. Findings Related to Organizational Performance of Enterprises

According to employees participating in this study, E4.0 technologies increased their competitiveness and energy efficiency in the market with the highest ratio E4.0 technologies improved the quality of work and work safety of employees with the least ratio. According to the majority of the employees, profitability, sales, produce amount and capacity increased with a ratio of 21-30 % in businesses with regard to quantitative organizational performance measurement criteria.

4.4. Findings Related to Hypothesis Testing

As a result of the analysis conducted with the data obtained, it was observed that the organizational performance of enterprises using E4.0 technology dimensions was affected accordingly, and this effect was positive.

The Effect of Industry 4.0 on Organizational Performance in Mogadishu

Volume 1 Issue 1
July 2021

Received: 25.01.2021
Accepted: 10.04.2021

Table 4.1 Regression Analysis for the Relationship Between E4.0 Technology Dimensions and Profitability

E4.0 Dimensions	Unstandardized Coefficients		Standard Coefficient		
	B	**S. Error**	**Beta**	**t**	**Sig.**
(Constant)	1,346	0,478		2,815	0,005
Cyber-Physical Systems	-0,461	0,151	-0,266	-3,057	0,003
Internet of Things	0,553	0,152	0,482	3,646	0
Big Data	0,177	0,085	0,206	2,095	0,038
Cloud Computing	0,086	0,106	0,105	0,811	0,418
3D Printer	-0,013	0,098	-0,017	-0,138	0,891
Robotic Applications	-0,223	0,147	-0,193	-1,519	0,131
Augmented Reality	0,313	0,101	0,384	3,11	0,002
R= 0,789	**R^2 =** 0,622	**F =** 42,048	**p =** 0		

According to the regression analysis results, E4.0 technology dimensions together has been found to be a significant predictor of organizational profitability and the rate of independent variables to explain the dependent variable is 62%. Accordingly, the hypothesis of "$H1_1$: E4.0 technology dimensions have an impact on the profitability of the organization", has been accepted. The increase in the use of Cyber-Physical Systems, Big Data and Augmented Reality applications in enterprises and the decrease in the use of the Internet of Things application increase the profitability of the organization and positively affect the organizational performance.

The Effect of Industry 4.0 on Organizational Performance in Mogadishu

Volume 1 Issue 1
July 2021

Received: 25.01.2021
Accepted: 10.04.2021

Table 4.2, Regression Analysis for the Relationship Between E4.0 Technology Dimensions and Cost

E4.0 Dimensions	Unstandardized Coefficients		Standard Coefficient		
	B	S. Error	Beta	t	Sig.
(Constant)	3,375	0,523		6,447	0
Cyber-Physical Systems	-0,069	0,165	-0,05	-0,415	0,678
Internet of Things	-0,281	0,166	-0,31	-1,69	0,093
Big Data	-0,325	0,093	-0,478	-3,503	0,001
Cloud Computing	0,209	0,116	0,323	1,803	0,073
3D Printer	0,058	0,107	0,092	0,535	0,593
Robotic Applications	0,171	0,161	0,188	1,065	0,288
Augmented Reality	-0,07	0,11	-0,11	-0,639	0,524
R= 0,521	**R^2 =** 0,271	**F =** 9,506	**p =** 0		

According to the regression analysis results, E4.0 technology dimensions together has been found to be a significant predictor organization cost and the rate of independent variable to explain the dependent variable is 27%. Accordingly, the hypothesis of "$H1_2$: E4.0 technology dimensions have an impact on the costs of the organization" has been accepted. The increase in the use of Big Data in enterprises decreases the cost of the organization and affects the organizational performance positively.

The Effect of Industry 4.0 on Organizational Performance in Mogadishu

Volume 1 Issue 1
July 2021

Received: 25.01.2021
Accepted: 10.04.2021

Table 4.3. Regression Analysis for the Relationship Between E4.0 Technology Dimensions and Sales

E4.0 Dimensions	Unstandardized Coefficients		Standard Coefficient		
	B	S. Error	Beta	t	Sig.
(Constant)	1,022	0,519		1,969	0,05
Cyber-Physical Systems	-0,248	0,164	-0,148	-1,517	0,131
Internet of Things	0,419	0,165	0,376	2,543	0,012
Big Data	0,2	0,092	0,239	2,179	0,031
Cloud Computing	-0,021	0,115	-0,026	-0,183	0,855
3D Printer	-0,023	0,107	-0,03	-0,216	0,83
Robotic Applications	-0,144	0,16	-0,128	-0,9	0,369
Augmented Reality	0,341	0,109	0,431	3,12	0,002
R= 0,726	**R^2 =** 0,527	**F =** 28,448	**p =** 0		

According to the regression analysis results, E4.0 technology dimensions together has been found to be a significant predictor of the sales of the organization and the rate of independent variable to explain the dependent variable is 53%. Accordingly, the hypothesis of "$H1_3$: E4.0 technology dimensions have an impact on the sales of the organization" has been accepted. the increase in the use of Internet of Things, Big Data and Augmented Reality applications in enterprises, increase the sales of the organization and positively affect the organizational performance.

The Effect of Industry 4.0 on Organizational Performance in Mogadishu

Volume 1 Issue 1
July 2021

Received: 25.01.2021
Accepted: 10.04.2021

Table 4.4. Regression Analysis for the Relationship Between E4.0 Technology Dimensions and Production Amount

E4.0 Dimensions	Unstandardized Coefficients		Standard Coefficient		
	B	S. Error	Beta	t	Sig.
(Constant)	-0,268	0,535		-0,501	0,617
Cyber-Physical Systems	0,187	0,169	0,099	1,111	0,268
Internet of Things	0,434	0,17	0,344	2,558	0,011
Big Data	0,407	0,095	0,43	4,295	0
Cloud Computing	-0,362	0,119	-0,401	-3,049	0,003
3D Printer	0,094	0,11	0,107	0,853	0,395
Robotic Applications	-0,239	0,165	-0,188	-1,455	0,147
Augmented Reality	0,377	0,113	0,421	3,348	0,001
R= 0,780	**R^2 =** 0,612	**F =** 39,612	**p =** 0		

According to the regression analysis results, E4.0 technology dimensions together has been found to be a significant predictor of the production amount in the organization and the rate of independent variable to explain the dependent variable is 61%. Accordingly, the hypothesis of "$H1_4$: E4.0 technology dimensions have an impact on the production amount of the organization", has been accepted. The increase in the use of Cyber-Physical Systems, Big Data and Augmented Reality applications in enterprises and the decrease in the use of the Cloud Computing application, increase the product amount of the organization and positively affect the organizational performance.

The Effect of Industry 4.0 on Organizational Performance in Mogadishu

Volume 1 Issue 1
July 2021

Received: 25.01.2021
Accepted: 10.04.2021

Table 4.5. Regression Analysis for the Relationship Between E4.0 Technology Dimensions and Production Amount Per Person

E4.0 Dimensions	Unstandardized Coefficients		Standard Coefficient		
	B	**S. Error**	**Beta**	**t**	**Sig.**
(Constant)	0,176	0,598		0,294	0,769
Cyber-Physical Systems	0,201	0,188	0,108	1,068	0,287
Internet of Things	0,31	0,19	0,25	1,635	0,104
Big Data	0,227	0,106	0,245	2,15	0,033
Cloud Computing	-0,214	0,133	-0,242	-1,616	0,108
3D Printer	0,241	0,123	0,281	1,965	0,051
Robotic Applications	-0,141	0,184	-0,113	-0,769	0,443
Augmented Reality	0,237	0,126	0,27	1,885	0,061

R= 0,702 **R^2 =** 0,493 **F =** 24,855 **p =** 0

As shown in Table 3.24 according to the regression analysis results, E4.0 technology dimensions together has been found to be a significant predictor of the production amount per person in the organization and the rate of independent variable to explain the dependent variable is 49%. Accordingly, the hypothesis of "$H1_5$: E4.0 technology dimensions have an impact on the production amount of the organization", has been accepted. The increase in the use of Big Data in enterprises increases the production amount per person in organization and affects the organizational performance positively.

The Effect of Industry 4.0 on Organizational Performance in Mogadishu

Volume 1 Issue 1
July 2021

Received: 25.01.2021
Accepted: 10.04.2021

Table 4.6. Regression Analysis for the Relationship Between E4.0 Technology Dimensions and Capacity

E4.0 Dimensions	Unstandardized Coefficients		Standard Coefficient		
	B	**S. Error**	**Beta**	**t**	**Sig.**
(Constant)	0,091	0,476		0,19	0,849
Cyber-Physical Systems	-0,06	0,15	-0,031	-0,397	0,692
Internet of Things	0,481	0,151	0,379	3,188	0,002
Big Data	0,414	0,084	0,434	4,914	0
Cloud Computing	0,03	0,106	0,032	0,28	0,78
3D Printer	0,128	0,098	0,146	1,312	0,191
Robotic Applications	-0,031	0,146	-0,024	-0,209	0,835
Augmented Reality	-0,018	0,1	-0,02	-0,182	0,856
R= 0,833	**R^2 =** 0,695	**F =** 58,158	**p =** 0		

According to the regression analysis results, E4.0 technology dimensions together has been found to be a significant predictor of the capacity of the organization and the rate of independent variable to explain the dependent variable is 70%. Accordingly, the hypothesis of "$H1_6$: E4.0 technology dimensions have an impact on the capacity of the organization", has been accepted. The increase in the use of Internet of Things and Big applications in enterprises, increase the capacity of the organization and positively affect the organizational performance.

The Effect of Industry 4.0 on Organizational Performance in Mogadishu

Volume 1 Issue 1
July 2021

Received: 25.01.2021
Accepted: 10.04.2021

Table 4.7. Regression Analysis for the Relationship Between E4.0 Technology Dimensions and Production speed

E4.0 Dimensions	Unstandardized Coefficients		Standard Coefficient		
	B	S. Error	Beta	t	Sig.
(Constant)	-0,481	0,556		-0,866	0,387
Cyber-Physical Systems	0,269	0,175	0,144	1,535	0,126
Internet of Things	0,517	0,176	0,417	2,93	0,004
Big Data	0,319	0,098	0,343	3,244	0,001
Cloud Computing	-0,354	0,123	-0,399	-2,869	0,005
3D Printer	0,083	0,114	0,097	0,73	0,466
Robotic Applications	-0,185	0,171	-0,148	-1,085	0,28
Augmented Reality	0,306	0,117	0,347	2,611	0,01
R= 0,750	**R^2 =** 0,562	**F =** 32,832	**p =** 0		

As shown in Table 3.26 according to the regression analysis results, E4.0 technology dimensions together has been found to be a significant predictor of the production speed in the organization and the rate of independent variable to explain the dependent variable is 56%. Accordingly, the hypothesis of "$H1_7$: E4.0 technology dimensions have an impact on the production speed of the organization", has been accepted. The increase in the use of Internet of Things, Big Data and Augmented Reality applications in enterprises and the decrease in the use of the Cloud Computing and Robotic Applications, increase the

Volume 1 Issue 1
July 2021

Received: 25.01.2021
Accepted: 10.04.2021

production speed of the organization and positively affect the organizational performance.

Table 4.8. Correlation Analysis for the Relationship between E4.0 Technology Dimensions and Qualitative Organizational Performance

Qualitative Organizational Performance		E4.0 Dimensions						
		Internet of Things	Cyber-Physical Systems	Big Data	Cloud Computing	3D Printer	Robotic Applications	Augmented Reality
Product Quality	r	0,373**	0,463**	0,421**	0,472**	0,179*	0,195**	0,327**
Production Processes	r	0,03	0,14	,158*	0,11	0,06	0,06	0,160*
Positive Feedback From Customers	r	-0,07	-0,06	-0,03	-0,04	0,01	-0,02	0,03
Efficiency in Decision Making	r	0,00	0,03	0,00	0,07	0,05	0,05	0,03
Communication within the Organization.	r	0,13	0,246**	0,269**	0,261**	0,13	0,11	0,147*
Work Quality and Job Security of Employees.	r	0,309**	0,479**	0,449**	0,502**	0,245**	0,227**	0,289**

The Effect of Industry 4.0 on Organizational Performance in Mogadishu

Volume 1 Issue 1
July 2021

Received: 25.01.2021
Accepted: 10.04.2021

Speed of Product Production and Delivery	r	0,288**	0,273**	0,306**	0,311**	0,308**	0,302**	0,288**
Efficiency of the Enterprise.	r	0,258**	0,366**	0,384**	0,385**	0,173*	0,176*	0,300**
Competitiveness of Enterprises.	r	0,486**	0,682**	0,541**	0,651**	0,256**	0,252**	0,466**
Image of The Company in the Market	r	0,420**	0,547**	0,432**	0,520**	0,200**	0,200**	0,382**
Energy Efficiency.	r	0,580**	0,775**	0,655**	0,753**	0,304**	0,282**	0,540**

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

According to the correlation analysis findings, there is a positive and significant relationship between the E4.0 dimensions and product quality, efficiency in decision making in enterprises, work quality and job security of employees, product production and delivery in enterprises, the efficiency of the enterprise, the competitiveness of the enterprise, image of the company in the market and energy efficiency in enterprises. Accordingly, the hypothesis of "H_8: E4.0 technology dimensions have an effect on the product quality of the organization", which is the sub-hypothesis of our research, has been accepted.

The Effect of Industry 4.0 on Organizational Performance in Mogadishu

Volume 1 Issue 1
July 2021

Received: 25.01.2021
Accepted: 10.04.2021

Conclusion and Recommendations

This study was realized with the participation of 187 employees working in 14 enterprises in Somalia, for the purpose of determining or revealing the effects of the information technology on organizational productivity. These enterprises established between 1943-2014, were managed by professional managers. According the employees, most of whom were workers, participating in this study, most of the enterprises were private businesses, had an average turnover of more than 25 million TL, had 50-249 employee or 250 employees and above. According the employees, 25.7% of the enterprises operated in the media sector and 23% of them in the telecommunication sector.

According the employees, enterprises transitioned to E4.0 technologies in between 2010-2014 years, most of them were experienced in E4.0 technologies and had defined strategic R&D, innovation targets and also E4.0 Targets.

According to employees participating in this study, Cloud Computing component was the most applied component in businesses and 3D Printer component was the least applied component in businesses among the E4.0 technology dimensions. Also, with regard to the basic applications of each E4.0 technologies and their sub-variables, Cyber-Physical Systems was the most realized component in businesses and 3D Printer component and Robotic Applications were the least realized dimensions in businesses.

According to employees participating in this study, E4.0 technologies increased their competitiveness and energy efficiency in the market with the highest ratio E4.0 technologies improved the quality of work and work safety of employees with the least ratio. According to the majority of the employees, profitability, sales, produce amount and capacity increased with a ratio of 21-30 % in

Volume 1 Issue 1
July 2021

Received: 25.01.2021
Accepted: 10.04.2021

businesses with regard to quantitative organizational performance measurement criteria.

As a result of the analysis conducted with the data obtained, it was observed that the organizational performance of enterprises using E4.0 technology dimensions was affected accordingly, and this effect was positive/positive. As a result of the research, the following conclusions were reached in general;

- E4.0 technology dimensions affect the profitability of enterprises in a positive way. The increase in the use of the Internet of Things, Big Data and Augmented Reality applications in enterprises and the decrease in the use of Cyber-Physical Systems application increase the profitability of the organization and positively affect the organizational performance.
- E4.0 technology dimensions affect the cost of enterprises in a negative way. The increase in the use of Big Data in enterprises decreases the cost of the organization and affects the organizational performance positively.
- E4.0 technology dimensions affect the sales of enterprises enterprises in a positive way. The increase in the use of Internet of Things, Big Data and Augmented Reality applications in enterprises, increase the sales of the organization and positively affect the organizational performance.
- E4.0 technology dimensions affect the production amount of enterprises enterprises in a positive way. The increase in the use of Internet of Things, Big Data and Augmented Reality applications in enterprises and the decrease in the use of the Cloud Computing application, increase the production amount of the organization and positively affect the organizational performance.

Volume 1 Issue 1
July 2021

Received: 25.01.2021
Accepted: 10.04.2021

- E4.0 technology dimensions affect the production amount per person in enterprises in a positive way. The increase in the use of Big Data in enterprises increases the production amount per person in organization and affects the organizational performance positively.
- E4.0 technology dimensions affect the capacity of enterprises in a positive way. The increase in the use of Internet of Things and Big applications in enterprises, increase the capacity of the organization and positively affect the organizational performance.
- E4.0 technology dimensions affect the production speed of the organization of enterprises in a positive way. The increase in the use of Internet of Things, Big Data and Augmented Reality applications in enterprises and the decrease in the use of the Cloud Computing and Robotic Applications, increase the production speed of the organization and positively affect the organizational performance.

Recommendations:

As a result, when looking at these benefits of E4.0 technologies for businesses, it becomes clear how much they will need E4.0. Recommendations for improving the use of E4.0 technologies in enterprises and E4.0 transformation are as follows:

- Businesses that have taken important steps and achieved success in E4.0 can provide consultancy services to the businesses which are in the beginning stage of the E4.0.
- Organizational structures of small businesses that are in the preparation stage of the E4.0, can be reshaped, emphasis can be placed on

Volume 1 Issue 1
July 2021

Received: 25.01.2021
Accepted: 10.04.2021

institutionalization efforts, and information technology investments can be prioritized first?

- More serious emphasis can be placed on strengthening the internet infrastructure, reducing the costs of internet access and taking necessary cyber security measures
- The number of R&D centers, which have an important role in the E4.0 transformation, can be increased. Engineers and employees from countries with significant levels of E4.0 can be employed in these centers.
- Employees are not only limited in their field of expertise, they should improve themselves according to new developments and working conditions, and can make their career plans accordingly.
- In the E4.0 transformation, the first issue should be focus on is education. The education system must be adapted to the conditions and needs of the new revolution. Especially in order to train qualified workforce, course curricula can be updated and departments belonging to new occupational groups can be established.
- Informative and developing activities can be organized in order to increase awareness and take measures against the consequences of E4.0.

In addition to the results and recommendations of the research, further research on E4.0 is recommended for future research and researchers.

References

The Effect of Industry 4.0 on Organizational Performance in Mogadishu

Volume 1 Issue 1
July 2021

Received: 25.01.2021
Accepted: 10.04.2021

Aksoy, S. (2017). Değişen teknolojiler ve Endüstri 4.0: Endüstri 4.0'ı anlamaya dair bir giriş. Sosyal Araştirma Vakfı Katkı, sayı. 4, ss. 34-44.

Alçın, S. (2016). Üretim İçin Yeni Bir İzlek: Sanayi 4.0. Journal of Life Economics, sayı. 8, ss. 19-30, http://dx.doi.org/10.15637/jlecon.129 (Accessed Date: 22.04.2018)

Benk, S., & Akdemir, T. (2004). Globalleşme ve Ekonomik Değişim. Çimento İşveren Dergisi, 18(1), 12-27.

Benligiray, S. (1999). İnsan kaynakları açısından otellerde performans yönetimi. Anadolu Üniversitesi, Sosyal Bilimler Enstitüsü, Turizm İşletmeciliği ve Otelcilik Ana Bilim Dalı. Yüksek Lisans Tezi. Eskişehir.

Dengiz, O. (2017). Endüstri 4.0: Üretimde kavram ve algı devrimi. Makina tasarım ve imalat dergisi, 15(1), 38-45.

Duman, M. Ç. (2020). Endüstri 4.0 teknoloji bileşenlerinin örgütsel performansa etkilerini belirlemeye yönelik bir araştırma.

EBSO (2015). Sanayi 4.0. Araştırma Müdürlüğü.

Fırat, S. Ü. & Fırat, O. Z. (2017). Sanayi 4.0 Devrimi Üzerine Karşılaştırmalı Bir İnceleme: Kavramlar, Küresel Gelişmeler ve Türkiye. Toprak İşveren Dergisi, Sayı. 114, ss. 10-23.

Frank, A. G., Dalenogare, L. S., & Ayala, N. F. (2019). Industry 4.0 technologies: Implementation patterns in manufacturing companies. International Journal of Production Economics, 210, 15-26.

Giddens, A. (2003). Runaway world: How globalization is reshaping our lives. Taylor & Francis.

Hermann, M., Pentek, T. & Otto B. (2016). Design Principles for Industrie 4.0 Scenarios. System Sciences (HICSS), 49th Hawaii International Conference

Karakuş, F. (2020). Endüstri 4.0 sürecinde lojistiğin yiyecek ve içecek endüstrisine etkisi (Master's thesis, Balıkesir Üniversitesi Sosyal Bilimler Enstitüsü).

Kılınç, T., & Akkavuk, E. (2001). Takım Performansının Ölçümüne Metodolojik Bir Yaklaşım. Akdeniz İİ BF Dergisi, (2), 103-120.

Kızılçelik, S. (2004). Sosyal bilimleri yeniden yapılandırmak. Anı yayıncılık.

McGivern, M. H., & Tvorik, S. J. (2017). Determinants of organizational performance. Management Decision.

The Effect of Industry 4.0 on Organizational Performance in Mogadishu

Volume 1 Issue 1
July 2021

Received: 25.01.2021
Accepted: 10.04.2021

Nunes, M. L., Pereira, A.C. & Alves, A.C. (2017). Smart products development approaches for Industry 4.0. Procedia Manufacturing, 13, pp. 1215-1222.

Özdoğan, O. (2018). Endüstri 4.0: Dördüncü Sanayi Devrimi ve Endüstriyel Dönüşümün Anahtarı (2. bs.). İstanbul: Pusula.

Pereira, A.C. & Romero, F. (2017). A review of the meanings and the imlications of the Indusrty 4.0 concept. Procedia Manufacturing, 13, pp. 1206-1214.

Salkın, C., Öner, M., Üstündağ, A., & Çevikcan, E. (2018). A conceptual framework for Industry 4.0. In Industry 4.0: Managing the Digital Transformation (pp. 3-23). Springer, Cham.

Şaşmaz, M. Ü., & Yayla, Y. E. (2018). Ekonomik Kalkınmanın Belirleyicilerinin Değerlendirilmesi: Ekonomik Faktörler. International Journal of Public Finance, 3(2), 249-268.

Shahzad, F., Luqman, R. A., Khan, A. R., & Shabbir, L. (2012). Impact of organizational culture on organizational performance: An overview. Interdisciplinary journal of contemporary research in business.

Schwab, K. (2017). The fourth industrial revolution. Currency.

Soylu, A. (2018). Endüstri 4.0 ve girişimcilikte yeni yaklaşımlar. Pamukkale Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, (32), 43-57.