50 Shades Of Green – Angel Investing In Green Businesses

Abstract

Entrepreneurs will play a critical role in developing the technological solutions to achieve a successful transition to net carbon zero. Their ability to develop these innovations into market ready products requires access to finance. Angels play a critical role in financing the start of the entrepreneurial pipeline. However, their actual and potential role investing in green/clean businesses is not considered in either the business angel or socially responsible investment literatures. This paper addresses this omission. It asks what motivates business angels to invest in green/clean tech businesses and how the weight of green/clean tech in their portfolios impacts the motivations to invest in this sector. Based on interviews with 65 investors, we show that the motivation of business angels for investing in green/clean tech opportunities differs according to the proportion of their investment portfolio that comprises green/clean tech investments. Those angels who invested solely in green/clean tech gave a higher weighting to economic motivations and lower weightings to Altruistic and Hedonistic motivations. Angels with less exposure to green/clean tech in their portfolios gave a higher weighting to Altruistic motivations and had lower weightings for economic and hedonistic motivations. Our findings have implications for policy-makers and to green entrepreneurs.

1. INTRODUCTION

There is a global consensus that the economic recovery from Covid-19 must be based on "building back better". Although this has a number of dimensions (OECD, 2020) central to this narrative is the emphasis on 'building back greener' with actions to reduce CO2 emissions, slowing

biodiversity loss and increasing circularity of supply chains (OECD, 2020) to reverse the environmental degradation created by decades of industrial development. However, there is no simple, quick fix; instead "everything needs to change". This requires grassroots innovations and granular change across the economy – including food production (e.g. the development of alternative protein-based food, vertical farming), mobility and transport, circular economies and renewable energy - for a successful transition to net carbon zero. These innovations need to occur for society to make the changes required to address the threat of climate change. But John Kerry, Special Presidential Envoy for Climate, has suggested that half of the technology required to reach net zero has get to be invented (The Guardian, 2021). This view is supported by the investment community. One venture capital fund manager has commented as follows: "we need innovation to be able to decarbonise; the technologies are just not in the market right now" (Financial Times, 2021). This highlights the critical role that entrepreneurs will play developing the innovations that are necessary to defeat climate change. But the ability of entrepreneurs to develop these innovations into market-ready products depends on their ability to access appropriate financing.

Money is flowing into technologies to combat climate change at an unprecedented rate in response to demand from governments and companies for new solutions to enable them to meet their net zero commitments (Financial Times, 2021). According to The Economist (2021) "billions [of dollars] are pouring into the business of decarbonisation" from venture capital funds, family investment funds, banks, private equity and large companies. However, these institutional investors typically make large investments in later stage businesses that have achieved market traction and are seeking finance for further expansion. They do not invest in start-ups that are developing and bringing innovations to market. The main source of finance that enables

entrepreneurs to bring green-tech innovation to the market comes from business angels. They are high net worth individuals – typically former entrepreneurs who have grown and sold one or more successful businesses, senior corporate managers and business professionals – who invest their own money directly in new and early-stage unquoted businesses and make their expertise and networks available to support the entrepreneurs that they support (Mason and Botelho, 2018). Some angels invest on their own but most now invest alongside other angels as part of organised angel groups and syndicates (Mason et al., 2013; 2016; 2019).

Angels play a key role in the entrepreneurial ecosystem. First, they are investing their own money and so are not accountable to anyone else. This enables them to think and act differently to institutional investors. As one of the early employees of Spotify who is now a business angel has commented: "the big difference between being an institutional investor and an angel is that you can be much more irrational. You can take more risks and have more control over who you invest in." (Sifted, 2021). Second, they are willing to take in the risks involved in investing in new and early-stage businesses that have limited revenue or are at the pre-revenue stage (Mason and Botelho, 2014). These types of businesses are at too early a stage and their financial needs are too small to be of interest to the vast majority of venture capital funds. Third, they are hands-on investors who are able to draw upon their entrepreneurial and business experience to make significant value-added contributions to their investee businesses (Politis, 2008; 2016). Fourth, business angels are patient investors (Harrison et al., 2016) who are willing to hold their investments for a significant period of time (average of 7 years) (Mason et al., 2016). Lastly, business angels are not motivated entirely by financial considerations. Various scholars (e.g. Wetzel, 1983; Sullivan and Miller, 1996; Mason and Harrison, 2002) have highlighted that many

business angels invest for a combination of financial and nonfinancial motives, deriving some of their returns in the form of psychic income, such as satisfaction from supporting the next generation of entrepreneurs, enabling socially beneficial products and services to come to market, and helping to create jobs in their local community. What all of this means is that business angels have the ability to "kick-off a business that might be fundamental to the planet when nobody else might" (GoBeyond, 2021).

The critical role of business angels in investing in entrepreneurial businesses to enable them to develop and bring their green tech innovations to market is not considered in the business angel nor in the socially responsible investment (SRI) literatures. This paper addresses this omission. The question that we address is as follows: what motivates business angels to invest in green tech businesses? The imperative to expand the funding of green tech innovations – and the suggestion that there is a funding gap for such investments (Owen et al, 2020) - means that the answer to his question has significant implications for both policy and practice.

The paper is structured as follows. The next section reviews two bodies of literature addressing investment motivations: (i) socially responsible investments and (ii) business angel. The following section provides a description of the data sources and methodology, and profiles the respondents to the survey. The results are presented in the next section. This is followed by a discussion of the implications of our findings. The final section re-engages with the investment motivations literature to consider in the light of this evidence the motivation of business angels to invest in green/clean tech businesses.

2. LITERATURE REVIEW

Investment motivations is a major focus of the business angel literature (e.g. Kelly, 2007; Morrissette, 2007; Stedler and Peters, 2003; Van Osnabrugge and Robinson 2000), particularly in 'first generation' studies (Mason and Harrison, 2000). Wetzel's (1983) pioneering study highlighted that business angel investing is characterised by both financial and non-financial motivations, with the 'typical' business angels motivated in part by non-financial considerations ('hot buttons') (Kelly, 2007; Morrissette, 2007). Moreover, some are willing to trade-off such considerations against a lower financial return (Wetzel, 1981; Sullivan, 1994). However, reflecting the heterogeneous nature of the business angel population (Sørheim and Botelho, 2016), angels have a variety of motivations for investing. Sullivan and Miller (1996) propose three types of motivations: Economic, Hedonistic and Altruistic. Investors who are motivated by economic consideration provide capital to a new business venture simply because they believe that this investment has the potential for higher returns than another investment at this given level of risk. This purely financial view of investment decision-making. Hedonistic investors have multiple investment goals that include non-economic motivation such as "psychic income". Altruistic investors are motivated to promote the wider interests of society ahead of their own financial interests.

There are no studies that have investigated the motivations of business angels for investing in green businesses. On the on hand a strong case can be made for arguing that those business angels who invest in green investment opportunities are motivated by non-financial considerations, specifically their desire to 'save the planet'. On the other hand, in view of the strong narrative that the need to address climate change is creating enormous investment

opportunities it could also be argued that those angels who invest in green investment opportunities are motivated by the prospect of high economic returns rather than for altruistic reasons. The absence of prior studies means that there is no evidence to support either position.

Investor motivation is a major theme in the SRI literature (e.g. Adam and Shauki, 2014; Beal et al., 2005; Chatterji et al., 2009; Lewis, 2001; Nilsson, 2009; Rosen et al., 1991; Williams, 2007). SRI refers to "the practice of integrating social, ethical and/or environmental considerations – sometimes referred to as 'environmental, social and governance' (ESG) considerations – into one's financial investment process" (Sandberg, 2011). Schueth (2003) has divided SRI investors into two groups according to their investment motivations, differentiating between the propensity of investors to think of others' (society) and their own values. One group - the "feel good investors" - invest in firms that are closely aligned to their intrinsic values and priorities while the other group - "social change investors" - focus on pursuing positive societal change. Beal et al. (2005) have combined finance theory and ethical investment literature to suggest that investors are driven by (i) superior financial returns; (ii) non-wealth returns and (iii) being able to contribute to social change and pursue SRI for a combination of these three motivations. A later study by Nilsson (2009) has suggested that SRI behaviour depends on three groups of variables: (i) socio-demographic; (ii) financial perceptions of SRI and (iii) social, environmental and ethical factors. In summary, these studies identify three investment motivations of SRI investors. First, is financially orientated motivation: SRI investors are driven by the expectation of higher financial returns (Chatterji et al., 2009; Nilsson, 2009). Second, is personal alignment: investors do not want to support companies that exhibit what they regard as unethical or immoral conduct (Rosen et al., 1991, Lewis, 2011, Schueth, 2003). Third, is to do "good": the perception

that investing in SRI is helping society will induce positive feelings amongst investors (Lewis, 2001; Diouf et al., 2016).

However, applying the insights from the SRI literature on investment motivations and what influences their investment decisions to business angel decision-making is problematic. First, although this literature identifies various types of SRI investors – one study offers a classification with ten types of SRIs (Chatzitheodorou et al, 2019) - business angels are not recognised in these studies as a distinctive class of investors. The consequence is that the role of angel investors as actual and potential sources of external finance for environmentally oriented businesses has been largely ignored by the literature on socially responsible investment (SRI).

Second, although investments that have environmental considerations have been identified by various studies as a significant dimension of SRI (e.g. Capelle-Blancard and Monjon, 2012; Galema et al., 2008; Sandberg, 2011; Sandberg et al., 2009; Schueth, 2003; Simpson and Kohers, 2002), these studies typically focus on the investment industry, notably investors in (mutual) funds (e.g. Benson and Humphrey, 2008; Diouf et al., 2016; Guenster, 2012; Rivoli, 2003) and so have little if any applicability to business angels . For example, Randjelovic et al., (2003) have examined the challenges, drivers and growth potential of the "green" venture capital industry. But venture capitalists operate differently from business angels, and invest at different stages in the entrepreneurial growth process, with these differences being well documented in the entrepreneurial finance literature (e.g. Fiet. 1995; Harrison and Mason, 2000; Van Osnabrugge; 2000). Estapé-Dubreuil et al. (2016, p. 118) looked at how micro-angels[i] who were members of an investment club – a hybrid between a venture capital and an angel group - "balance the triple

objectives of people, planet and profitability". But here again this evidence cannot be transferred to the business angel context as these investors were passive, retail style investors who invest very small amounts, with the investment decision taken as a group, not individually, and hence their investment process has little in common with typical angel investors.

Moreover, there is some controversy in the literature on the willingness of SRI investors to sacrifice financial returns (Diouf et al., 2016). The SRI literature has identified "doing "good" as one of the key drivers of investing (Diouf et al., 2016; Lewis, 2001). In contrast, as noted earlier, studies of business angel motivations are more nuanced, suggesting that they invest for a combination of reasons (Kelly, 2007; Morrissette, 2007). For example, a study of green start-ups (Bergset and Fitcher, 2015: 137) concludes that "business angels often accept lower return-levels when they have additional sources of motivation.

A third limitation of this body of literature is that it has looked at SRI investment from an ethical perspective rather than focusing on environmental issues. There are few examples in the SRI literature of studies that focus on "green" investments. This reflects the shift in the approach of green funds over time from a pure environmental stance to a more social responsible focus to fit broader investors' preferences (Sparkes, 2001). One few studies that does look in detail at investor motivations to invest in green opportunities is by Chatterji et al., (2009) who classify SRI investors according to the use of environmental ratings. They identify four types of investors: (i) Financial investors; (ii) Deontological investors; (iii) Consequentialist investors; and (iv) Expressive investors. The *Financial investors* believe that higher financial performance can be achieved through an environmental focus. The *Deontological investors* try to avoid investing in firms that

are not environmentally friendly because for ethical reasons. The *Consequentialist investors* aim to reduce the cost of capital for environmentally friendly firms and increase it for those that are harmful to the environment. Lastly, *Expressive* investors see their investment activity as part of their identity; thus, they seek to invest in eco-friendly firms. This classification is consistent with the three investment motivations identified[ii] previously.

Table 1 integrates these two literatures, linking Sullivan and Miller's (1996) categorization of angel motivation with the classification of investor motivations in the SRI literature to provide a framework for this study which, to the best of our knowledge, is the first attempt to understand the motivations of business angels to invest in green/clean tech opportunities. We do so by adapting Sullivan and Miller's (1996) categorization as we recognize that investors invest for a mix of motivations, hence, we conceptualize an investment being driven by a combination of reasons. This approach is consistent with other studies on investment motivation (for example: Brettel. 2002; Stedler and Peters, 2003; Tashiro, 1999; Van Osnabrugge and Robinson 2000). Our research questions emerge from these literatures on investor motivations. First, are business angels who invest predominantly in green/clean tech businesses distinctive from those who do not? Specifically, are investors in green/clean tech businesses more likely to be motivated by altruistic rather than financial motivations? Second, do business angels have different motivations to invest in green/clean tech businesses compared to other sectors? And third, do the motivations of business angels to invest in green/clean tech businesses differ according to the size of their green/clean tech portfolio?

Table 1 ABOUT HERE

3. METHODOLOGY

This paper is based on semi-structured interviews with 65 UK business angels. Our sample of investors include both those who have invested in green/clean investments, with at least one investment of this type in their portfolio (n=55), and those who have considered green/clean tech opportunities (and hence were familiar with such investment opportunities) but not invested in this type of investments (n=10). This approach allows the research to discriminate investments from investment motivations and participant or researcher expectations (King et al., 1994; Lieberson, 1994). The group of non-green investors (n=10) were older, with higher levels of education, more entrepreneurial and SME experience and longer years investing (see Table 3 below). The decision to include this group of investors was driven by two considerations. First, the research is focused on investment motivations, which are set before an investment occurs (Van Osnabrugge and Robinson, 2000). These 10 participants had previously screened green/clean tech opportunities, indicating their willingness to consider this type of investments and giving them a familiarity with the specificities of the sector. Understanding why these investors were open to investing in green/clean tech is therefore of relevance to the study. Second, business angels are a heterogeneous population (Sørheim and Botelho, 2016), hence a larger the sample will improve the study's precision (Israel, 1992).

The process of recruiting angels followed a multi-sample approach that used different sources (business angel groups, media, snowballing). Because of the invisibility of business angels, reliance on a single source to identify business angels is likely to generate a biased sample (Mason and Harrison, 2008; Avdeitchikova et al., 2008). Our previous studies of angel groups

and individual investors (the authors, 2017) provided an initial sample of potential investors who had screened and invested in green/clean tech. At the end of the interviews participants were asked to suggest other investors who had also screened or invested in green/clean tech opportunities. An additional tool to identify potential participants was Twitter, as it provides information about the users interests and activities. Snowballing was a particularly effective strategy as it allowed the recruitment of participants who had co-screened green/clean tech opportunities[1] alongside other interviewees. Biernacki and Waldorf (1981) define snowballing as a way to contact a new participant via the network of others. This technique is not new to angel research (some examples: Botelho et al., 2019; Collewaert and Manigart 2016; Mason et al., 2017). Recruitment of non-green participants followed a similar process, as the single requirement was to have screened one or more green/clean tech opportunities, rather than having this type of investments in their angel investment portfolio.

The representative participant in this study is male (89%), with a university degree (93%), is a member of an angel group (80%), has been investing on average for 12 years and has 17 investments in their portfolio[2]. This profile is consistent with the characteristics of angel investors identified in other business angel studies of the UK market (e.g. BBB, 2020; Mason and Botelho, 2014) and other markets (Ali et al., 2017; Gvetadze et al., 2020).

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[1] According to Clift (1995, p. 321) clean tech is defined as "a means of providing a human benefit which, overall, uses less resources and causes less environmental damage than alternative means with which it is economically competitive".

[2] The first quartile of investors had 5 or less investments while the fourth quartile had 20 or more investments. In terms of years investing, investors in the first quartile have been doing so for 8 or less years, while investors in the fourth quartile had been investing for 21 years or more.

The 65 participants responded to a set of questions where they were asked for their views on green/clean tech investments. The interviews included a combination of open and closed questions. This Quintamensional Plan of Question Design (Gallup, 1947) is particularly useful when the study is designed to start with very broad set of questions and then move to more specific ones. The aim of such approach is to let participants freely express their views about a topic while allowing further exploration of topics with the closed questions. First, participants were asked a set of open-end questions focused on ethical and financial considerations and investment motivations. They were designed as open questions to enable participants to freely express their opinions, thereby reducing the risk of biasing the responses with the interviewee' attitudes and views (Vinten, 1995). Kintzer (1977: 38) has observed that "open questions offer opportunities to tell it as it is". Responses to these questions provided an understanding of how investors perceived the drivers of investing in green/clean tech. The answers were subsequently coded to understand what reasons investors gave for investing in green/clean tech. Second, participants were asked a set of closed questions that requested them to: (i) weight their investment motivations according to Sullivan and Miller's typology (1996) and (ii) to compare the expected return from green/clean tech versus the remaining portfolio. Kelley et al. (2003) suggest that closed questions are more appropriate for topics where the possible responses are known. By asking participants to compare green/clean tech investments to their general portfolio investments in terms of investment motivations and expected returns this study is able to understand what, if any, trade-offs investors consider when evaluating green/clean tech opportunities.

In the first step of the analysis the 65 participants were divided into four groups according to their experience of investing in green/clean tech. This typology considered the weight of green/clean tech in their portfolio as a means of identifying the relative importance of this sector to each investor. This weighting was measured in terms of number of investments[3]. Investment experience was measured by the number of investments made. This is a well establish approach in angel research as it assumes that the more exposed an investor is the more learning they will have accumulated from this activity (for more detail discussion see Botelho et al., 2021). Hence, we assume that the motives to invest in green/clean tech are influenced by the investment experience in this sector. This approach enables the actual behavior - that is, investment in green/clean tech - to be considered rather than aggregating the views of all participants without considering if they actually have performed the action. Reflecting the exploratory nature of this research this approach allows patterns to emerge within the groups (Jain et al., 1999). After grouping participants by the weighting of green/clean tech in their angel portfolios, the groups were then compared on the basis of investor characteristics (age, gender, education, SME and entrepreneurial experience) and investment experience (including years investing, number of investments, syndication and impact investment syndication). This approach enables a deeper characterization of each group while helping to evaluate whether the groups differ in a range of motivations (Mooi and Sarstedt (2011). Post hoc comparisons were made using the Scheffe test to evaluate the statistical difference across the four groups. This test was chosen as it is less sensitive to the assumption of homogeneity of variances between groups.

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[3] The composition of the groups did not change considerably if the choice of measurement was the amounts invested.

The open-ended questions on investment motivations were then independently coded by two of the authors following the Gioia method (Gioia et al., 2013).This approach was used because of its ability to identify original insights on how different actors perceive an event which, in this study, is how business angels, with different levels of green investment experience, view investing in green/clean opportunities. According to Gioia et al., 2013, this method was designed to enable the development of high-quality inductive research to enable researchers to rigorously generate new concepts. A coding scheme (Table 2) was developed to organize participants' reflection on their investment motivations about green/clean tech opportunity. Our analysis presents a procedural novelty as it the splits the data set into subsets to allow the particularities of each group to arise. The methodology assumes that in a socially-constructed world participants are knowledgeable individuals who can explain their actions, intentions and thoughts. As previously noticed, variation of investment experience impacts angels' industry knowledge, hence, to capture this specific expertise it is fundamental to apply the methodology to each of the four groups. This follows Goia et al. (2012) criticism of the lack of innovative use of the methodology. Ultimately, this method allows for theory building which is the aim of this research.

A four-step process was followed to code the data. The process was characterized by a high level of interaction with the data. First, each author read the interview transcripts several times and separately produced summary reports for each interview. Miles and Huberman (1994:89) note that this type of approach "not only aids definitional clarity but also is a good reliability check". The authors then used open codes to identify initial concepts within the data and grouped them into categories. These first-order concepts were then compared to identify how similar or distinct

these categories were (axial coding) (Strauss and Corbin, 1990). This approach enabled the first-order concepts to be grouped into second-order themes grounded in the angel investment literature (e.g. investment criteria, returns). In the final step, similar second-order themes were combined into broader aggregate dimensions (Gioia et al., 2013). To better illustrate our results verbatim "power quotes" (Gioia et al., 2013; Pratt, 2008) were employed (Ryan and Bernard, 2000). This approach resulted in a high intercoder agreement (Krippendorff's (nominal) $\alpha =$ 0.84). In cases of disagreement on the initial coding, both coders discussed the cases in order to reach agreement on the final coding. In a very small number of cases, where agreement could not be reached, a third author was involved to make a decision.

Table 2 ABOUT HERE

4. RESULTS

4.1. Profiling of angels on the basis of the weighting of green investments in their investment portfolios

The 65 participants were divided into four groups based on the weight of green/clean tech investments in their angel investment portfolios in order to capture the diversity of views amongst business angels on investing in green/tech opportunities (Table 3). The first group were those angels who had not invested in green/clean tech. They were older (average 61.6 years), highly educated and with higher entrepreneurial and SME experience. This group of angels also had the longest investment experience (22 years) and were less likely to belong to an angel group[4]. The second group of investors comprised angels who have invested in green/clean tech,

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[4] Both measure in angel groups and impact angel groups.

but these investments represented less than 50% of their portfolio. This was the biggest group

with 32 investors. On average, investors in this group had made three investments in green/clean

tech. These investors had the highest number of angel investments (average 23.6) and were more

likely to part of an angel group (91%). The third group comprised 14 participants whose

investments in green/clean tech represented between 50% and 99% of their angel portfolio. They

have the highest number of green/clean tech investments in their portfolios (9 investments).

What makes investors in this group distinctive is that they are more likely to have a professional

qualification and, on average, have the highest number of green/clean tech investments in their

portfolios (9 investments). The last group comprise angels who have invested exclusively in

green businesses. The representative investor in this group is male (100%), younger (average

51.6 years) and less likely to have entrepreneurial experience. Members of this group also had

the shortest angel investment experience (9 years), the smallest number of angel investments (6)

and, unsurprisingly, were more likely to belong to an impact angel group.

Table 3 ABOUT HERE

4.2. Motivations for investing in green/clean tech.

Participants were asked to give weights to each of the three investment motivations in Sullivan

and Miller's typology (1996). First, they were asked to give weights to their investment

motivations in their entire angel portfolio. Second, they were asked the same question for their

green/clean tech investments (Table 4). This was to identify whether angels have different

motivations for investing in green/clean tech. Table 4, which compares the motivation

weightings for making angel investments with those specifically for green and clean tech investments, indicates that this the case.

Economic motivations are the most important reason why angels invest. Angels who had not invested in green/clean tech were the most economically driven. They were the only group in which economic motivations accounted more than 50% of the reasons to invest. Altruistic motivations were the second most important motivation amongst all of the groups for making angel investments. The greater the weighting of green/clean tech in the portfolio the higher was the score for altruistic motivations. Hedonistic motivations were the least important by all four groups.

The relative importance of each of the three investment motivations remains constant when investing in green/clean tech (Table 4). However, participants did modify the weighting given to each of the three motivations. Those angels who invested solely in green/clean tech had the most significant variation (average 3 percentage points). When comparing green/clean tech investments with their angel portfolio, investors in this group gave a higher weighting to economic motivations and lower weightings to Altruistic and Hedonistic motivations. The opposite effect can be found amongst investors with 50% to 99% of green/tech investments in their portfolio: these investors have higher Altruistic (2.5 percentage points) and Hedonistic motivations (0.4 percentage points) and lower Economic motivations (-2.9 percentage points). Angels with 1% to 49% of green/clean tech in their portfolio had a lower variation (0.5 percentage points). Similar to the previous cluster, angels in this group gave a higher weighting to Altruistic motivations (0.5 percentage points). However, they also had lower weightings for

Economic (0.2 percentage points) and Hedonistic (0.3 percentual point) motivations. These variations suggest that business angels are driven by different reasons when investing in green/clean tech.

TABLE 4 ABOUT HERE

4.3. Green/clean tech investment motivations.

We have established that angels invest in green/clean tech investments for different reasons than their other investments. In this section we apply the Gioia method to understand the motivations of each of the four groups of investors either to invest, or consider investing, in green/clean tech.

Figure 1 shows the data structure for the group of angel investors who have not invested in green/clean tech. Angels in this group did not have Hedonistic motivations when considering Green/clean tech investment opportunities. This is not a surprising finding as their lack of investments in this sector would imply a smaller likelihood of *obtaining psychic income* that is derived from being involved in an entrepreneurial process. Altruistic motivations are represented by Environmental and Ethical second order themes. These themes reflect the willingness of these investors to make a positive contribution to the environment and do what they believe to be 'the correct thing to do'. The environmental concerns reflect Brettel's (2002) suggestion that angels invest because they want to support socially desirable products or services. Although the ethical dimension of angel investing has been identified in prior research it is not reflected the notion of one doing their part for the greater good. A second motivational dimension that underpins the inclination of this group of angels to invest in green/clean tech is Economic reasons. Angels

consider the financial return, the market and the opportunity itself as key economic drivers for investing. These factors have been widely discussed in the literature that has examined the investment criteria of business angels (e.g. Maxwell, 2016). In summary, this evidence indicates that angels who have not previously invested in green/clean tech would be likely to invest in this sector for a combination of Altruistic and Economic motivations. This group's motivation to invest in green/clean tech is reflected in this comment from one interviewee (C_8): *"Would I invest [in green/clean tech] just because it's got the word green attached to it? That's insufficient. I need to get my money back"*. For this group, even though investing in green/clean tech has the merit of helping the planet, the opportunity it has to be economically and commercially attractive.

FIGURE 1 ABOUT HERE

The second group comprised angel investors whose green/clean tech investments represented a minority of their investment portfolio, accounting for between 1% and 49% of their investments. Figure 2 shows the data structure for this group of angel investors. In contrast to the first group of investors, Hedonistic motivations are a key driver for this group to invest in green/clean tech. Issues associated with personal factors (for example: feeling good about themselves) and social reasons (for example: being involved with others) were identified as the two second-order themes. This can be understood as their desire for acceptance by others and by themselves. These broad themes have been identified in previous angel research; however, the focus on personal and social recognition for doing what is considered to be the 'correct' thing in a novel insight. With regard to Altruistic motivations, impact was identified as a new second-order theme.

Angels indicated that they were motivated to invest in green/clean tech because of their desire to generate specific societal impact. This second-order theme differs from the ethical theme because of its specificity, and from the environmental theme as it did not focus on eco-friendly benefits. Economic motivations were similar to the previous group. However, there was greater focus on market characteristics. Investors in this group were attracted by the future proofing of green/clean tech opportunities on account of their appeal to younger generations. In summary investors who have a minority of their portfolio invested in green/clean tech invest in this sector for a combination of motivations. The range of factors influencing their decision to invest in green/clean tech is summarized by one interviewee (C_{37}) as follows: *"It cannot be reduced to the feel-good factor. It needs to be something beneficial to society and justify me investing my money"*. Another interviewee (C_{33}) commented as follows: "*it helps behavior change, so by default it has to be a growth market, that's the first thing, and the second thing is ultimately it is actually doing something good for our planet and for our wallets*".

FIGURE 2 ABOUT HERE

The investment motivations of angels to whom green/clean tech represents the majority of their portfolio differs slightly from the drivers of the previous group. Figure 3 shows the data structure for this group of angel investors. First, angels in this group made no reference to the features of the green/clean tech opportunities. This lack of attention to the opportunity's features might be interpreted as indicating that these investors give more attention to the market rather than the opportunity: in other words, their main objective is to invest in a growing market. Although the second-order themes of the Hedonistic motivations were similar the focus is different. The

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previous group were motivated by the pursuit of acceptance both by others and for themselves. This group of investors emphasised the importance of being involved with others and in challenging activities. This was highlighted by one interviewee (C_{51}). who commented as follows: "*I think the kind of people that are involved tend to be quite motivated, they tend to be quite altruistic themselves, to a degree, they tend to want to do the right thing, and as investors the people are very important, so I think green investment attracts people that want to make a difference and that attracts us*". The Altruistic motivations of this group were similar to those of the previous group of investors, with a focus on environmental, ethical and impact themes. However, the distinctiveness of this dimension amongst this group of investors was their focus on generational concerns. These investors explained investing in green/clean tech as a way to protect future generations. One interviewee (C_4). stated that investing in green/clean tech is "*the way the world is going to go, in a sense you're swimming with the tide, but it's also the way the world has to go to protect the planet for future generations*". Another interview (C_{62}) commented as follows; "*Well first and foremost is society's requirement to become more in sync with the natural world and to even attempt to have our grandchildren live somewhere healthy we have to change, that's the key driver*".

FIGURE 3 ABOUT HERE

The last group of investors comprises business angels who have exclusively invested in green/clean tech opportunities. Figure 4 shows the data structure for this group of angel investors. This group of investors highlighted the same set of second order themes. Consistent with the previous group, these investors did not make any reference to the opportunity. Here

again this may reflect their primary focus on the market. However, their view on returns was centered on wealth generation rather than its ethical nature. One interviewee (C_{46}) commented as follows: "*I think that green investments are wrongly seen as being lower returns than a standard investment. I think that the reason I've decided to invest in this space is explicitly to give some of these businesses an injection of funding and experience and time to help them to grow and so I can achieve a big exit*". In terms of their Hedonistic motivations, this group differs from the previous group by seeking both the pursuit for acceptance by others and for themselves and also being involved with others. Regarding their Altruistic motivations, this group was less focused on the impact of green/clean tech on future generations and on the environmental effects associated with this type of investment, both of which are associated with improving the prospects of future generations who will be the main beneficiaries of the environmental impacts of green/clean tech. This rationalization might be linked to the strong market commitment by investors in this group. One interviewee (C_{29}) commented on the features of the market as follows: "*you could say actually it's a peace of mind investment, because you know that it's helping other people and helping society in general. I focus personally on green and not social impacts. Angel Group X and Angel Group Y [that I am a member of] are very much social impact focused with a bit of green, but personally I'm looking for green over the social impact so, yeah this is a future proof market*".

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FIGURE 4 ABOUT HERE

In summary, this analysis shows that the motivations of business angels to invest in green/clean tech businesses differ according to the size of their green/clean tech portfolio. These variations in

investment motivations are presented in Table 5 which shows the weights[5] for each of the second

order themes and aggregate dimensions. Angels in the four groups gave different levels of

importance to the aggregate dimensions. Economic motivations were considerably more

important for angels who had not invested in green/clean tech (60%) but were less significant to

the groups of investors that had invested in this sector (ranging from 46.7% to 34.6%). Similarly,

all second order themes varied across the four groups of investors. For example, whereas the

Impact theme was not mentioned by angels who had not invested in green/clean tech, it was

consistently cited by angels who had invested in the sector (between 18.3% and 15.4%).

TABLE 5 ABOUT HERE

These results provide a clear conceptual contribution to business angel investment motivation

literature. Our study confirms our initial assumption that, contrarily to Sullivan and Miller's

work (1996), business angels make investments for a combination of different factors. Moreover,

we show that, in the case of green/clean tech investments, motivations to invest will vary

dependent on how committed an angel is to this sector. This effect could potentially be

associated with what angels learn from their investments; in other words, the more exposed they

are to a particular sector the more knowledgeable they will be about it. Our findings also

introduce new concepts in business angel investment motivations. In particular, in terms of

Hedonistic motivations, previous angel research identified social responsibility as the willingness

to give back economic value to the society. Our findings indicate that business angels also aware

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[5] Calculated by the number of times a second order themes was stated over the total number of statements made by a particular group of investors. This procedure was also completed to the aggregate dimension.

of other dimensions of social responsibility, notably being eco-friendly and making investments

with impact. A schematic representation of our conceptualization is presented in figure 5.

Figure 5 ABOUT HERE

5. IMPLICATIONS FOR PRACTICE AND FUTURE RESEARCH

Our findings provide rich insights into the characteristics of business angels who have invested

or are willing to consider investing in green/clean tech businesses. Investors who have solely

invested in green/clean tech businesses are younger, male, and have less SME and angel

experience. They are also more likely to belong to angel groups that focus on impact investment.

This has implications for entrepreneurs, gatekeepers of angel groups, and policy makers. First,

green entrepreneurs should be aware of the potential trade-offs with this type of investor.

Specifically, because they have less SME and angel experience, they might be less likely to be

able to add value to their investee companies (Politis, 2008). Second, it suggests to the

gatekeepers of impact angel groups that they should tailor their recruitment efforts towards

younger and less experienced angels. However, this needs to be counter-balanced by the need

also to have experienced angels in the group. Lastly, if policy makers aim to increase the number

of green/clean teach investors then they should focus their interventions on seeking to convert

younger individuals into business angels.

Our findings also reveal that business angels have different motivations for investing in

green/clean tech businesses compared with other businesses. This has implications for

entrepreneurs, gatekeepers of angel groups and scholars. First, green/clean tech entrepreneurs

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should be aware of this difference so they can adapt their pitch and business plan accordingly. For example, entrepreneurs who are pitching to angels who solely invest in green/clean tech businesses should be aware that the investment motivations of these investors are likely to be more economically driven compared with other investors. Our findings also provide the gatekeepers of angel groups with a better understanding of what will make an investment more likely to be funded by the group's membership. Investors who had not invested in green/clean tech were the only who their motivations were not depend on the "greenness" of the opportunities. Those angels who have invested in green/clean tech put greater emphasis on Altruistic motivations and less emphasis on Hedonistic motivations.

Our findings also show that the motivations of business angels to invest in green/clean tech businesses vary according to the relative size of their green/clean tech portfolio. Entrepreneurs, gatekeepers of angel groups and policy makers need to be aware of the implications of this finding as once again it emphasises that not all green/clean tech angels are driven to invest in this sector for the same reasons. For example, impact investment is more relevant to angels who belong to groups two and three. Hence, regardless of the stakeholder's objectives, they need to modify their approaches to the specific groups they are trying to reach.

Our findings also open several research avenues. The first is returns. This second order theme was mentioned by all groups as a driver to invest in green/clean tech. However, by being a relatively new sector, only a small number of exits have occurred to date. Hence, future research should address the following questions. How easy is it to achieve exits from green/clean tech investments? What is the time to exit? What is the most likely exit route? And what is the rate of

return? How does this rate compare to the return of other businesses? The second topic is investment criteria. How do business angels screen green/clean tech opportunities? What are their key investment criteria for investing in green/clean tech opportunities? Are these criteria distinctive from other types of investment opportunities? What weighting do business angels give to the green credentials of green/clean tech opportunities when considering whether to invest? Do they require entrepreneurs to provide evidence for their likely impact on CO_2 emissions? And how detailed do they require this evidence to be? Third, as a new theme in angel research there is a need to consider impact. All green/clean tech investors recognise the importance of the impact that such investments have. But how do angels conceptualise and measure impact? Do they put greater emphasis on specific types of impact? How does green/clean tech rank in an impact portfolio? What are the characteristics of business angels that can better predict the likelihood of making an impact investment? Are all green/clean tech investments considered to have impact? Do angels recognise a hierarchy of impacts? Many of these research questions will require different approaches from those commonly used in the field so far.

6. CONCLUSIONS

Entrepreneurs will play a critical role in developing the innovations required to address climate change. But for them to do so requires that appropriate forms of finance are available. The money that is pouring into green and clean tech is being invested in large, later stage projects (The Economist, 2021). It is critical that there is sufficient funding at start of the entrepreneurial pipeline which is reliant on business angels. However, the willingness of business angels to invest in green/clean tech businesses and their motives for doing so have not been addressed by

the existing business angel literature and the SRI literature has not recognised them as a distinctive investor class. Unlike institutional investors who are under increasing societal pressure to invest in a socially and ethically responsible way (and which is a significant driver of the flow of institutional investment into 'climate tech') business angels are investing their own money and as invisible investors are not subject to public scrutiny and so have much greater discretion in what investments they make. Understanding the willingness of business angels to invest in green and clean tech businesses is therefore an important gap in both the business angel and SRI literatures and makes a key contribution to the development of policies to mobilise private capital to address the climate crisis.

Our research shows that, based on the Sullivan and Miller (1996) categorisation of business angel investment motivations, business angels who invest in green/clean tech businesses do so for a combination of altruistic, hedonistic and economic reasons. None of the angels in our study were motivated to invest in green/clean tech businesses exclusively for just one of these reasons. Posing the question whether business angels invest in green/clean tech "with their hearts or their wallets" is therefore a false dichotomy. This has implication for green/clean tech entrepreneurs that their investment pitch must go beyond the environmental benefit to attract the interest of business angels. Moreover, although the relative importance of each of these three investment motivations is similar for their overall investment activity and when investing in green/clean tech, angels do modify the weighting given to each of the three motivations when investing in green/clean tech. This suggests that business angels are driven by different motivations when investing in green/clean tech. Further, reflecting the heterogeneity of the business angel population, the motivations of angels for investing in green/clean tech or have considered doing

so are diverse, with the mix of motivations related to the weighting of green/clean tech investments in their investment portfolio. Specifically, angels who invest in green/clean tech are driven by different motivations compared with those who have considered but never invested in this sector.

This paper is the first focused study of 'green' business angels. The need for innovative solutions to address climate change – and key role that entrepreneurial finance plays – highlights the clear need for further research from an entrepreneurship perspective. We hope that our findings provide a stimulus for further research that will add new perspectives to our understanding of the early-stage financing of green/clean tech businesses. To this end, we have posed several research questions on business angel investing in green/clean tech that arose from our research which require the attention of scholars.

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[i] The research looked at CIGALES, a very specific venture capital structure (club) that enables their members (from 5 to 20) to aggregate their monthly savings (typically around 30€ to 50€) to invest the aggregate saving in local ventures. The club has a life expectance of 5 years, after this it will be proceed to liquidation of his portfolio with the "profits" being shared across members in proportion to their contribution (see more in http://cigales.asso.fr/spip.php?rubrique06).

[ii] Financial and Consequentialist investors' main motivation is financial since both use financial rewards as incentives. Deontological investors' main motivation is personal alignment while Expressive investors want to do "good