ROLE OF EVOLVING WEB TECHNOLOGIES IN THE DISCOVERY OF ENTREPRENEURIAL OPPORTUNITIES IN TECHNOLOGY-BASED ORGANISATIONS

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Abstract

Information and communication technologies are inspiring and enabling entrepreneurial endeavours yet our understanding of how entrepreneurial opportunities are discovered, especially influenced by the web technologies, is limited. The advent of web technologies (especially Web 2.0 and Web 3.0) has enabled the creation of internet giants such as Facebook and Twitter on one hand, while empowered the existing online businesses such as Amazon and eBay on the other. However, there is limited research that investigates the role of web technologies for entrepreneurial opportunities discovery (EOD).

The findings of a systematic literature review reveal that prior EOD research has mostly investigated different factors such as prior knowledge, social capital and systematic search in isolation. Most of these studies did not investigate the role of technology in EOD indicating a dearth of research.

The study used qualitative multiple case studies research methodology including semi-structured interviews, informal observations and archival review to collect data. The qualitative case study methodology was chosen because little was known about the phenomenon under investigation, and the purpose of the study was to develop a theory of entrepreneurial opportunity discovery in the context of web technologies.

The research findings revealed several factors that influence entrepreneurial opportunity discovery in technology-based organisations and shed light on the enabling role of web technologies for EOD. The extensive data and information accumulated on the web can be exploited by companies to find entrepreneurial opportunities. The findings of present research can stimulate and encourage the use of web technologies for EOD, which has so far not been used to its full potential.

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1. INTRODUCTION

The research presented in this thesis focuses on the investigation of factors that contribute the entrepreneurial opportunities discovery (EOD) in technology-based organisations. It also focuses on the role of web technologies for EOD. I used the theory of entrepreneurial opportunity (Ardichvili et al., 2003; Shane, 2000; Shane and Venkataraman, 2000) to develop a tentative conceptual framework for this research investigation. The theory of entrepreneurial opportunity has been extensively investigated, and several factors have been identified that influence EOD (see Grégoire et al., 2015 for a review).

Technology-based organisations are referred to organisations where evolving web technologies play a vital role in the delivery of services and related business models are in place, and where web technologies play an essential role in EOD. Web technologies are referred to the second stage of development of the Internet, characterised especially by the change from static web pages to dynamic or user-generated content and the growth of social network.

I conducted a systematic literature review (SLR) to identify relevant literature. The findings of SLR reveal that prior research has mostly investigated different EOD factors such as prior knowledge, social capital and systematic search in isolation. Also, most of these studies did not investigate the role of technology in EOD indicating a dearth of research (Jia et al., 2017; Susa et al., 2018). Another interesting finding of the SLR is that the focus of prior research that investigates the role of web technologies for EOD has been mainly on its influence through the mediating role of other factors such as prior knowledge and social capital (Park, 2005). However, there is little research that investigates factors related to EOD for technology-based organisations, particularly the role of web technologies for EOD (Park, 2005; Grégoire and Sheperd, 2012; Grégoire et al., 2015; Richter et al., 2017). This research addresses this gap.

Specifically, the following research questions have been investigated in this study:

(1). What are the factors that contribute to the entrepreneurial opportunities discovery for technology-based organisations?

(2). What is the role of web technologies in the entrepreneurial opportunities discovery for technology-based organisations?

I used an inductive multiple case study methodology to investigate the phenomena in the context of technology-based organisations which use web technologies to support their businesses and transform their processes. The study used inductive multiple case studies research methodology including semi-structured interviews, informal observations and archival review to collect data. The inductive case study methodology was chosen because little was known about the phenomenon under investigation, and the purpose of the study was to develop a theory of entrepreneurial opportunity discovery in the context of web technologies.

The research findings revealed several factors that influence entrepreneurial opportunity discovery in technology-based organisations and shed light on the enabling role of web technologies for EOD.

The findings of present research can stimulate and encourage the use of web technologies for EOD, which has so far not been used to its full potential as identified by Karakas and Manisaligil, 2012; Jia et al., 2017; Richter et al., 2017).

This introductory chapter is structured as follows: after describing the structure of this thesis (section 1.2), the main concepts involved in this research are defined; these include an introduction to web technologies (section 1.3), discussion on entrepreneurial opportunities discovery (section 1.4), and a summary of the research contributions (section 1.5).

1.1 Thesis Structure

This thesis is structured to be consistent with the inductive approach advocated by Huff (2008), and with the steps proposed for building theory from multiple case studies (Eisenhardt, 1989; Stake, 2006).

Figure 1.1 provides a summary of the structure of this thesis, and the main outputs of each chapter.

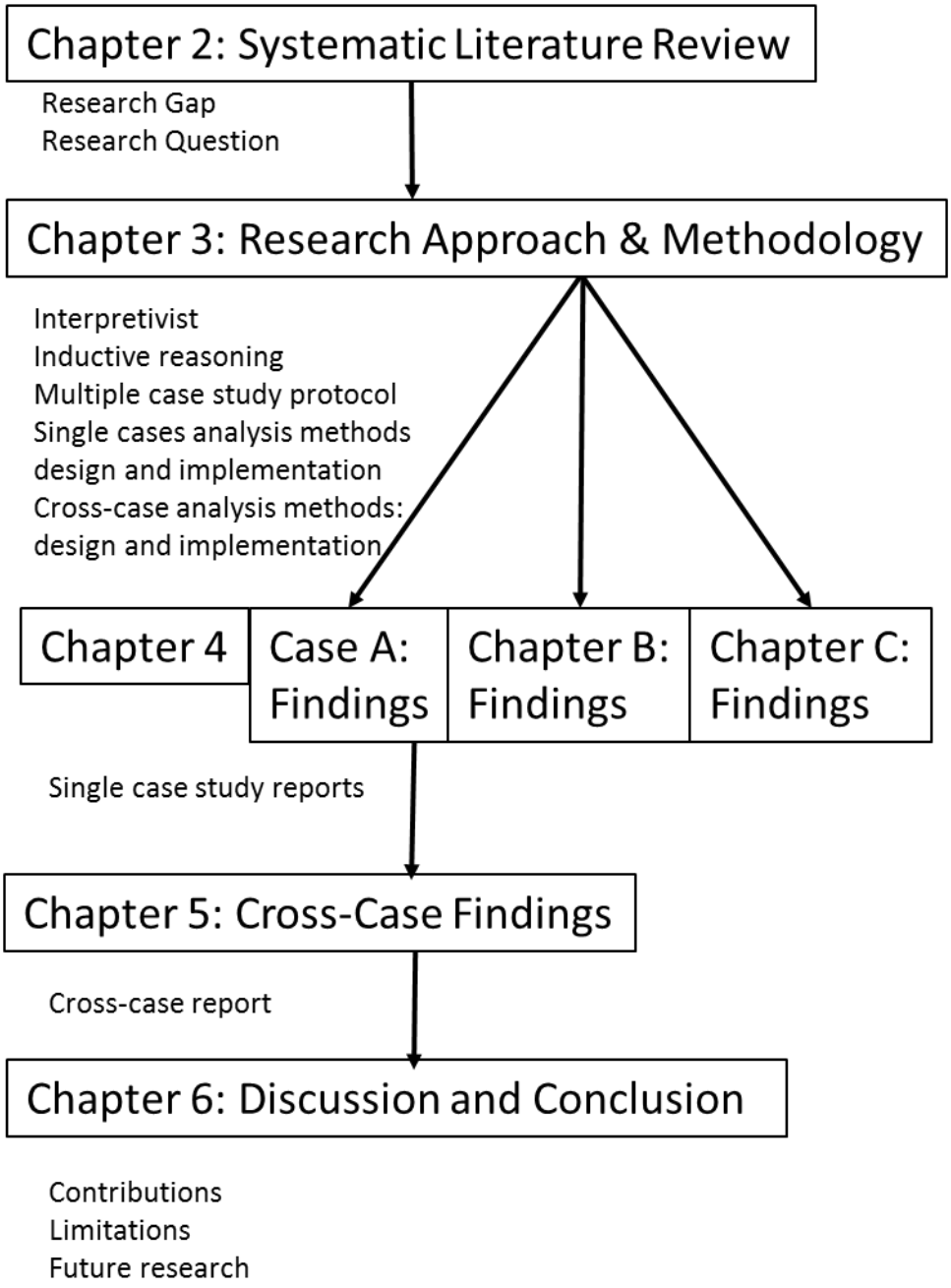

Figure 1.1: Structure of the thesis

As shown in Figure 1.1, Chapter 2 is dedicated to the systematic literature review (SLR) undertaken for this study. Because of the inductive nature of this research, this review focused on identifying research efforts regarding contributions to the technology entrepreneurship literature. In other words, in order to minimise the risk for inductive researchers of extensively considering the literature at the early stage of the process, the SLR study had the primary objective of mapping contributions to the field of interest and identifying opportunities for implementing a research effort. Chapter 2 also introduces the identified research gap, and the research question formulated for this study.

Chapter 3 outlines the approach taken and the methodology designed for this research. This chapter is divided into four main segments. The first one is dedicated to the philosophical underpinnings of this research, and the critical choices regarding adopting inductive reasoning through a qualitative approach to data collection and analysis. Subsequently, a comparison and reflection of methodologies that are acknowledged to be suitable with these decisions are provided. This led to the identification of multiple case studies as the methodology for investigating the research questions. This first section of the chapter is concluded with reflections on the role entrepreneurship theories across the stages of this inductive study. The following segment outlines the actual methodology design and implementation. In particular, it is dedicated to the multiple case study protocol, the cases' selection criteria, the data collection techniques employed, and to aspects of the reliability of this research. The third segment of Chapter 3 focuses on the data analysis approach concerning cases.

Chapters 4 provide analysis and results of the data collected for the three individual cases. This chapter provides details of data sources for all three cases, followed by the data analysis techniques used to analyse the data. Finally, the chapter presents a within-case analysis of the three cases.

The findings are derived from the interview data, observations and archival data. The archival data was collected through the organisation's documentation available publicly and on their websites.

This research investigates the understanding of the role of web technologies for EOD in technology-based organisations.

In Chapter 5 the cross-case findings are discussed concerning the two academic conversations tackled by this study. The inductive findings from this research are positioned within the existing literature on technology entrepreneurship as well as within those relevant theories proposed about entrepreneurship.

In Chapter 6, I discuss the confirmatory results of this research as well as new theoretical insights indicated by the results. I also discuss managerial and policy recommendations based on the findings of the current research. This thesis ends with a discussion of the limitations of this study and future research directions.

1.2 Entrepreneurial Opportunity Discovery

An entrepreneurial opportunity has been defined as “a situation in which a person can create a new means-ends framework for recombining resources that the entrepreneur believes will yield a profit." (Shane, 2003, p.18). There are two views on opportunities either being created or discovered. One view is that opportunities exist out there and they have to be discovered by entrepreneurs (Kirzner, 1973). The other view suggests that opportunities need to be created (Schumpeter, 1934).

The opportunity discovery view suggests that opportunities objectively exist (Shane, 2000) and come into existence as a result of technological invention or advancement, or a change in customers' preferences (Shane and Venkataraman, 2000). It further suggests that entrepreneurs are different from other people regarding possessing several attributes necessary to discover opportunities (Kirzner, 1973). The opportunity creation view suggests that opportunities do not exist on their own; instead it is the entrepreneur who creates them (Busenitz, West, Shepherd, Nelson, Chandler and Zacharakis, 2003). It further suggests that the entrepreneur brings together resources and competencies to create an opportunity (Alvarez and Barney, 2010). In the context of current research (i.e., the role of web technologies for EOD), opportunity discovery and creation go hand in hand.

1.3 Web Technologies and Evolution

The fundamental characteristic that made the World Wide Web (WWW or Web) popular is its universality. Hyperlinks enable its universality. "The power of a hyperlink is that anything can link to anything" (Berners-Lee, Hendler and Lassila, 2001, p. 3). The first version of the web enables us to publish any information that we want on the web so that people can read it. The second version of the web enabled us to write to the web, which in turn led to several possibilities such as social networks. The third version of the web enabled us to execute simple software programs over the web. This evolution of the web is of immense importance and led individuals and organisations around the world start using it for personal and business use (Susa et al., 2018).

Rudman and Bruwer (2016) argue the evolution of the web has caught many organisations off guard. Organisations must be ready and acquire knowledge about the opportunities and challenges arising from web technologies, and in particular, anyone in the information technology data and management industry.

At present, there are several ways in which individuals and organisations are using the web. Individuals and organisations are using Web for marketing, getting quick feedback, testing their new products or ideas and even recruiting the most suitable candidates. For some organisations, the Web is at the heart of their operations and a primary source of revenue (Newman et al. 2016, Cabada et al. 2018).

Berners-Lee et al., (2001) proposed the future of Web as an enabler of the complex software programs to be run over the Web that would allow software programs to roam "… from page to page….[to] carry out sophisticated tasks for users" (p.2). The web had achieved this capability a decade after this proposition. Shaughnessy (2010) proposed nearly a decade ago that evolution in Web will allow us to run software programs over the Web that can identify patterns in the online content and "…help us understand the extensive idea flow created by the Web" which can "help strategists understand how people are responding to changes and take action based on it" (p.2). Today's web has achieved this capability. Valaei and Reaei (2017) research found out evolving web's utilisation influences business entities' sense-making activities in the way they realise the intrinsic

value of knowledge and take action to apply the organisational knowledge. This in turn yields multi-faceted opportunities for organisations.

The current state of the evolution of Web can be summed up as follows; Web is "Highly specialised information silos, moderated by a cult of personality, validated by the community, and put into context with the inclusion of meta-data through widgets. While information silos are Web 1.0, community validation is a characteristic of Web 2.0, and contextuality (or "semantic") via metadata is a feature of Web 3.0 (cf Nayar, et al., 2013, Rudman and Bruwer, 2016). Figure 1.2 shows evolution of Web from Web 1.0 to Web 3.0.

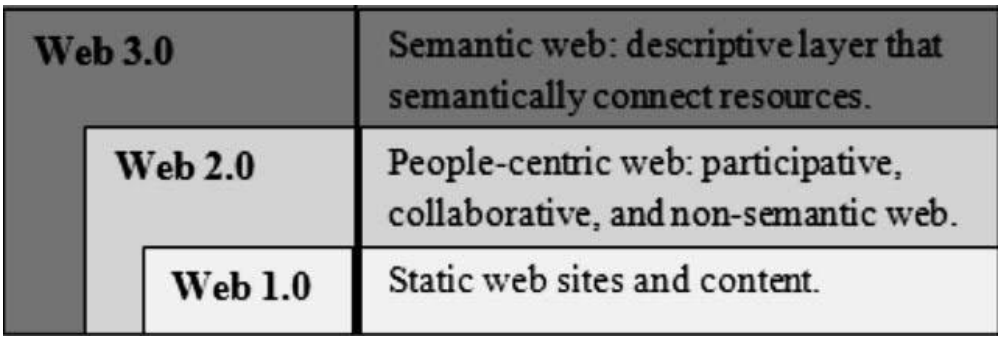

Figure 1.2: Evolution of Web

The web technologies can infer relationships between heterogeneous data in different social software applications and create business intelligence from that automation process, as argued by Chao (2016) and Kumar and Babu (2011). This productive and meaningful information has the potential to enable automation and reuse of data across various applications, and as a result, use it for business purpose. In short, the web has become so ubiquitous that it cannot be avoided, whether at an individual or organisational level. More importantly, it offers several new avenues to explore entrepreneurial opportunities. However, despite the vital role of the web in businesses, there is little research that investigates its role for EOD.

1.4 Research Contribution

In summary, this research investigates the factors that contribute to the discovery of entrepreneurial opportunities for technology-based organisations as well as the role of web technologies for EOD. This study makes several theoretical and managerial contributions.

On theoretical front, it contributes to the theories of plural occupational identities (Leavitt et al., 2012), entrepreneurial perceptions (McMullen and Shephard, 2006), entrepreneurial culture (Ireland et al., 2003), entrepreneurial cognition (Mitchel et al., 2007) and prior knowledge (Shane, 2000). This research also sheds light on the enabling role of web technologies for EOD especially by indicating that the use of web technologies can directly influence entrepreneurial alertness, prior knowledge and the pursuit of continuous learning. The results of the current research also indicate that the use of web technologies moderates the relationships between collaboration and EOD and market reach and EOD.

The results of the present research indicate that plural occupational identities positively affect entrepreneurs' cognitive ability and divergent thinking. The results also indicate that entrepreneurial perception is a multi-faceted construct and variables such as entrepreneurs' ability to perceive their surroundings, reflect on new information and understand strategic planning are crucial for entrepreneurial perception, particularly for technology-based organisations. This research also makes important contributions to the theory of entrepreneurial culture. The results reveal several factors related to entrepreneurial culture that can positively influence EOD either directly or indirectly. These factors include using web technologies to share knowledge, physical setup, physical resources, positive organisational environment, moral encouragement and physical environment.

This research also makes several managerial contributions. The first managerial contribution relates to selecting the type of personnel that would be involved in the entrepreneurial process within an organisation. This, by indicating that apart from other individual attributes reported in prior research attributes such as divergent thinking, entrepreneurial perception, inclination to be involved in the pursuit of continuous learning and prior knowledge of anticipated customers' needs are critical especially for technology-based organisations. The second managerial contribution relates to improving entrepreneurial culture of an organisation. The findings of this research suggest that organisations can increase the quality and quantity of identifying new opportunities by conducting design thinking type of seminars on a regular basis. The third managerial contribution relates to the approach of an organisation to external pressure. The findings of this research suggest that

organisations should perceive external pressure positively and every instance of such pressure should be perceived as an opportunity to improve their business processes.

Finally, the fourth managerial contribution relates to the advantages of using web technologies to not only facilitate several other important factors that influence the process of EOD but also that in some instances the use of web technologies may lead to the identification of new opportunities. For example, organisations can use web analytics to identify patterns from their customers' feedback regarding their products and services (Mitr et al., 2017; Zhuang, Liu, Shen and Reid, 2017) to see which aspects of their products or services need improvement. The findings of such web analytics can also lead to the identification of completely new set of services (Susa et al., 2018; Cook, 2017).

2. SYSTEMATIC LITERATURE REVIEW

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This chapter presents the conceptual background for the current research. It aims to (i) identify pertinent factors for entrepreneurial opportunity discovery (EOD); (ii) review prior literature on the role of web technologies for EOD; and (iii) based on the review's findings; propose a tentative conceptual framework on the interaction of technology and other pertinent factors for EOD. The tentative conceptual framework presented in this chapter was used as a launch pad for the remainder of the thesis. Reviewing literature in the field of technology entrepreneurship is challenging due to its fragmented nature, as pointed out by several studies (Shane, 2000; Park, 2005; Grégoire et al., 2015). Research on technology entrepreneurship is going on for decades but research on evolving web technologies is comparatively new. Therefore, I reviewed literature as far back to 1960s to understand theories of technology entrepreneurship. Considering the emergent nature of the web technologies research area, I reviewed literature between 2001 and 2018.

The chapter proceeds as follows. Section 2.1 discusses the theoretical origins of entrepreneurial opportunities and provides the view adopted by the current research. Section 2.2 concisely describes web technologies including their usefulness in modern businesses. Section 2.3 provides a systematic literature review (SLR) and a summary of its findings. Section 2.4 provides a tentative

conceptual framework by synthesising the findings of the SLR. Finally, Chapter 2 concludes with a summary.

2.1. Theoretical Origins of Entrepreneurial Opportunities

An entrepreneurial opportunity has been defined as "a situation in which a person can create a new means-ends framework for recombining resources that the entrepreneur believes will yield a profit" (Shane, 2003, p.18). The concept of entrepreneurial opportunity is a crucial concept within entrepreneurship research (Blenker, Philipsen and Damgaard, 2005). Two theoretical approaches, Neoclassical Equilibrium and Austrian theories, provide different assumptions for the economic origins of entrepreneurial opportunities. These approaches are explained in the next sections.

2.1.1. Neoclassical Theory of Entrepreneurial Opportunities

Neoclassical theory of entrepreneurial opportunities posits that markets are in perfect equilibrium and there are equal chances for everyone to discover entrepreneurial opportunities (Khilstrom and Laffont, 1979). It further proposes that "... no one can discover a misalignment that would generate an entrepreneurial profit because, at any point in time, all opportunities have been recognised and all transactions perfectly coordinated" (cf, Shane, 2000, p.449). Further, according to neoclassical theory, the discovery of entrepreneurial opportunities is a personal attribute of an entrepreneur who possesses a higher taste for uncertainty; whereas people who possess a weaker taste for uncertainty usually prefer to become employees. In neoclassical theory's context, a perfect market is where (1) many buyers and sellers with no decisive influence on market prices, (2) prices determined by the markets themselves, (3) products and services that are substantially equivalent but different in price, and (4) buyers and sellers who have access to full market knowledge and transactions. The neoclassical theory is interesting in the context of evolving web as we see how e-businesses grew in the last decade and how multiple entrepreneurial opportunities emerged as the web evolved.

2.1.2. Austrian Theory of Entrepreneurial Opportunities

The Austrian theory of entrepreneurial opportunities posits that it is the disequilibrium that leads to the discovery of entrepreneurial opportunities (Kirzner, 1997). It further proposes that different

people have different sets of knowledge, and it is the knowledge of people which lead them to discover opportunities even when they are not actively engaged in the process of discovering entrepreneurial opportunities (Shane, 2000). People who possess idiosyncratic information can identify opportunities which others cannot see. Table 2.1 provides a summary of key differences between Neoclassical and Austrian theories of entrepreneurial opportunities as identified from the literature. As opposed to neoclassical theories, the Austrian theories are pro-entrepreneurship and argue that innovation capability or entrepreneurial opportunity identification is the key driving force for new goods and services. They emphasise that markets are in the state of constant disequilibrium, dynamic competition and entrepreneurs' knowledge and the relevant knowledge not equally distributed. The Table 2.1 shows key differences between Neoclassical and Austria theories of EOD.

Table 2.1: Key Differences between Neoclassical and Austrian Theories of EOD

Neoclassical Theory	**Austrian Theory**
Markets are in a state of constant equilibrium	Markets are in a state of constant disequilibrium
Markets are characterised by perfect competition	Markets are characterised by dynamic competition
Everybody would have equal chances to discover entrepreneurial opportunities	It is entrepreneurs' knowledge that would determine who will discover entrepreneurial opportunities
Relevant knowledge is equally distributed	Relevant knowledge is not equally distributed

2.1.3 My Approach to the Theory of Entrepreneurial Opportunities

I adopt the Austrian theory approach (along with a few assumptions relaxed following Renko and Shrader, 2012, explained next) in this study for several reasons. First, I believe that unlike Neoclassical theory, it is inevitable that in the context of web technologies, information asymmetry will always exist (Kirzner, 1973), because of the rapid technological advancements and hence, it

would always be the case that all opportunities may not be evident to all entrepreneurs. Second, I believe that apart from individual attributes of an entrepreneur, several other factors such as prior knowledge of markets, web technologies and related technologies and the ways in which that knowledge could be used to serve people, customers and also to run organisational functions more effectively, also play a vital role in EOD - an approach supported by Austrian theory. Third, unlike neoclassical theory, Austrian theory suggests that any entrepreneur can develop a required skill-set and knowledge to discover entrepreneurial opportunities. However, it is also true that in the context of the role of technology in EOD, it may not be possible for one entrepreneur to see all the opportunities that the particular technology can offer (Shane, 2000). Finally, the concept of 'information asymmetry' offered by Austrian theory is perfectly in alignment with the context of this study - the role of web technologies for EOD. The pace at which Web technologies and the ways in which they can be implemented is fast that is leading to a high level of information asymmetry. It is not possible for an entrepreneur to gain knowledge of all the available Web technologies and the ways they can be implemented.

Following Renko and Shrader (2012), I argue that that unlike Kirzner's position that entrepreneurial opportunities may be accidental, an entrepreneur can discover opportunities by actively engaging in opportunity search – a position supported by other scholars (e.g., Fiet et al., 2004; Murphy, 2011). Also, unlike Kirzner's position that knowledge must be acquired through interactions with the market; I argue that such knowledge can also be acquired through other sources such as research and social networks. Other scholars also support the position taken in this study (e.g., Shepherd, 2011; Shrader and Hills, 2003).

Next section describes two prevailing views on whether entrepreneurial opportunities are discovered or created and concludes with the approach adopted in this study and the rationale for adopting the approach.

2.1.4 Opportunity Discovery vs Opportunity Creation

There are two views on opportunities either being created or discovered. One view is that opportunities exist out there and they have to be discovered by entrepreneurs (Kirzner, 1973). The other view suggests that opportunities need to be created (Schumpeter, 1934).

The opportunity discovery view suggests that opportunities objectively exist (Shane, 2000) and come into existence as a result of technological invention or advancement, or a change in customers' preferences (Shane and Venkataraman, 2000). It further suggests that entrepreneurs are different from other people regarding possessing several attributes necessary to discover opportunities (Kirzner, 1973). The opportunity creation view suggests that opportunities do not exist on their own; instead, it is the entrepreneur who creates them (Buenstorf, 2007). It further suggests that an entrepreneur brings together resources and competencies to create an opportunity (Alvarez et al., 2013; Cook, 2017).

Hansen et al. (2016) reviewed how researchers defined and operationalised entrepreneurial opportunity discovery and opportunity-related processes in order to better understand what they really mean when they say 'entrepreneurial opportunity'. They found a total of 102 definitions and 51 operationalisations from 105 articles published in leading entrepreneurship and management journals. There is much debate in the literature on entrepreneurship about entrepreneurship opportunities. There was also a lack of construct clarity. These two problems combined to undermine progress in understanding this important phenomenon. Foss and Klein (2017) also suggest theories of opportunities creation and discovery is complimentary rather than contradictory.

I argue that a technological invention or advancement can lead to both opportunity discovery as well as creation. For example, the invention of iPad can be argued to be an example of opportunity creation as the company had to bring together its resources and competencies into this invention. However, just inventing the iPad was not going to bring any profits. The company should have some implications in mind that could generate revenue. However, use of the iPad by several businesses to improve the performance for their processes suggests that the iPad as a technological invention led many entrepreneurs to discover opportunities, which is entirely in alignment with the opportunity

discovery view. Scully (2016) argues that the technologies emerged and converged to create the tablet computer and social network technologies and the iPad is at the centre of this new computing movement.

Specifically, I argue that in the context of current research (i.e., the role of web technologies for EOD), opportunity discovery and creation go hand in hand. The opportunity creation view argues that new technology is created with an opportunity in mind (Mckelvey et al., 2015). However, I argue that it may not be the case in all situations. For example, the search engine companies at the start did not know how to generate revenue from their online search engine services.

They created the search engine with two objectives in mind – one, that the results should be produced in the shortest time possible; two, that the results should be the most relevant (i.e., displayed on the Web in an orderly fashion based on their relevance), (Teece 2018). However, now look at the different implementations of search engine companies that led several businesses to prosper apart from them. Their business model now involves giving away search services to consumers and earning profits through targeted advertising services, data collection, and the sale of data (Teece, 2018).

Similarly, the social network companies did not know how to generate revenue at the start, but now hundreds of businesses are using social media for their business processes. With more than a billion active daily users, they work with data collection and help marketers to easily and economically reach their target group - advertisements as the primary source of revenue Srnicek (2017).

Therefore, I argue in the context of the role of web technologies for EOD, opportunity creation and discovery complement each other. The view adopted to reconcile both opportunity discovery and creation views is also in alignment with other prior literature (e.g., Renko and Shrader (2012) and Teece (2018). Renko and Shrader (2012) note that "...a single entrepreneurial opportunity can encompass objective [opportunity discovery view] as well as subjectively [opportunity creation view] perceived entrepreneurial outcomes" (p.1234).

Based on the above discussion, opportunity discovery and creation, in the current research, are used synonymously. However, for the clarity of the argument, I have used opportunity discovery throughout the thesis.

2.2. Social Networks

Social networking is the use of web-based social media sites to stay connected with friends, family, colleagues, customers, and clients. Social networking can have a social, business or both feature. The extensive data and information accumulated on the social network can be exploited by companies to find entrepreneurial opportunities (Chao 2016). In order to remain competitive, technological trends must be kept up -to -date.

The fundamental characteristic that made the World Wide Web (WWW or Web) popular is its universality. Hyperlinks enable its universality "The power of a hyperlink is that anything can link to anything" (Berners-Lee, Hendler and Lassila, 2001, p. 3).

The first version of the Web enables us to publish any information that we want on the Web so that people can read it. The second version of Web-enabled us to write to the Web, which in turn led to several possibilities such as social networks. The third version of Web enables us to execute simple software programs over the Web and as a result led to social network to grow exponentially. This evolution of the Web is of immense importance and led individuals and organisations around the world start using it for personal and business use.

The Web is maturing in a unique way. From the static informative features of Web 1.0, the interactive experience provided by Web 2.0 has progressed. Web 3.0 is already in the next phase of Web evolution. Web 3.0 involves an integrated web experience in which the machine can understand and catalogue data in a human - like way. This will facilitate a global data warehouse where any data format can be shared and understood through any network by any device.

A research project conducted by McAfee in 2010 to predict web's future reported several vital facts on the use of social network around the globe (McAfee, 2010). The authors surveyed more than 1,000 decision makers in 17 countries across the globe. They also conducted expert and in-depth

interviews to get deep insights into the use of social network in organisations. The findings of the report suggest that 3 out of 4 organisations use social network for different business processes. The reason behind the adoption of the social network has been reported by the two-thirds of respondents to be its potential of generating new revenue streams. At present, organisations are using social network for marketing, getting quick feedback, testing their new product or ideas and even talent hunting Cabada et al. (2018). For some organisations, Web is their primary source of revenue (Newman et al., 2016).

The evolution of the Web has brought forth new set of opportunities and challenges (Cabada et al., 2018). The evolving web is recognised as the fastest growing medium of publication ever. Rudman and Bruwer (2016) argue the exponential growth of social network has caught many organisations off guard. Organisations must be ready and acquire knowledge about the opportunities and challenges arising from social network, and in particular anyone in the information technology data and management industry.

2.3. Systematic Literature Review

I conducted a systematic literature review (SLR) to review relevant prior studies for the current research. I chose to conduct SLR for several reasons. First, to ensure that literature review is complete and thorough as argued by Briner et al. (2009) who suggested that because traditional literature reviews, particularly in information management studies, lack rigour and evidence, SLR is a more appropriate approach to ensure methodological rigour and make the research robust (also see, Briner et al. 2009; Denyer and Tranfield, 2009; Petticrew and Roberts, 2006). Reviewing literature in the field of information management is challenging due to its fragmented nature, as pointed out by several studies (e.g., Couglan et al., 2008; Denyer and Tranfield, 2009; Kitchenham et al. 2004). Therefore, it is more appropriate to conduct SLR to make the review robust and transferable. Finally, I wanted to use explicit criteria to locate, select, filter, extract and synthesise the relevant research to identify any gaps in the current research as suggested by Cronin et al. (2008).

Systematic literature reviews use a set of an explicit selection criteria to assess the relevance of each study located (Petticrew and Roberts, 2006; Denyer and Tranfield, 2009). The selection process aims to delimit the subject area, explicit criteria to include relevant research and justify the selection decisions and to incorporate multiple concepts, constructs and perspectives (Kitchenham et al., 2004; Boaz and Ahyby, 2003; Denyer and Tranfield, 2009). Figure 2.1 illustrates the process map of the SLR.

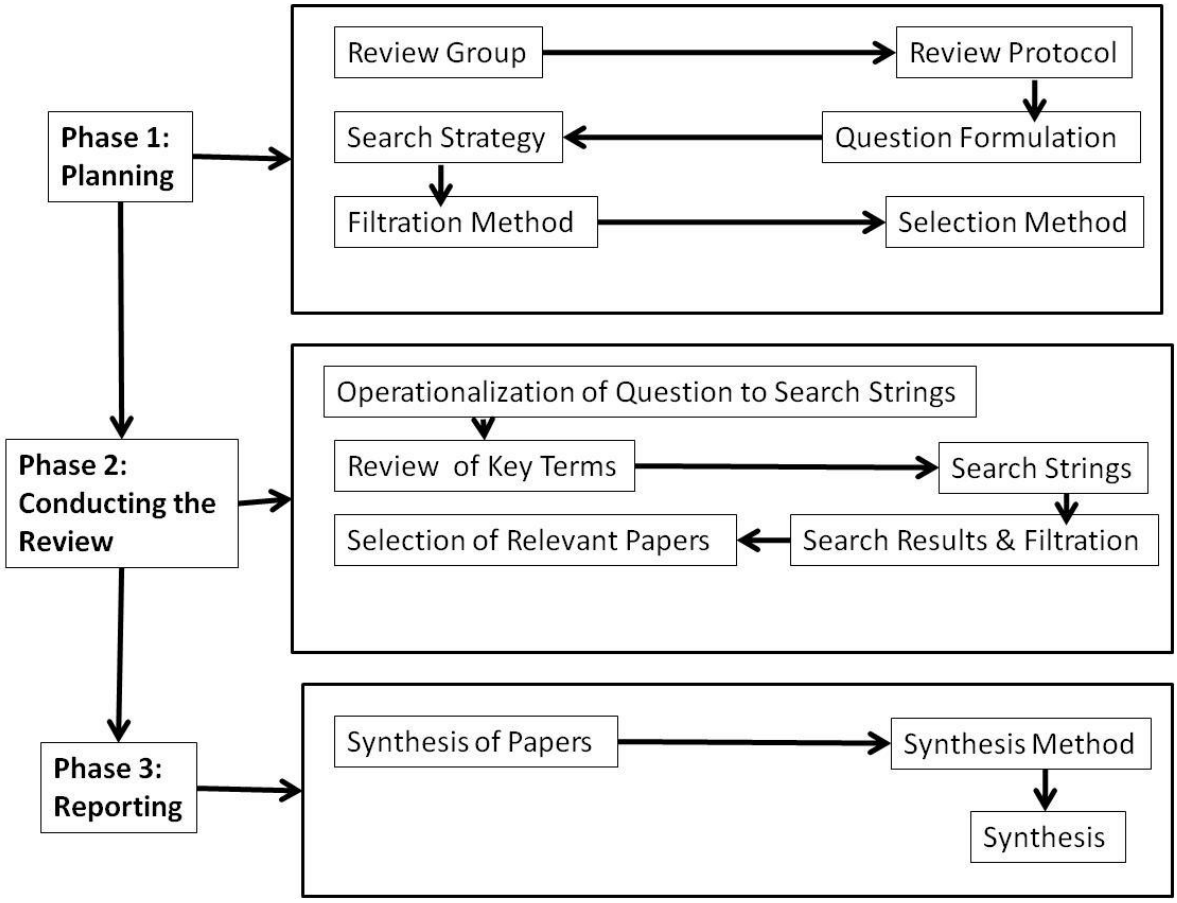

Figure 2.1: Process Map of the Systematic Literature Review for the Current Research

The next sections provide details of the process map for the SLR.

2.3.1 Planning the Review

At this stage of the research, a review group for this review was assembled. A review question was re-formulated, and the review protocol was made which included formulating a search strategy, filtration method for searches and selection methods.

2.3.1.1. Review group

Different people may have different ideas on a research topic and interpret the research problem within different theoretical and ideological perspectives. Involving different users in a systematic review is vital as implicit ideas of different people enable effective decision making for the research problem (Petticrew and Roberts, 2006). To make systematic review robust, practitioners, information scientists, policymakers and academics can be a part of the review (Denyer and Tranfield, 2009). The review group for the SLR in this study consisted of experts from diverse backgrounds such as academics and practitioners from relevant areas. Appendix 1 provides the details of experts involved in the review group and the rationale of why they were chosen.

2.3.1.2. Review Protocol

The review protocol activities included: formulating a review question, defining the search strategy and making filtration and selection methods.

(1). Formulating a review question

After consultation with the review group, it was decided that a revised review question should be formed based on specific criteria for formulating a review question. Higgins and Greens (2006) argue that a well-formulated review question in medical science should have four criteria termed as PICO [Problem, Intervention, Comparison, and Outcome]. Petticrew and Roberts (2006) support PICO for social science but argue that Higgins and Greens (2006) approach, though useful, lacks the appropriateness in social science Pawson (2006) argues well-formulated review questions in management and information systems need to consider the circumstances in which relationship occurs and why or how they occur. Extending the work of Petticrew and Roberts (2006) and Higgins and Greens (2006), the PICO criteria for a review question was reformulated into a CIMO model [context, Intervention, mechanism, and outcome] by Denyer and Tranfield (2009). The extended CIMO model made the criteria more explicit by stressing mechanisms as the relationship between intervention and outcome, an approach missing in the earlier PICO model. This criterion is relevant in the development of the review question for this research as it has both context and a mechanism

of research which was missing in the earlier approach discussed above. Another reason for using CIMO criteria to develop the question was because it does not address population, instead its primary focus is on investigating the impact of web technologies on EOD. The review questions below had all four criteria developed; intervention, mechanism, context and outcome:

Review Question 1: What are the factors that influence the discovery of entrepreneurial opportunities for technology-based organisations?

Review Question 2: How web technologies influence the discovery of entrepreneurial opportunities?

Intervention: Web technologies are an intervention for this review. Web 2.0 (and emerging Web 3.0) is based on these web technologies, which is evolving into a new era of web-enabled applications that are built around user-generated or user-manipulated content, such as wikis, blogs, podcasts, and social networking sites.

Mechanism: Mechanisms are the processes through which web technologies evolve and are being implemented in carrying out the operations of technology-based businesses as well as in delivering the services provided by them. These operations also include the process of entrepreneurial opportunity discovery.

Outcomes: The outcome variables for this review was theoretical understanding of the role of web technologies in the discovery of new entrepreneurial opportunities, and entrepreneur's discovery of opportunities as a result of web evolution. This review seeks to generate insights about these factors based on existing literature.

Context: The review focused on the technology-based businesses which use web technologies to restructure their business in light of EOD.

By applying the above criterion, the review questions became clear, focused and answerable.

(2). Search Strategy to Identify Relevant Research

The protocol driven, snowballing and academic network search strategies were used to locate relevant articles while conducting the review. Considering the emergent natures of my research, the

findings relating to the 2016-2018 were also reviewed. The search that is restricted to electronic database searching may not give all the relevant papers, suggests, Greenhalgh and Peacock (2005).

The following comprehensive strategy was developed to locate relevant research:

A **protocol-driven** search strategy involved identifying keywords of similar meanings (synonymous and authors supplied words), grouping keywords into search strings and running the searches in research databases. In order to implement a protocol-driven search strategy, EBSCO and Emerald Management Extra (X) and Scopus research databases were chosen as the review group recommended these.

EBSCO search database was selected for its comprehensiveness. It is a multidisciplinary database providing coverage of over 4,370 full-text journals. Within EBSCO the databases chosen were: Business Source Complete**,** Academic Search Complete**,** Social Science Full index**,** Econ. Literature Full Index and PychArticles**.** These databases within EBSCO were chosen as they contain a large number of journals in the social sciences (management and business in particular), humanities, computer science, and human-computer interaction and information systems field.

Emerald Management Extra was chosen as it contains articles from approximately 300 internationally reputed management journals. The Emerald management X database provides options for searching the whole database at once, or to limit results to journal articles or book chapters.

Scopus: Scopus research database was selected as it offers a cited reference index and author's search to find more papers of key authors which would feature during searches in EBSCO and Emerald Management X.

Other databases considered for searching were the Web of science and JSTOR. Though Web of Science offers cited reference index and author's search, Scopus has much larger author's records than Scopus. Although JSTOR covers scholarly journals in the areas of arts and humanities, social sciences and computer science, EBSCO was chosen due to its comprehensiveness as it contains

approx. 4,370 full-text journals, were much more extensive than JSTOR. Emerald management X was preferred over JSTOR because it is a specialist database for management journals and contains more than 300 highly reputed journals while JSTOR is much like EBSCO but offers fewer journals than EBSCO.

A **snowballing** search strategy involved reference tracking of chosen papers which came as a result of searches in EBSCO and Emerald management X. A snowballing search strategy was adapted to locate more relevant papers from chosen papers, and further searches of key authors to find more papers from these authors. Scopus research database was used to search key authors by their name to locate more relevant papers.

An **academic network** approach involved locating papers by asking review group about any paper they know of relevance to this research.

Google Scholar was also used to expand the search efforts and to locate more papers.

(3). Filtration Method to Remove Irrelevant Papers

As this research investigates a complex topic which involves research from both information systems and management fields, the context of the search had to be kept broad to locate maximum amount of papers that discuss the influence of web technologies for EOD. Therefore, it was expected that there would be articles in the search results which would be irrelevant.

The filtration method helped remove irrelevant papers and ensure that as many papers as possible were assessed as to their relevance during the selection process. The filtration method involved scanning the papers by their abstracts and titles presented in electronic databases and remove irrelevant or least relevant papers. The other purpose of filtration was to remove duplicate papers which would appear as a result of searches in different search databases. The decision to run a selection process to include the most relevant articles was made when all the articles appearing in search results were checked and filtered.

(4). Selection Method to Identify Relevant Papers

Boaz and Ashyby (2003) suggest that during the selection process it is essential to find out the inclusion reasons to select articles, and the selection should be made after all possible inclusion reasons are exhausted. At this stage of research, it was not fully known all the reasons to select articles as the context of research was kept broad. The following selection methods were developed to delimit the subject area:

- Only papers that address the use web technologies in organisations to carry out their operations
- Only papers that address the effect of web technologies on entrepreneurial organisations
- Only papers that measure performance regarding organisation restructuring
- Only papers that discuss the role of web technologies in business and particularly in the process of discovery of entrepreneurial opportunities

2.3.2. Conducting the Review

In the second phase, the review question was operationalised by identifying key terms and creating search strings. Then the search strings were operationalised by using them in chosen databases to locate papers. Lastly, the search results were filtered to remove irrelevant papers and then most relevant papers were selected and appraised from the list of identified papers.

2.3.2.1. Operationalisation of Review Question to Create Search Strings

The review question helped in identifying key terms. The components of the review question were taken to identify keywords and then to form search strings. The three keywords derived from the review question were: 1) Web technologies 2) Entrepreneurship 3) E-business. The terms *web technologies* and *entrepreneurial opportunities* were mentioned in the review question, so they were chosen. However, *e-business* term was not in review question but was chosen because it was the context developed while formulating the review question and the purpose was to locate maximum papers out of search process.

2.3.2.1. Review of key terms

The protocol driven search strategy developed at phase 1 was implemented by conducting the review of key terms derived from the review question. From these key terms, a search string was made and run in selected databases. Two reviews were conducted to identify words of similar meanings to the keywords derived from the review question.

In **review 1**, the words of similar meanings were identified from a general understanding of the topic, and by using an online thesaurus to find synonymous. The synonymous identified from thesaurus were added with words of similar meanings identified from general understanding.

In **review 2**, the subject terms and author's supplied keywords in the summaries of the papers mentioned were identified. The *key words* heading in the papers mentioned were checked to identify the author's supplied words.

From these two reviews, the search string was made, and pilot tested in EBSCO. Review 1 and review 2, search string, and result of this process are attached in Appendix 2.

Further searches within the search results were conducted using keywords: *web technologies, entrepreneurial opportunities and e-business*. This process highlighted that many of the papers that appeared were irrelevant and some of the main articles on entrepreneurship and web technologies, recommended by the review group and known before the start of the systematic review, were not in the search results. This suggested that the search string lacked sufficient precision and the list of synonymous had to be revised.

Revised key terms and search string

The review 1 and review 2 had terms which were irrelevant and could not be included to make a meaningful search string. For example, the term *innovation* cannot be a synonymous for the entrepreneur as this research is not referring to entrepreneurs as innovators, and the term *e-business* which was used in earlier reviews could not be used as it was not part of review question

hence could not be considered a component of review question. Similarly, terms such as *information technology and communication technology* which came as a result of review 1 and 2 were not included. Web technologies are an umbrella term which refers to technologies used in the development of web applications such as Ajax and JavaScript which are computer programming languages (Lim et al., 2002), while information and communication technologies are broad terms and are not meaningful to locate papers relating to web technologies. Web 2.0 technologies contribute to web blogs, wikis etc. These web technologies are bringing about a new web, termed as web 3.0 which may use increasingly available machine intelligence for larger user engagements (Kumar and Babu, 2011). *Social media* as a term was not used to make a new string as it is also an overused term. The social media is a web 2.0 innovation, but web 2.0 is not referred to as social media as it ignores its less social aspects such as blogs and wiki etc. (Fernando et al. 2012).

While excluding *information technology* and *social media* terms, there was a risk of losing papers that don't mention web technologies but use information technology or *social media* to discuss web 2.0 or web 3.0 technologies. In order not make the search process practical while not losing relevant articles, it was decided that when the relevant articles were searched, the bibliography of key authors would be checked to see if there are any papers on information technology and social media that actually discuss web technologies.

It was concluded that the revised key terms should emanate from the components of the review question, and only relevant synonymous and authors supplied key word had to be added with these terms to make the search process meaningful and practical. All other terms which were irrelevant were excluded. The key terms in the review question are 1) Web technologies 2) Entrepreneurial opportunities. From synonymous and author supplied words, the following key terms were identified: *web technologies, web evolution, web 2.0, web 3.0, business opportunities, entrepreneurial opportunities, and entrepreneur*. These terms are the most relevant to make a search string as these are the terms which frequently appeared as *key terms* in earlier searches.

2.3.2.2. Search Strings

A new search string was formed from above keywords using Boolean logic operators. This search string emanated directly from the review question as components of the review question resulted in the identification of key terms and the key terms then further resulted in making following search string:

("Web technologies" OR "web evolution" OR "web technologies "OR "web 2.0" OR "web 3.0")

***AND** ("business opportunities" OR "entrepreneurial opportunities" OR "entrepreneur*)*

2.3.2.3. Search Results and Filtration

The above search string was run in EBSCO and Emerald management X databases. Appendix 3 shows the results of searches in both databases. The search results showed 336 papers from Emerald management X and 74 papers from EBSCO. In the search results, all types of papers, i.e. conceptual, review, empirical and practitioner's papers appeared. There were few empirical papers; most papers were review papers or conceptual/theoretical papers. No papers within the searches appeared which had the title "web technologies and entrepreneurial opportunities" or "web technologies and entrepreneurial opportunities", although there were a few papers which had the title "web 2.0 and business (or innovation or marketing or education)".

The search results showed papers which were identified by the academic network approach (appendix 4) and came up as a result of a new search string. The search results showed most relevant papers, discussing web technologies impact on businesses opportunities, were published from 2010 to 2013. This indicated that it is an emerging research area. Other papers discussed web technologies impact on business in general but not on entrepreneurial opportunities. One paper recommended by the review group, by Guidice and Straub (2011), and key to this research, did not appear in search results. Another paper by Shane (2000) though not critical but informs theory, also did not appear in search results. Overall the search results showed that the search string used to search was accurate, though it missed two key papers, and produced most of the critical papers relevant to this research.

(1). Filtration of Irrelevant Papers

EBSCO's papers were filtered first, and the same papers which also appeared in emerald management X were removed. The irrelevant papers were removed by their titles and abstracts, for example, irrelevant papers appearing with the title, "Web technologies and election campaign". Where the title was not an indication of irrelevancy, the abstract was read to determine if it was relevant.

(2). Reference Tracking and Key Authors Searches

To implement a snowballing search strategy (developed at phase 1) to locate further relevant papers, reference tracking of identified papers was conducted using title searching, and *key terms* developed. Another purpose of reference tracking was to locate papers on *information technology and social media* that discuss web technologies. For this purpose, terms such as *information technology, communication technology, social networking and social media* were used in titles or bibliographies of papers to search relevant papers. As a result of the above process, a further 12 papers were located. After applying the filtration method on these 12 papers, 2 papers were identified as relevant. The list of these papers is attached in appendix 5. The list of key authors was made and by using the author's name, searches were conducted in Scopus to identify more relevant papers by these authors. As a result of this process, 1 relevant paper was identified. The result of this process is attached in Appendix 5. Appendix 6 shows the number of papers identified by their categories.

To make the search process comprehensive, Google Scholar was used to ensure there were no other relevant papers missing. Most of the papers identified above featured in Google scholar.

2.3.2.4. Selection of Relevant Papers

At this stage of review, most relevant papers were selected from the list of identified papers. The selection method developed during the planning stage was revised as more understanding of the topic had been developed.

(1). Revised Selection Criteria

The revised selection method was to include:

- Only papers discussing entrepreneurial organisations using web technologies in their business to gain competitive advantage, idea generation, restructuring, transformation and discovering entrepreneurial opportunities.
- Only papers that address the effect of web technologies on entrepreneurial organisations. The studies which deal with the role of technologies in entrepreneurial endeavours.
- Only papers that help address the influence Web 2.0 evolution has on business transformation or discovery of entrepreneurial opportunities.
- Only papers that measure organisational performance regarding their restructuring or formation of businesses lead by the identification of successful opportunity through the use of web technologies.

The assessment criteria were developed to classify papers based on their relevance to this research;

- Criteria 1 - Papers which can be critical to the development of a research question
- Criteria 2- Papers which may assist in informing the development of a research question
- Criteria 3 - Papers which provide background on the field and (or) inform the design of the research methodology

The selection method and assessment criteria were applied to select the most relevant papers and then classify them. All other papers were excluded which had not fulfilled the selection and assessment criteria. As a result of this process, 27 papers were selected and classified as to their relevance to this research. The selection of a few papers based on the selection method and their classification is shown in Appendix 7 (complete list).

2.3.2. Summary of Findings

There is a consistent increase in the number of studies investigating the phenomenon of EOD. It is important to note that the highest cited studies are Shane and Venkataraman (2000) and Shane (2000) with 8,631 and 3,427 citations respectively (Source: Google Scholar) which suggests that Austrian theory of entrepreneurial opportunities have received increasing support and followership

as compared to Neoclassical theory. This finding also suggests that cognition (Shane and Venakataraman, 2000) and prior knowledge (Shane, 2000) are two crucial factors for EOD and have been investigated extensively, which is evident by the identified number of articles for these two factors (see Table 2.2).

Table 2.2 summarises prior research that investigates different factors that influence EOD, including technology. However, for the sake of clarity, I created a separate table to present a summary of prior research that investigates EOD, factors influencing EOD and also web technologies (Appendix 9). The findings of the SLR reveal that studies that did not investigate the role of web technologies for EOD, mostly have investigated different factors (e.g., prior knowledge, social capital, systematic search etc.) in isolation (Table 2.2.). Also, most of these studies did not investigate the role of technology at all (e.g., only 6 studies out of 83 investigated the role of technology). This finding suggests that there is a dearth of research that investigates the role of technology in EOD.

Another interesting finding of the SLR is that the focus of the prior research that investigates the role of web technologies for EOD has been mainly on its influence through the mediating role of other factors such as prior knowledge and social capital. However, there is little research that investigates the direct relationship of Web technologies with EOD (e.g., only 3 studies out of 19 have investigated the direct relationship of Web technologies with EOD; See Appendix 9).

Table 2.2: Synthesis Table for the SLR - Pertinent Factors for EOD

Factor	**Author**	**Findings (Relationship with EOD)**	**Technology Construct**
Cognition and Other Traits	Zahra et al. (2006)	Trust can have both positive and negative effect in enabling an individual for EOD	N/A
	Zahra and George (2002)	Absorptive capacity enhances the ability of entrepreneurs for EOD	N/A

	Tumasjan and Braun (2012)	Individual attributes of promotion focus are significantly related to EOD	N/A
	Shane et al. (2010)	Genetic factors of becoming an entrepreneur may lead to high levels of EOD	N/A
	Oyson and Whittaker (2015)	Entrepreneurial imagination leads to EOD	N/A
	Nicolaou et al. (2009)	Genetic factors of becoming an entrepreneur may lead to high levels of EOD	N/A
	Mahnke et al. (2007)	Entrepreneurial judgment would lead to EOD	N/A
	Lunnan et al. (2006)	Entrepreneurial attitude would lead to EOD	N/A
	Lindsay et al. (2005)	Entrepreneurial attitude would lead to EOD	N/A
	Gordon (2007)	Individual's disposition towards trust affects his/her ability for EOD	N/A
	Geiger et al. (2009)	Problem-solving skills leads to EOD	N/A
	Friedman and Foerster (2005)	Promotion focus lets individuals think out of the box ideas leading to	N/A

		high levels of EOD	
	Crick and Spence (2005)	Anticipation and reaction to internal and external factors affect an individual's ability of EOD	N/A
	Butler et al. (2010)	Creativity enhances the ability to identify opportunities	N/A
	Brockner et al. (2004)	Promotion-focused individuals are more creative and would identify a high number of opportunities	N/A
	Baron and Tang (2011)	Individual's creativity affects EOD	N/A
	Baron and Ensley (2006)	Refined cognitive frameworks help identify opportunities	N/A
	Baron (2008)	Affect influences cognition and EOD	N/A
	Baron (2006)	Ability to develop connections between seemingly unrelated information help identify opportunities	N/A
	Baron (2004)	Basic perceptual processes help identify opportunities	N/A
	Ardichvili et al. (2003)	Individual attributes are antecedents of EOD	N/A. However, authors mention that technological advancements can lead to

			entrepreneurial opportunities
	Gregoire et al. (2010)	Different kind of mental models help individuals recognise different opportunities	N/A
	Alvarez and Busenitz (2001)	Better cognitive ability leads to EOD	N/A
Entrepreneurial Alertness	Webb et a. (2011)	Alertness inspires an individual to acquire knowledge, search for opportunities which in turn lead to EOD	N/A
	Tominc and Rebernik (2007)	High degree of alertness supports EOD	N/A
	Sambasivan et al. (2009)	Alertness mediates the relationship between Individual attributes and venture performance	N/A
	Miao and Liu (2010)	Alertness and knowledge are antecedents of EOD	N/A
	Garcia-Cabrera and Garcia-Soto (2009)	There is a relationship between alertness and cognitive abilities which leads to EOD	Technology knowledge leads to EOD
	Gaglio and Katz (2001)	Alert individuals are more likely to identify opportunities	N/A

	Endres and Woods (2007)	Entrepreneurs structures their existing knowledge of markets and market problems which enhances their ability of EOD	N/A
	Ardichvili et al. (2003)	Alertness is an antecedent of EOD	N/A
	Alvarez and Busenitz (2001)	Entrepreneurial alertness leads to EOD	N/A
Environmental conditions	Zhu and Lin (2015) Nicolai J. Foss and Peter G. Klein (2017)	External pressures would affect EOD	N/A
	Webb et a. (2011) Abdelkafi, N. and Täuscher, K. (2016)	Technological advancements, as well as external environmental factors, lead to better EOD	N/A
	Tang (2010)	The entrepreneurial environment moderates the relationship between EOD and personal traits	N/A
IT infrastructure	Zhu and Lin (2015)	The maturity of IT infrastructure would affect EOD	N/A
	Ragowsky et al. (2012)	The maturity of an organisation's IT infrastructure would lead to initiate value enhancing measures	N/A
Prior Knowledge	Vaghely and Julien (2010)	Information processing affects EOD	N/A

	Shane and Venkataraman (2000)	Provides a framework that may be used as a guide to discover and exploit opportunities.	N/A
	Shane (2000)	Differences in prior information affect the ability of EOD	Prior knowledge leads to the exploitation of a new technology
	Sanz-Velasco (2006)	Prior knowledge affects positive EOD	N/A
	Ramos-Rodriguez et al. (2010)	Individual's possession and access to knowledge affects EOD	N/A
	Pech and Cameron (2006)	Opportunity-laden knowledge leads to EOD	N/A
	Oyson and Whittaker (2015)	Prior knowledge positively affects EOD	N/A
	Mejri and Umemoto (2010)	Market knowledge, experiential knowledge, network and cultural knowledge leads to EOD	N/A
	Marvel and Droege (2010)	Both explicit and tacit knowledge leads to EOD	N/A
	Kourilsky and Esfandiari (1997)	Innovation related knowledge leads to EOD	N/A
	Hsieh et al. (2007)	Accumulated knowledge leads to	N/A

		EOD	
	Fiet (1996)	Some individuals are better at EOD than others due to their prior knowledge and ability to evaluate information critically	N/A
	Cooper and Park (2008)	Environmental factors such as social contexts, work etc. help entrepreneur in EOD	The maturity of technology infrastructure may lead to EOD
	Cliff et al. (2006)	Prior knowledge and experience leads to EOD	N/A
	Chiasson and Saunders (2005)	Knowledge and experience leads to EOD	N/A
	Casson (2005)	Prior knowledge and better information leads to EOD	N/A
	Audretsch and Keilbach (2007)	Knowledge leads to EOD	N/A
	Ardichvili et al. (2003)	Prior knowledge is an antecedent of EOD	N/A
	Park (2005)	The interaction of technology, entrepreneur and knowledge leads to entrepreneurial opportunities. This study uses technology as a	N/A

		passive concept.	
	Acs et al. (2009)	Knowledge spillovers help entrepreneurs in EOD	N/A
Research collaboration	Perkmann et al. (2013)	Academic engagement with industry would lead to EOD	N/A
	McKelvey et al. (2015)	Research collaboration with other firms would enhance the capability of a firm to identify opportunities	Developments in existing technology may lead to EOD
Social capital	Vandekerckhove and Dentcheve (2005)	Two mappings' comparison leads network opportunities	N/A
	Van Gelderen (2007) Rui Shu, Shenggang Ren, Yi Zheng (2018)	Social capital can be used to get resources, information and finance which leads to EOD	N/A
	Shaw and Carter (2007) Rui Shu, Shenggang Ren, Yi Zheng (2018)	Social networks lead to knowledge which in turn leads to EOD	N/A
	Ozgen and Baron (2007)	Mentors, informal networks and professional forums positively linked with EOD	N/A
	Mainela and Puhakka (2009)	Resourcefulness and legitimacy in the markets would affect EOD	N/A
	Macpherson et al. (2004)	Relationships between firms enhance chances of EOD	N/A

	Kellermanns and Eddleston (2006)	Willingness to change within family firms positively affects EOD	N/A
	Hite (2005)	Ties which are established through a social network may lead to EOD quickly	N/A
	Farr-Wharton and Brunetto (2007)	The experience of trusting leads to EOD	N/A
	Bhagavatula et al. (2010)	Social capital plays a mediating role between human capital and EOD	N/A
	Audretsch et al. (2011)	Social capital is effective only when a business idea is present	N/A
	Arenius and Clercq (2005)	Nature of one's residential area can affect EOD	N/A
	Aldrich and Cliff (2003)	Changes in family composition lead to EOD	N/A
	Ardichvili et al. (2003)	Social network is an antecedent of EOD	N/A
Systematic search	Shepherd and Levesque (2002)	Search for opportunities would lead to good and bad opportunities	N/A
	Patel and Fiet (2009)	Systematic search has a direct effect on EOD	N/A
	Fiet (2007)	Entrepreneurs search activity for opportunities which enhances their	N/A

		chances of EOD	
	Casson and Wadeson (2007) Hansen, D. J., Monllor, J. and Shrader, R. C. (2016)	Search systematically would lead to opportunities	N/A

It is important to note in Table 2.2 these are the studies which were identified in the second round of SLR carried out in January 2016. For the purpose of comprehensive literature review and in alignment with SLR strategy, the studies from 2016 -2018 were added in to Table 2.2.

2.4 Tentative Conceptual Framework

This study adopts an inductive research approach to build a theory of entrepreneurial opportunity discovery enabled by web technologies. Therefore, it is important to note that the following sections synthesise the findings of SLR and as a result of the synthesis, a tentative conceptual framework is presented. The tentative conceptual framework is proposed so that it can be used as a preliminary guideline as advised by Eisenhardt (1989) who suggested that a "priori specification of constructs" may help the researcher to "measure constructs more accurately" (p. 536).

2.4.1 Web Technologies and Entrepreneurial Opportunities Discovery

The review of prior research on EOD suggests that the relationship of technology (e.g., web technologies) with EOD can be classified into two categories - cognitive approach and technology-usage approach. The cognitive approach suggests that entrepreneurial opportunities can be discovered by identifying similarities between the elements of a technology and the market and environment where it is used (Gregoire and Shephere, 2012). This approach proposes a direct relationship between technology and EOD. The technology-usage approach suggests an indirect relationship between technology and EOD (Park, 2005). This approach proposes that technology

affects factors important for EOD which in turn influence the discovery of entrepreneurial opportunities. Sections 2.4.1.1 and 2.4.1.2 provide details of these two approaches.

2.4.1.1 Cognitive Approach of Web Technologies and EOD

The process of entrepreneurial opportunities discovery refers to "how entrepreneurs use simplifying mental models to piece together previously unconnected information that helps them to identify and invent new products or services and [or] to assemble the necessary resources to start and [or] grow businesses" (Mitchell et al., 2002, p.97). The simplification of mental models and its implication how it may lead to facilitate EOD has been explained in prior studies (e.g., Gregoire and Shepherd, 2012; Hwang, 2014). They report that when individuals come across external stimuli (e.g., a new technology, a change in existing technology, or a market problem), they create mental models representing the units of information and the structural associations among those units.

Following are a few other examples of how web technologies have led to entrepreneurial opportunities in different periods of time:

The progressive developments of web technologies have brought "structure to the meaningful content of Web pages, creating an environment where software agents roaming from page to page can readily carry out sophisticated tasks for users." (Berners-Lee et al., 2001, p. 2). This led organisations to offer several services to enhance online user experience which might not have been possible without developments in the Web. For example, banks are providing their customers with online tools so that they can manage their finances. A Spanish bank, BBVA is "rethinking their online banking models, experimenting with how to combine Web 2.0 capabilities, such as personalisation and information aggregation, with financial services that make the customer experience simpler and more relevant." (Nayar et al., 2013, p.479).

Similarly, developments in the Web have led to the automation of online data and information processing by enabling different software to communicate with each other. This capability of the Web has led to a whole suite of other entrepreneurial opportunities. For example, Cabada et al. (2018) more recently found out the identified opportunities can primarily be characterised by the

autonomous integration of data and services that increase pre - existing web services capabilities and the creation of new functionalities. Newman et al. (2016) proposed Web 3.0 for the next generation of work that integrates Cloud Computing, Big Data, Internet of Things and security.

Shaughnessy (2010) has employed Web's automation capability to perform automated reasoning which led them to develop a product called "semantic clustering". Semantic clustering allows organisations to identify people's attitudes by allowing computers to understand the meaning of online content written by and shared by online users. Also, the on-demand architecture capability of the web has led organisations to offer services such as Software-as-a-Service (Saas). These days' individuals or firms do not have to spend much money to buy software. They can directly rent it or pay for its use in the way they pay for utility bills. All they need is a computer, Web browser and Internet connection.

2.4.1.2 Technology-Usage Approach of Web Technologies and EOD

Apart from the potential direct relationship of web technologies for Web use, it also may have an indirect relationship with EOD. For example, Web facilitates online communication. Personality enriches the communication experience by making it more user-friendly and interactive for the parties involved (Chao, 2005; Ramaswamy, 2010; Fernando et al., 2012). Effective communication between firms and their customers lead to new ways of assessing customer psychology and their needs (Fernando et al., 2012) which in turn help them discover new entrepreneurial opportunities. Also, the Web technologies have led to the creation of effective communication channels not only between the firm and their customers but also among customers themselves. Customers more than ever are connected. Cromer (2010) argues, “Web 2.0 environment encourages collaboration and breaking down walls of information asymmetries between various stakeholders" (p. 192). This is assisting organisations to better understand their customers' needs and the ways in which they can fulfil those needs.

Further, Web organisations are upgrading their IT infrastructure to accommodate Web technologies to support social networking, knowledge sharing and instant communication among employees which enhances their capability to acquire new knowledge at a rapid pace (Liang and Turban, 2011).

Acquisition of new knowledge combined with prior knowledge leads to EOD (Shane, 2000). In short, the effective use of web technologies encourages participation, and information sharing thus deepens the firm's knowledge (Chang, 2005; Fernando et al., 2012; Ramaswamy, 2010). It also enables the gathering of online customer's information that can be exploited by the use of Web mining tools. These tools help in finding meaningful patterns to understand customers' needs better and helps lead to the discovery of entrepreneurial opportunities. For example, Web technologies such as semantic clustering can be used to infer what customers are thinking by evaluating online information (Shaughnessy, 2010).

2.4.2. Prior Knowledge and EOD

Information is generally defined as: processed data (Saint-Onge, 2002) and data endowed with relevance and purpose (Drucker, 2001). While knowledge is useful information gained through learning and experience (Gordon, 2002). Thus, the main difference between information and knowledge is that information is much more easily identified, managed and distributed. Knowledge, on the other hand, is complex because it resides in one's mind. An organisation uses information strategically to make sense of change in its environment, to create new knowledge for EOD; and to make futuristic decisions (Choo, 1996; Stenmark, 2001). In the context of this research, these seemingly separate processes are in fact complementary pieces of a larger canvas. Knowledge is one of the most critical factors necessary for EOD (Shane, 2000). The findings of the SLR carried out for the current research suggests that prior knowledge of the web technologies (that are to be used within the organisation), target market and the environment (where Web technologies to be used) is at the core of discovering entrepreneurial opportunities. The role of web technologies is to provide access to a rich discourse of information. Web technologies help us interpret the meaning and discuss the implications of the information. By acting upon our new state of knowledge, the web technologies may facilitate both structured and ad hoc cross-organisational collaboration and co-operation.

The construct of prior knowledge can be argued to be an umbrella concept that includes prior knowledge of markets, customer's problems and ways to serve customers - all factors critical for the

identification of entrepreneurial opportunities, mostly have been studied in isolation (Shane, 2000). This effect of prior knowledge on EOD is due to its facilitating role in harnessing entrepreneurs with innovative ways to solve unmet customers and markets' problems (Ucbasaran et al., 2009). However, a fundamental pre-requisite that enables entrepreneurs to utilise their prior knowledge for the discovery of entrepreneurial opportunities is the degree of leveraging this knowledge with other sources of information in a given context (Chandra et al., 2009; Lettl et al., 2008; Van Gelderen, 2007). Therefore, it is imperative that entrepreneurs combine their prior knowledge with the information of a given situation and context to be able to effectively identify entrepreneurial opportunities (Choi et al., 2008; Fuentes et al., 2010).

2.4.3. Social Capital and EOD

Social capital is another critical factor that positively influences EOD (Ardichvili et al., 2003; Baron, 2006; Garcia-Cabrera and Garcia-Soto, 2009). Social capital enriches entrepreneur's knowledge by harnessing them with information (Alvarez and Busenitz, 2001), it also makes them resourceful (Shane and Venkataraman, 2000), and both are crucial elements that help entrepreneurs in identifying new entrepreneurial opportunities. Shu et al. (2018) found out social networking empowered by the evolution of web is increasingly important to entrepreneurs and managers because it can help them to discover valuable opportunities.

Entrepreneurs who establish connections with people from different ways of life and keep themselves engaged with them in productive communication are more likely to discover new entrepreneurial opportunities than the ones who keep themselves to themselves (Tang, 2010). Another significant benefit of social capital is that it can provide entrepreneurs with the resources that they are lacking, which can be crucial for the process of EOD (Fuentes et al., 2010). In the Web technologies context, the enrichment of one's social capital depends on the engagement and effective use of social media platforms.

2.4.4. Individual Factors and EOD

In line with prior research (e.g., Delamar and Davidson, 2000), I argue that the entrepreneur's individual characteristics can be developed and should be flexible to change with the changing

entrepreneurial environment. Delamar and Davidson (2000) points out a flaw in the current entrepreneurial theory when it comes to the role of individual traits for EOD. He suggests that because the environment in which entrepreneurs operate changes regularly, therefore, attributes of an entrepreneur should reflect that change. Prior research on EOD points out several characteristics of entrepreneurs that are deemed essential for their ability to help entrepreneurs identify new entrepreneurial opportunities. These characteristics include creativity, self-efficacy, need for achievement, self-leadership and a diverse skill set (Ardichvili et al., 2003; Baron, 2006; Garg et al., 2011). Furthermore, Baron (2006) reports that risk-taking individuals are more capable of seeing the bigger picture of opportunities than the ones who tend not to take the risk. Similarly, creativity and intelligence are also vital for EOD (Nicolaou et al., 2009). Cognition and effect are two significant components that steer entrepreneurs towards the identification of new entrepreneurial opportunities (Baron, 1998; Gregoire et al., 2010). The involvement of cognition and affect is further explained by the finding that during the process of EOD, new information is compared with the already stored information in an entrepreneurs' memory (Baron and Ensley, 2006; Baron, 2006). Also, entrepreneurial alertness is vital for EOD (Ardichvili et al., 2003).

2.4.5. Organisational Environment and EOD

When new technologies are brought into organisations, employees need to know how they can effectively utilise them for their daily work-related tasks. These changes directly affect their cognitive frames which they have developed during their work life and equip them with new information that may lead to the discovery of new opportunities (Baron, 2006).

Prior research suggests that external pressure leads to better EOD (Webb et al., 2015). External pressure can be due to mimetic pressure or coercive forces (Barley and Tolber, 1997). Mimetic pressure makes organisations adapt with new practices or technologies while coercive pressure makes them fulfil customers' expectations (Barley and Tolber, 1997).

2.4.6. Systematic Search and EOD

When individuals or firms engage in discovering new opportunities by performing a systematic search, the probability of finding new opportunities increase (Westhead et al., 2009; Zahra et al.,

2009). The current form of web technologies lets individuals and organisations develop software programs which can automatically collect information from the several sources on the Web and that information then can be used meaningfully (Nayar et al., 2013). Therefore, the findings of the SLR suggest that systematic search can lead to the discovery of new entrepreneurial opportunities especially in the context of the Web.

2.4.7. Overarching Concept

Based on the SLR, different closely related factors can be grouped into overarching concepts. Table 2.3 provides details of such categorisation. The results of the SLR indicate these concepts are critical for EOD. The factors include entrepreneurial alertness, prior knowledge, leadership, risk taking, IT infrastructure, social capital, system search and external pressure. In the grouping, Web technologies are an enabler of factors such as systematic search, entrepreneurial alertness and prior knowledge.

Table 2.3: Categorising factors into overarching concepts

Overarching Concept	**Factors**
Individual factors	Entrepreneurial alertness
	Prior knowledge
	Leadership
	Risk taker
Organisation factors	IT infrastructure
	Systematic search
	Social capital
Environmental factors	External pressure

Web technologies as EOD enabler	Entrepreneurial alertness
	Prior knowledge
	Systematic search

As advised by Eisenhardt (1989), I developed a tentative conceptual framework for this study. Eisenhardt (1989) suggested that a "priori specification of constructs" may help the researcher to "measure constructs more accurately" (p. 536). Figure 2.2 shows a tentative conceptual framework based on the literature review.

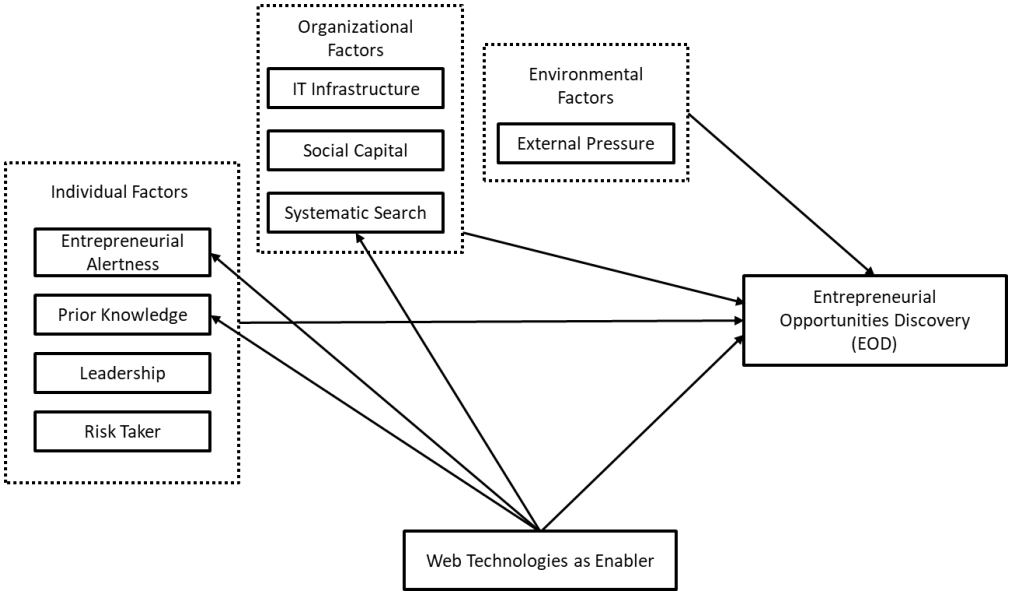

Figure 2.2: Tentative Conceptual Framework

The tentative conceptual framework revealed several factors related to individual factors, organisational factors, environmental factors and the enabling role of web technologies for EOD. The conceptual framework describes and explains the concepts to be used in the study and their relationships with each other. A written or visual presentation that: "Explains either graphically, or in narrative form, the main things to be studied – the key factors, concepts or variables - and the presumed relationship among them" (Miles and Huberman, 1994, P18).

The conceptual framework is a structure that holds or support a theory of a research work. It presents the theory which explains why the problem under study exists. Thus, the theoretical framework is but a theory that serves as a basis for conducting research. In conceptual framework, the researcher presents the general assumptions of the theory for the issues under study, why the theory is selected, and how it will shape the whole study.

2.5. Chapter Summary

I presented the conceptual background for the study in this chapter. I conducted an SLR to review relevant prior research for the notion of how web technologies and other factors influence EOD. The chapter described the two prevalent theories of entrepreneurial opportunities - Neoclassical and Austrian, followed by the hi-bred approach adopted in this study and its rationale. The chapter also discussed the findings of the SLR and synthesised the findings in proposing a tentative conceptual framework.

The SLR's findings revealed that prior knowledge, cognition and Individual attributes, social capital, systematic search and research collaboration are pertinent factors that influence EOD. It also revealed that web technologies might influence EOD directly or indirectly depending upon one of two perspectives. Web technologies can, directly and indirectly, influence EOD. In technology-usage approach Web influence EOD through the mediating role of other factors presented in Table 2.2.

In the last section of this chapter, I synthesised SLR's findings to propose a tentative conceptual framework to guide the late stages of data collection and analysis as advised by Eisenhardt (1989).

This study will adopt an inductive multiple case study approach to develop a theoretical framework of entrepreneurial opportunities discovery for a web technologies context. Chapter 3 presents the research philosophy and methodology for this research. Chapter 4 to 7 present multiple case studies and provide the details of the analysis as well as the theoretical framework that was developed as a result of the analysis.

3. RESEARCH APPROACH AND METHODOLOGY

3.1 Introduction

Chapter 3 presents the research philosophy and methodology for this thesis. I used a qualitative research methodology to explore the factors that contribute to entrepreneurial opportunities discovery (EOD) in technology-based organisations and the role of web technologies for EOD. Web technologies are advanced software applications delivered on the internet and are people-centric, collaborative and participative. They include the social networking, blogging, online communities and other virtual worlds. Technology-based organisations are referred to organisations which use and exploit web technologies to continuously produce new goods or services with high added value, and to discover entrepreneurial opportunities.

Web technologies can infer relationships between heterogeneous data in different social network and result in EOD from that process. Web technologies offer several new avenues to discover entrepreneurial opportunities. However, despite the vital role of the web technologies in businesses, there is little research that investigates its role for EOD.

The data was collected regarding these factors and the role of EOD through semi-structured interviews of the staff members of technology-based organisations who were involved in entrepreneurial activities of the organisation. The organisations' documentation relevant to the use of web technologies for EOD and other entrepreneurial activities was also collected and analysed.

This chapter is organised as follows. Section 3.2 reports research philosophy guiding this study and its rationale. Section 3.3 describes the research approach. Section 3.4 discusses the research strategy. Section 3.5 outlines research choice. Section 3.6 discusses the time horizon chosen for this study. Section 3.7 describes the study's data collection process and techniques followed by section 3.8 which discusses the data analysis approach.

3.2 Research Philosophy

The term research philosophy relates to "…the development of knowledge and the nature of that knowledge" (Saunders, Lewis and Thornhill, 2009, p. 107). Blaikie (2000) emphasises that research

philosophy is about the researcher's thoughts and analysis on the development of knowledge, which will affect how the research should be conducted and the conclusions reached. Further, a research philosophy is a way that a researcher views the world (Saunders et al., 2009). I followed Saunders' research onion approach to explain my philosophical stance, research approach, strategy and choice. Figure 3.1 depicts the layered nature of the research process offered by Saunders et al., (2009). I used the "research onion" because it helps in deducing a valid and appropriate research methodology by peeling away layers of the research onion (Saunders et al., 2007).

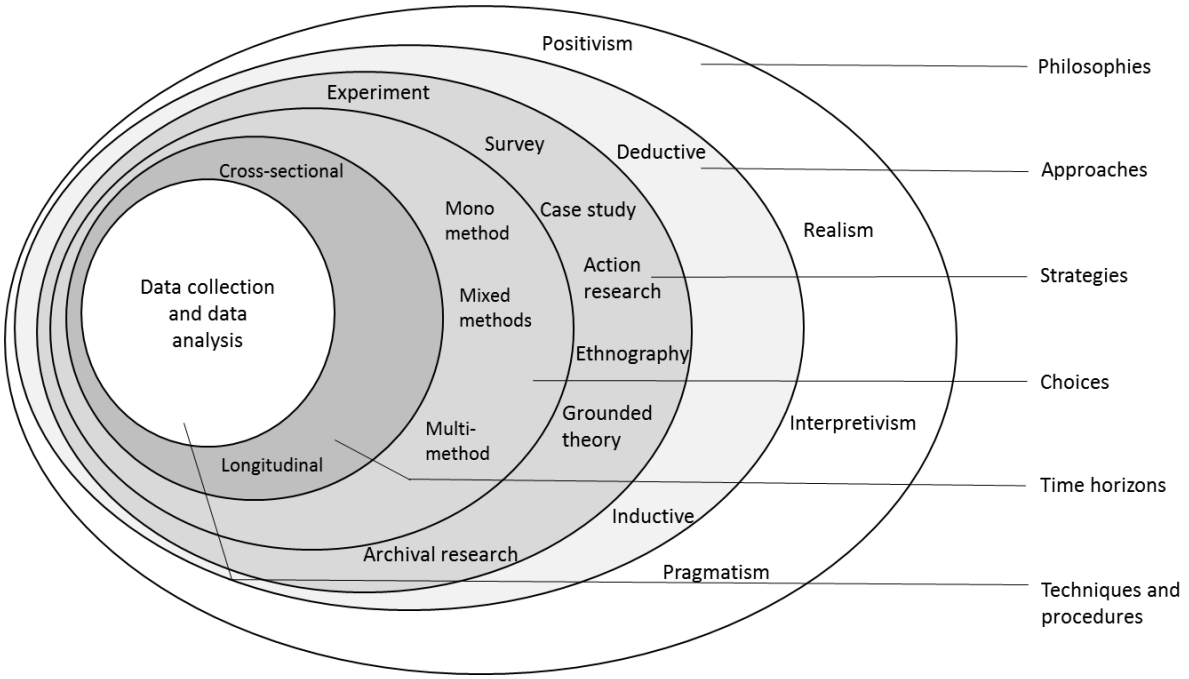

Figure 3.1 The research onion (Saunders, Lewis and Thornhill, 2009)

According to Saunders' research onion, there are four main philosophies for management research (Saunders et al., 2009) – positivism, interpretivism, realism and pragmatism.

3.2.1 Positivism

The positivist paradigm is based on the idea that reason and observations are the best way of getting to know human behaviour and that true knowledge lies in the experience of the senses. It can be acquired by observation and experiment (Blaikie, 2000). At the ontological level, this

approach assumes that reality is observable and that '...the end product of such research can be law-like generalisations similar to those produced by the physical and natural scientists (Saunders et al., 2011, p.113). The adequate knowledge in positivism is in the form of facts and not impressions. These facts are similar to observable social reality in the natural sciences. Hence, positivism is concerned with "uncovering truth and presenting it by empirical means" (Henning et al., 2004, p. 17). Further, the researcher is external to the process of data collection, i.e., neither the researcher is affected by the research, not is research affected by the researcher.

3.2.2 Realism

Realism is also, like positivism philosophical position, used for scientific enquiries, "The essence of realism is that what the senses show us as reality is the truth: that objects have an existence independent of the human mind." (Saunders et al., 2011, p.114). Gill and Johnson (1997) report, realism implies reality to be present even when humans were not around. "Therefore, valid knowledge about a concrete reality can only be discovered through sense observation and measurement and any reference to the intangible or subjective are excluded as meaningless" (Holden and Lynch, p.10).

3.2.3 Interpretivism

The interpretive paradigm is concerned with understanding the world as it is from the subjective experiences of individuals. Critics from the interpretive perspective started to question the positivist approach due to its lack of subjectivity in interpreting social reality. Particularly, researchers argue that "... the world of business and information management is far too complex to lend itself to theorising by definite 'laws' in the same way as the physical sciences." (Saunders et al., 2011, p.116). Advocates of the interpretive perspective argue that if the complexities of the world are reduced to law-like generalisations (as in case of positivism); it is possible that the deep meanings in these complexities may be lost (Blaikaie, 2000; Hatch and Cunliffe, 2006). Hatch and Cunliffe (2006) view interpretivism as anti-positivist and argues that Interpretivism strongly emphasises the need to understand humans in their role as social actors rather than simply as objects. Reeves and Hedberg (2003) note: interpretive paradigm stresses the "need to put analysis in context" (p.32).

3.2.4 Pragmatism

Pragmatism entails that “it is possible to work within both positivist and interpretivist positions. It applies a practical approach, integrating different perspectives to help collect and interpret data” (Saunders et al., 2009, p. 598). However, in order to adopt a pragmatist approach, it is necessary that the research question is suitable for both positivist and interpretivist approaches.

3.2.5 Author's Philosophy

The purpose of this research is to investigate the factors that contribute to EOD and the role of web technologies for EOD in technology-based organisations. I believe interpretivism is an appropriate philosophical approach to guide the phenomenon under investigation for several reasons. Firstly, this study explores the social meanings that managers (managers here refer to the staff members involved in entrepreneurial activities either directly or indirectly) in technology-based organisations assign to the link between web technologies and the discovery of entrepreneurial opportunities. Therefore, the underlying assumption at ontological level is that social phenomenon under investigation is subjective and is created from the understanding and actions of managers in technology-based organisations. Secondly, investigation of managers' understanding of the given topic is a complex phenomenon, and there is no adequate, relevant extant literature. Therefore, due to the complex nature of the phenomenon, it is not possible to arrive at the truth by merely aggregating data. Thirdly, interpretivism allows the researcher to get deep insights about the life experiences from the viewpoint of the ones who had experienced them (Schwandt, 1994). The systematic literature review conducted for this study suggested that there was little research on the influence of web technologies on EOD. Therefore, interpretivism seems an appropriate philosophical approach for this study.

Table 3.1A displays the characteristics of interpretivism, as used in this research categorised into the purpose of the research - the nature of reality (ontology), nature of knowledge and the relationship between the researcher and the inquired into (epistemology) and the research methodology (Cantrell, 2001).

Table 3.1A. Characteristics of interpretivism in this study (Adapted from Cantrell, 2001)	
Feature	**Description**
Purpose of research	Explore the phenomenon of what are the factors that contribute to EOD and the role of web technologies in EOD in technology-based organisations.
Ontology	• There are multiple realities. • Reality can be explored, and constructed through human interactions and actions. • Discover how people make sense of their social worlds in the natural setting employing daily routines, conversations and writings while interacting with others around them. These writings could be text and visual pictures. • Many social realities exist due to varying human experience including people's knowledge, views, interpretations and experiences.
Epistemology	• Events are understood through the mental processes of interpretation that is influenced by interaction with social contexts. • Those active in the research process socially construct knowledge by experiencing the real life or natural settings. • Inquirer and the inquired-into are interlocked in an interactive process of talking and listening, reading and writing. • More personal, interactive mode of data collection.
Methodology	• Processes of data collected by interviews and relational analysis. • Research is a product of the values of the researcher.

3.3 Research Approach

Next to the philosophy layer of the research onion, is a research approach layer. There are two main methods of reasoning – inductive and deductive. In an inductive approach, a researcher does not

start with a theoretical model; rather the idea is to develop a theoretical model by identifying concepts and themes from the collected data. In other words, the researcher "infers the implications of his or her findings" (Bryman and Bell, 2011, p.11). In a deductive approach, a researcher starts with a theoretical model, develop hypotheses, collect data and test those hypotheses. If hypotheses are not confirmed, the researcher tends to revise the underlying theory.

I adopted the inductive research approach in this study for two reasons. First, the findings of the systematic literature review revealed no relevant theory of entrepreneurial opportunity discovery in the context of web technologies. Second, the phenomenon of entrepreneurial opportunity discovery in the context of web technologies is novel and complex, and inductive qualitative approach has been argued to be preferable approach when the investigation of a complex phenomenon is involved (Eisenhardt and Graebner, 2007; Saunders et al., 2011).

3.4 Research Strategy

The research strategy is the third layer of the research onion. Creswell (2007) suggests there are five approaches that best suit theory building research: phenomenology, ethnography, grounded theory, narrative research, and case study. These five main qualitative research methodologies are considered for the basis of the research strategy. These methodologies differ in their philosophic perspective to their research strategy for data collection and analysis. An understanding of these differences is essential for the selection of methodology that suits this research best.

3.4.1 Phenomenology

For the purpose of describing a phenomenon, phenomenology is often used as a methodology. The focus of this approach is to examine how life is experienced (Denscombe, 2003). In Phenomenology, the human experience come in to play and is concerned with how participants experience things and try to describe their experiences. Its interest is in the construction of social life and how humans interpret events. It suggests that interpreting events should be shared with others who are part of that community as it acknowledges that interpreting events is not an individual experience. This research strategy has not to be selected because the research question of this study is not only

about describing but actually about understanding what aspects of the web technologies supports in the discovery of entrepreneurial opportunities.

3.4.2 Ethnography

Ethnography is about the research subject interpreting the social world in the way they inhabit it and in the way in which they interpret it (Saunders et al., 2011). It has its origins in comparative cultural anthropology. Its focus is on an entire cultural group (Creswell, 2007). To conduct comprehensive ethnographic research, the researcher is required to do a long-term observation and have involvement in the social system that is being studied (Hussey and Collins, 2003). This then gives researchers enough knowledge about the social system and that of participants and their perspectives. Ethnography is suitable when the research question concerns a process or a group and seeks to explore the behaviours or belief and issues (Hussey and Collins, 2003). This research strategy has not been selected because there is a loose description of the cultural group (i.e., entrepreneurial managers) for participants and this study's aim is to go beyond mere description.

3.4.3 Grounded theory

Grounded theory is based on much fieldwork to discover what takes place in practice (Glasser and Strauss, 1967; Strauss and Corbin, 1990). Grounded theory can be a suitable approach where researchers are looking to generate new theory or to investigate human interaction. The general idea of this approach is to understand the main concerns of participants and how they solve them. Therefore, it requires a time consuming longitudinal approach to understanding a particular issue. As in this approach, researchers have to be completely open about new angles in the study; they cannot figure out prior to the study what will occur. In this study, I am embarking on a process to examine managers' understanding of the role of web technologies on the discovery of entrepreneurial opportunities.

Although the objective of this study is also to build a theory, following Eisenhardt (1989), I have analysed data with a few tentative constructs in mind which were identified through an extensive systematic literature review. Therefore, I did not adopt the grounded theory method research strategy.

3.4.4 Narrative

Creswell (2007) stresses: narrative research is suitable when the focus of the research is the study of one or two individuals and the collection of their stories to form data. Those life stories are then reported chronologically and the meaning of those stories is given.

The narrative methodology may have a specific contextual focus such as entrepreneurial managers in technology-based organisations. However, an individual narrative of the entrepreneurial managers was beyond the scope of this study. Clandinin and Connelly (2000) argue that a narrative methodology is more appropriate for getting the life experience or detailed stories of a small number of individuals or in often cases, details about single life; neither of which are pursued in this study.

3.4.5 Case study Research

In his influential work on the case study, Yin (2003) stresses that the case study is an empirical inquiry that;

1) Investigates and examines a contemporary phenomenon in its real-life context,
2) When the boundaries between that particular phenomena and context are not evident.

While writing in support of the case study in business research, Johnston et al., (1999) note: "Case study research consists of a detailed investigation that attempts to provide an analysis of the context and processes in the phenomenon under study" (p. 203). The approach lends itself to answering "why?" as well as "how?" type questions and for this reason is suited to the explanatory nature of this study. By comparison, the case study is a particularly useful way to investigate both the phenomenon itself and the context within which it is being studied.

Table 3.1B shows the circumstances where different research strategies can be used.

Table 3.1B. Appropriateness of situations where various research strategies can be used (Yin 1994)			
Strategy	Form of the research question	Control over behavioural events?	Focus on the contemporary event?
Experiment	How, Why	Yes	Yes
Survey	Who, what, Where, How many, How much	No	Yes
Archival Analysis	Who, what, Where, How many, How much	No	Yes-No
History	How, Why	No	No
Case Study	How, Why	No	Yes

Case studies are an appropriate methodology to map the field of technology entrepreneurship (Park, 2005; Farhoomand and Drury 1999). Stake (1995) note that in the case study there is a single unit of analysis based on the depth that is often exhaustive and holistic.

Given the interpretive stance adopted in this research and the nature of the research question of understanding how web evolution influence the discovery of entrepreneurial opportunities, it is believed that this approach is suitable for this topic as it has the potential to reveal in detail the unique experiences of individuals (entrepreneurial managers) and the layers of factors influencing the opportunity discovery process. The unit of analysis in this study is the individual within technology-based organisation. The individuals were selected based on their knowledge about web technologies and involvement in entrepreneurial activities in order to be able to provide details about the use of web technologies for EOD.

The case study method was chosen because of its advantages in creating novel and profound insights and its focus on examining the rich social and cultural influence on managers who use web technologies to discover entrepreneurial opportunities. Pare and Elam (1997) argue that case study

research strategy makes the capture and understanding of context possible and can be used to achieve a variety of research aims using diverse data collection and analysis methods.

3.5 Research Choice

Section 3.2.5 explains the rationale for the choice of the qualitative interpretivist approach adopted for this study. The research studies can be qualitative, quantitative or combination of both (Creswell, 1998). Any study can use a single method (one quantitative or qualitative), mixed methods (a mixture of quantitative or qualitative) or multi-methods (more than one qualitative or quantitative) to collect and analyse data. I adopted qualitative multi-methods choice to triangulate data so that plausible case studies could be presented.

3.6 Time Horizon

Time horizon layer of the research onion is concerned with time of research – cross-sectional or longitudinal. A cross-sectional design entails the collection of data on more than one case, and at a single point in time in order to collect a body of quantitative or quantifiable date in connection with two or more variables (Bryman and Bell, 2011). A longitudinal study investigates a phenomenon over a more extended period. The primary interest of this study is to investigate the factors that contribute to the discovery of entrepreneurial opportunities and the role of web technologies for EOD in tech-enabled organisations. I believe that a cross-sectional investigation can reveal equally essential insights about the phenomenon as longitudinal investigation could. The cross sectional studies are inexpensive and fast. Another advantage of cross - sectional studies is that participants are less likely to leave the study before data is fully collected (Bryman and Bell, 2011).

Following Saunder's onion model, the next sections follow research techniques and procedures.

3.7 Multiple Case Study Research Approach

The first step in every proposed case study approach is the definition of the phenomenon of interest (Eisenhardt, 1989; Eisenhardt and Graebner 2007; Stake, 2006; Yin, 2013). The term "*quintain"*, coined by Stake (2006), means a general description of the subject to be studied. This research involves the inductive investigation the role of the web technologies on the discovery of entrepreneurial opportunities in technology-based organisations.

In the second step, suitable cases for studying the *quintain* are selected (Stake, 2006). Following the second step, the staffs working at the organisation is structured, as outlined by Stake (2006).

In this study, I performed the role of a director, data collector and analyst, so there was no need to perform staff structuring activity. In the last chapter of the thesis, my limitations are acknowledged as a single researcher.

When the cases were appropriately chosen, a data examination was done independently and separately. Stake (2006) stresses the significance of concentrating "on every single case as though it is the just a single" and that multiple case study research ought to include the investigation of "one case at any given moment" (p.1).

Now, I entered the field with various data collection methods previously structured. The primary target was to understand the case. Thinking about what each contextual investigation is and what it is not is imperative for epistemological reasons in connection to the qualitative investigation. As Stake (2006) point out there is both an inside and an outside of the case. The individual cases were concentrated to find out about their self-centring, multifaceted nature, and situational uniqueness. Indeed, the multiple case study analysis of a phenomenon "isn't so much an investigation of the quintain as it is an investigation of instances of what they inform us concerning the quintain" (Stake, 2006). Along these lines, two distinct parts of every single case were considered, that is the contextual information and those related to the case's operations.

Contextual data refers to the "situationality of the quintain" (Stake, 2006), that is all the outline attributes of the case and its activities. In this research, it incorporates, for instance, insights concerning the organisation, number and abilities of individuals inside it, web technologies used, types of business services offered, etc. Information about the case's tasks are implied. The outfit of data is in connection to activities that are engaged with the utilisation of web technologies. Once all the significant information has been gathered and systematically saved, the first round of qualitative analysis and interpretation for the single explicit case is led. From this progression, various tentative assertions use web technologies, related factors, and connections explicitly identified with the

individual case are laid out. With these preliminary findings, Stake (2006) proposes directing a validation/approval effort.

This activity includes a step back to the case to make sure that the correct data and interpretations have been acquired. The last step (if no requirements for further data collection activities emerge from the validation stage) for the single case study is the composition of the case report. Inside each case study report, various factors, related variables, and connections between factors were available. At this stage, as per Stake (2006), often the final report of each case investigation is intactly presented (see Sections 3.4 and 3.5), proceeding with a cross-case investigation with some more accentuation on the binding ideas or concepts (see Chapter 5).

Before achieving the conclusions, another stage was planned in this study. Specifically, Stake (2006) proposes the open door for the case study researcher to gather further information outside the cases themselves. Along these lines, I coordinated the findings from the multiple case studies with extra meetings involving experts in the area and other participants in the web technologies for information relating to EOD. To this last stage the name "validation across cases" is given in this research. Further activity was lastly done by enfolding the literature. As part of this progression, the inductive investigation across cases was positioned within both the technology entrepreneurship literature and those theories developed for entrepreneurship. By contrasting the investigation from this exploration and two bodies of literature, contributions to these scholarly discussions developed.

The procedure used for this research is planned upon the work exhibited in (Stake, 2006). Other multiple case study scientists' methodologies have been assessed and considered. Especially applicable for the extent of this research is the comparative methodology for inductive theory building proposed by Eisenhardt (1989). The author proposes an eight-step process inductive theory building for multiple case studies. These steps are: (1) beginning; (2) choosing cases; (3) creating instruments and protocols (i.e. information gathering strategies); (4) entering the field; (5) break down the information: the information gathered should be investigated from both the single and multiple case study points of view; (6) moulding theories; (7) enfolding literature; and (8) achieving

conclusion. A summary of the multiple case study protocol including the main steps followed is presented in Figure 3.2.

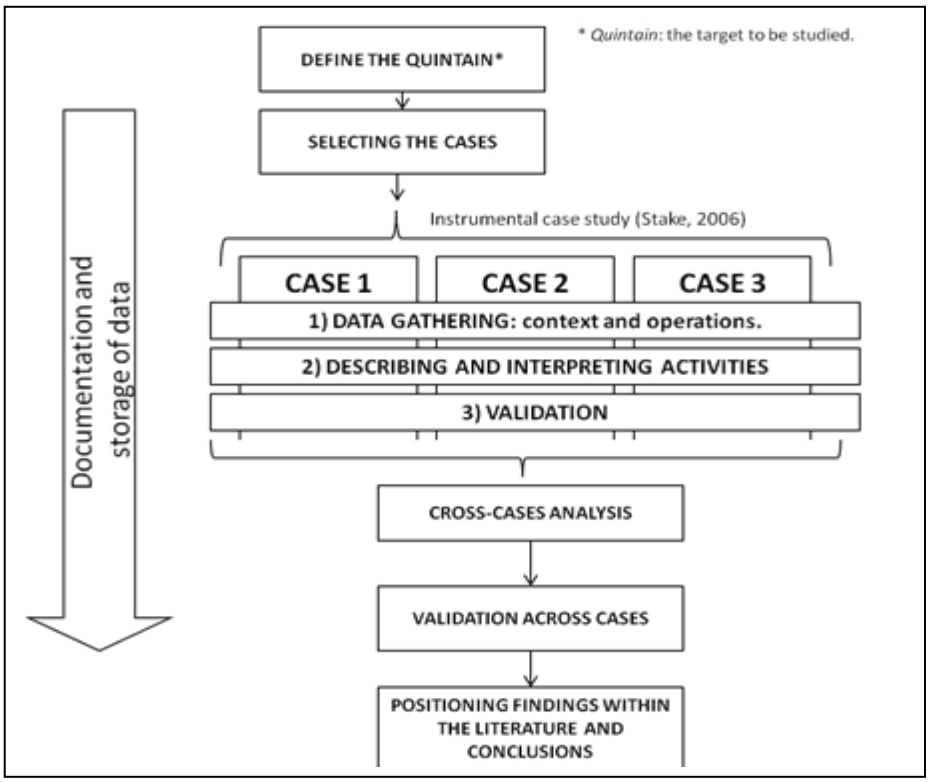

Figure 3.2: Multiple case study protocol (Adapted from Stake, 2006; Maccani, 2016)

3.8 Case Study Selection

As a result of reviewing the different approaches proposed in the literature, three cases that are adopting web technologies for EOD were selected. This section describes this process. Various case study methodologists consider it vital to select correct cases (Stake, 2006; Eisenhardt, 1989; Yin, 2013; Walsham, 1995). Eisenhardt (1989) argues that random selection of cases is not preferable. As a result, criteria must be established to select the most appropriate cases.

The first fundamental requirement for a case, technology-based organisation, was its involvement in the use of web technologies for EOD. Eisenhardt and Graebner (2007) argue that cases may be an interesting phenomenon of historical accounts, but are more likely to be new descriptions of "recent events" (p.25). Pettigrew (1988) proposed since the standard number of cases that can be examined is restricted, to consider extraordinary circumstances in which the phenomenon of intrigue is transparently observable. Therefore, the potential sample of cases was initially reduced to technology-based organisations where web-based services are developed, and related business

models are in place, and where web technologies play an essential role in EOD. In other words, those organisations in which web technologies plays a marginal role within the actual services delivered were excluded.

Another key aspect is the diversity of cases in different contexts (Miles and Huberman 1994; Stake, 2006). It is critical to place each case within their own context and to study their relationships and influence on the quintain (Stake, 2006). Including all these characteristics, Stake (2006) proposes three questions regarding the suitability of cases. These are: 1) Is the case is relevant to the quintain? (2) Do cases provide context-wide diversity? (3) Are there good opportunities for cases to learn about complexities and contexts?

Concerning the first question, the quintain "must be important in such cases "(Stake, 2006). For an in-depth understanding of the central phenomenon, information-rich cases are recommended (Patton, 1990). The second question was dealt with differently by selecting cases in which employees are involved in EOD. Finally, cases were selected for how long I could spend and how accessible they were (Stake, 2006).

Therefore, the final criterion for selecting the cases was their accessibility. By this I mean the availability within the targeted organisation of the subjects to: reveal relevant information about the company, its activities, its history and its strategies for the future; devote adequate time to data collection; make sure that subjects at all levels of the company are available to involve with me as a researcher; and show willingness in research study and see potential value for them by involving in to it.

After defining criteria for selection of cases, the number of cases to be studied is another decision to be taken. Stake (2006) proposes examining three to ten cases. In light of the use of the Stake method, the three case studies yielded sufficiently robust results. Data saturation was reached when there was enough information to replicate the study (O'Reilly and Parker, 2012), when the ability to get additional new information was attained (Guest et al., 2006), and when further coding was no longer feasible (Guest et al., 2006).

The application of triangulation (multiple sources of data, see section 3.10) enhanced the reliability of results (O'Reilly and Parker, 2012) and the attainment of data saturation. Denzin (2009) note that triangulation is the way in which researcher explores different levels and perspectives of the same phenomenon. It is one method by which the validity of the study results are ensured.

Burmeister and Aitken (2012) argue that the data saturation is not about the numbers but about the depth of the data. Therefore, I chose the sample size that had the best opportunity for me to reach data saturation. A large sample size does not guarantee one will reach data saturation, nor does a small sample size—rather, it is what constitutes the sample size (Burmeister and Aitken, 2012). O'Reilly and Parker (2012) note that if case study researcher has reached the point of no new data, he/she has also most likely reached the point of no new themes; therefore, he/she has reached data saturation. Guest et al., (2006) made the point that the concept of data saturation has many meaning to many researchers and it is inconsistently assessed and reported.

From a socially constructive perspective, however, one of the risks associated with multiple case studies is to reduce complex cases to some comparable variables, leading to the loss of individual cases' idiosyncrasies (Lauckner et al., 2012). To mitigate this risk, Creswell (2007) proposes less case may be examined in order to investigate individual cases properly. Guest et al., (2006) noted that data saturation may be attained by as little as six interviews depending on the sample size of the population.

According to Stake's (2006) perspective, this study examined three cases in which web technologies data is extracted, elaborated, and converted into entrepreneurial opportunities. To achieve robust results, the focus of study was to think of data in terms of rich and thick rather than the size of the sample (Burmeister and Aitken, 2012).

Section 3.10 explains data collection methods in detail.

A summary of the demographics of individual cases is provided in Table 3.2.

	Case A	Case B	Case C
Context	Data Analytics	Telecommunications and ICT Equipment	IT and Innovation services
Year of Foundation	2011	1970	1956
Size	6 staff	100 + staff	1000 + staff
Location	Ireland, USA and Italy	Ireland and Worldwide	Ireland and Worldwide
Web technologies data	End-user data	End-user and in-house innovation data	End-user data and in-house innovation data
Revenue Models	Freemium and Premium	Freemium and premium	Freemium and premium

Table 3.2 Case Demographics

As shown in Table 3.2, the selection criteria were met by all cases.

In particular, all the cases represent a situation in which web technologies data for the delivery of one or more commercial services are in place and where that data is analysed for entrepreneurship. Also, diversity across contexts is ensured given the different domains and locations in which services are delivered in different cases. Finally, all cases expressed interest in the study and offered to share documents and information and to allow adequate time for the study.

3.9 Single Case Study Protocol

This section aims to illustrate the general steps taken in each case. It is noted that every step described in this section is addressed later in this chapter in detail. Each case study with one of its representatives began with a first contact (stage 1). For all cases, this contact occurred through emails. The first step was a short discussion with the subject to introduce myself and my research purposes. Once positive feedback was received, a first face - to - face meeting was proposed and

planned. As stake (2006) argued, researchers should anticipate what the meaning and activities of different people could be. To this end, the first stage was impacted by a thorough review and analysis of the case organisation documents available to the public (stage 2). It included the website of the organisation and other relevant materials on the internet. After collecting general information about the organisation, I was able to reflect first on the appropriateness of the case (stage 3). In particular, by examining these data, I was able to verify whether the company is using web technologies for EOD, detailed explanations of the services provided and other relevant information, such as the web tool(s), the models with which the company communicates with customers, etc. When the requirements for this study were met, a first face - to - face meeting (stage 4) was planned and undertaken.

Until this stage, the company's CEO has been the main interlocutor. The first meeting focused on the collection of internal documents and a full range of contextual data and general information on the company and more detailed web technology characteristics. Context information was critical to confirm the "situationality of the quintain" (Stake, 2006). At these four stages, the dynamics of each case and the activities involved in the specific case became evident. Also, the primary methods of data collection planned have been described. Technical parts of the interviews were agreed (e.g. duration, recording, type of interview, questions which have been asked). Other ethical aspects were mentioned in accordance with the regulations of the University. In this regard, in order to minimise the possibility of lack of trust in me, it was highlighted I am collecting the data for research purposes only (See Appendix 8, consent form). In the following stages, this meeting was used regarding specific efforts to minimise social disconnect with the subject(s). From the outcome of the first meeting, a second reflection was carried out on the appropriateness of the case (stage 5). This included the presumed (and actual) utilisation of documents and relevant information and positive feedback on the thorough purposes of this research. I was able to structure the general contextual information on the organisation at this stage (stage 6).

Once I knew the case and its practices, I could answer in detail the fundamental question of "what can be known" (Stake, 2006) (stage 7). I have “entered the field” with this information (Eisenhardt,

1989) (stage 8). At this stage, I spent a good amount of time putting the activities of each case in their own scenario (Stake, 2006). One of the most important aspects of multiple case studies is to show how the phenomenon occurs in various contexts. I have therefore been involved with the people in each case in order to study in depth what the case does concerning its internal activities and working. This knowledge was enhanced by observing operations and informal conversations between people carrying out their activities. Field notes were written to store the relevant data. I conducted semi-structured interviews after entering the scope of the case (stage 9). The initial protocol (see subsection 3.10.4) was updated concerning the data collected and structured in the process up to now. In this way, changes to the original protocol were made concerning both content and language from the “what can be known “stage. When the first interview cycle was conducted, there was a need to deepen certain aspects in all cases. Thus, following analysis of the first interviews, a new protocol was designed specifically to examine unclear or under-investigated aspects. The collected data was the input for qualitative data analysis (step 10). At this stage, tentative assertions were made about each case. In other words, a tentative model detailing the influence of web technologies on the discovery of entrepreneurial opportunities had emerged in each case. During the final validation stage (stage 11), these preliminary results were the primary object in question. This is intended as a set of activities to ensure that the data has been correctly interpreted (Stake, 2006). After analysing, (also sometimes) correcting and enriching the findings on each case, the case study reports were written. The above stages are summed up in figure 3.3. In practical terms, each case study lasted between three (Case B) to six months (Case C) from the first interaction to the establishment of the company's latest web technology model.

In the end, I reported to the company's CEO about involvement with other practitioners and entrepreneurs who showed interest in seeing the final findings of this research. I made it clear that there is no contract or agreement for which these subjects will be followed up. However, I specified how the other subjects reported being interested in engaging with the companies as a step to understanding this research phenomenon for entrepreneurial opportunities. This aspect was well

received by the CEOs of the cases and, in my opinion, encouraged them to conduct this collaboration seriously and proactively.

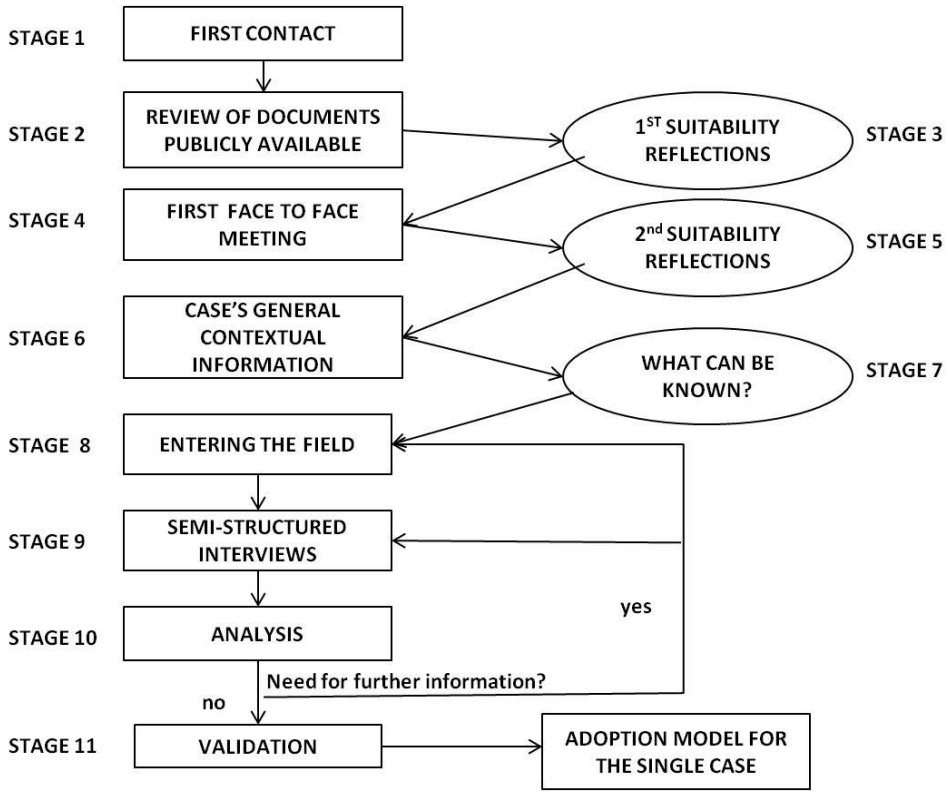

Figure 3.3: Single case study protocol (adapted from Stake, 2006; Maccani, 2016)

3.10 Data Collection Methods

Yin (2013) and Stake (2006) stress the importance of setting a specific framework for the collection of structural data in the context of a case study. It is recognised that starting without a good plan is a road to failure. It is noted, however, that having a data collection plan differs from preconceived ideas. The more quantitative the study is, the more similar the methods should be in each case, but inductive qualitative case study researchers usually blend multiple data collection methods (Eisenhardt, 1989) and keep the process design flexible. Yin (2013) argues that there may be evidence from six different sources for case studies: documents, archival records, direct observation, participant observation, interviews and physical artefacts.

Though observation was a natural source for the collection of data during the time that I spent in the cases, some further reflections on the other evidence sources proposed are necessary.

Specifically, archival records were found to be good source for the collection of critical qualitative data concerning the nature of the cases to be studied. Concerning the former, given the early stage of web technologies phenomenon, the companies that were studied have recently started to use them to identify entrepreneurial opportunities. As a consequence, archival records were not even available. Furthermore, the journey from taking web technologies data from a raw dataset to the design of one or more valuable services for end-users was not found to involve specific physical artefacts.

Consequently, informal meetings (i.e. observation, analysis of documents) and interviews were the primary sources of data gathering in the three cases. It is also noted that the final validation phase was also part of the process of data collection.

3.10.1 Observation – Informal Meetings

Part of the data collected throughout the cases consisted of field notes taken during the time I spent on site personally. In particular, this data source played a vital role in the first stages. Many questions were asked to the people of the cases when they collected general information about the organisations, their services and the people in them. As an actual observation step, another critical phase of these meetings took place. In particular, participants agreed to show me (from their computers) the technical characteristics of the web services, including the general platform and the coding behind it, the datasets and databases, as well as how general web tools management activities are implemented.

3.10.2 Documents Analysis

Yin (2013) argues that useful information can be obtained from the analysis of documents. The author points out five main documents which are often used in case studies:

1) Organisational website
2) Newspaper articles
3) Company reports and regulations
4) Policies and Procedures

5) E-mail correspondences

In this study, I initially collected all the available documents for each case. First, contextual information on each case was gathered from the organisation's website and structured. Secondly, I found a plethora of articles and interviews concerning the cases on the Internet. These have been searched, ordered and selected based on which were the most relevant, reliable and complete. Positive feedback from the CEOs of the cases was also obtained in this selection. Thirdly, documents such as management summaries, financial reports, regulations and company statutes were considered crucial to understanding how the organisations operate, function and connect to the overall EOD ecosystem. The websites and related web portals of these organisations from which the information is reused have also been taken into consideration. Also, the written communication between the participants in the organisations (only relevant for Case B) and me was another source of qualitative data. Lastly, given the availability of all services as web applications, I experienced them personally in order to become more familiar with the activities and results of the cases. All documents played an essential role in gaining an overview of the organisation and its context and in shaping "what can be known" from the case. This information was subsequently used to customise the interview protocol and to provide evidence for the final findings.

3.10.3 Qualitative Interview

Walsham (1995) argues that interviews are the primary data source, "For this method is the best way for the researcher to access the interpretations that participants have regarding the actions and events that have taken place or are taking place, and the views and aspirations of themselves and other contributors " (Walsham, 1995, p.78).

Interviews are effective ways of collecting rich empirical data (Eisenhardt and Graebner, 2007). As the unit of analysis in this study is the individual within technology-based organisation, this method was selected because it differs from other research methods by directly engaging participants in a conversation with the researcher in order to generate profoundly contextual, insightful and genuine accounts of the external and internal worlds of participants, that is, their experiences and interpretations (Schultze and Avital, 2011).

A qualitative interview is an exchange of opinions between two people–one of whom is a researcher–who have a common interest in a topic (Kvale, 2008). The subject of interest is usually the interviewee's experience of his or her world of life, because it is lived and formed in consciousness (Polkinghorne, 2005). The qualitative interview method is used in all kinds of qualitative research (Myers and Newman, 2007; Hesse-Biber and Leavy, 2006; Klein and Myers, 1999; Myers, 1997). Reality is not discovered here but is interpreted and built. Various types of interviews occur. Some of the most common of these are:

- Structured interviews: there is a complete script within this type that is prepared and structured before the interview. There is no room to improvise.
- Semi-structured interviews (SSI): a script is incomplete in this type. There may have been some questions before the actual interview, but there is room for improvisation.
- Group interviews: two or more people are interviewed at once in this type - structured, semi-structured or unstructured (Fontana and Frey, 2000).

I adopted the SSI type for this research project. The purpose of qualitative interview research is to describe and clarify the experiential life of people as human beings have lived, made sense of, felt about, undergone and accomplished it (Schwandt, 2001).

As experiences are not usually observed, the interview needs to help researchers reach beyond the simplistic layers of their experience to produce insightful and new accounts of the phenomena of interest. As a consequence, I was actively involved in the construction of data in order to discover the lived world and life experiences of people before scientific knowledge (Kvale, 2008). One of the researcher's goals is to trigger and stimulate the interpretive skills of the interviewee (Holstein and Gubrium, 1995). In other words, SSIs provide space for improvisation, which in turn drive the interpretive aspect of the discussion. In the SSI process, therefore, everyone is an interpreter, and the objective of interpretive studies is to understand the complexity of the process of creating human sense and the processes through which inter-subjectivity is acquired as the situation changes continuously (Nicholson and Sahay, 2004). In summary, as described in Schultze and Avital (2011), the SSI method has three main characteristics. The following are:

1. The interview is based on the experiences of the participants: the method is based on the description of the participants ' experiences. This means keeping the interview based on real events and settings. The recounting of lived events enables the researcher to see the social world of the people involved and their meaning (Alvesson, 2003).
2. Recognising and valuing the narrative (re) construction of the experience of the participants: this means that the data generated in an interview must be regarded as narratives generated at present rather than facts or stable meanings.
3. Provide an explicit framework to guide participants in the articulation and interpretation of their experiences. A framework must be defined to organise the conversation in a way that guides the interview through his or her introspective journey to honour his or her freedom of expression and thought. Therefore, an SSI protocol was developed before data collection began.

3.10.4 The Semi-Structured Interview Protocol

The interviewee participants were selected based on their knowledge about web technologies and involvement in entrepreneurial activities, in order to be able to; (1) provide comments, critiques, and details about the use of web technologies for the discovery of entrepreneurial opportunities; 2) interpret and support the preliminary findings of this research. Those involved in this effort should, therefore, be "informative participants" (Miles and Huberman 1994). Purposive sampling was chosen as an appropriate method for the selection of participants.

Purposive sampling is defined as a set of strategies designed to improve the understanding of the experiences of selected individuals or groups or to develop theories and concepts.

Researchers seek to achieve this objective by selecting information-rich cases that provide the “most insight into the research issue” (Devers and Frankel, 2000, p.264).

As a first step in the definition of the SSI protocol, the main information areas needed were described. The targets were mainly conceived from the aims for this research. In line with the role of theories of entrepreneurship in this research (see section 3.6). At this stage, theoretical language

and concepts were excluded. The information areas needed for this research study were, therefore, the starting points for the definition of the SSI protocol. The following areas are:

- Individual perception and understanding of web technologies.
- The influence process of entrepreneurial opportunities discovery.
- The motivations for using web technologies for business
- The factors that influence the sustainable establishment of the web technologies in the company's processes and the relationships between those factors.
- The barriers to putting in place a web technologies service-oriented business.
- Factors that would encourage people to use web technologies to discover entrepreneurial opportunities.
- Factors that would prevent people from using web technologies to discover entrepreneurial opportunities.
- Required resources and facilitating factors for implementing web technologies service-oriented business.

Overall, the designed SSI protocol was divided into six stages. In the first stage (Table 3.3), an estimated five - minute time was allocated to obtain personal information about the interviewee in the so-called "placing the actor" step (Myers and Newman, 2007).

#	Questions
1	*What is your name/age/gender/nationality?*
2	*What is your background?*
3	*What are your main experiences?*
4	*What role are you playing within the organisation?*
	Estimated time allocated: 5 minutes.

Table 3.3: SSI protocol step 1, situating the actor

The second stage (Table 3.4) was intended to research the individual perceptions of the ecosystem based on web technologies. This action is believed to be vital to reflect on the language used by the interviewee and to reflect it subsequently when formulating the questions of the next steps.

Further, it was necessary to make sure there was not a divergence regarding the understating of the main concepts involved (i.e. web technologies, entrepreneurial opportunities).

#	Questions
1	*How would you define web technologies?*
2	*Do you believe web technologies have the potential for discovering entrepreneurial opportunities?*
3	*How did you get involved with the web technologies based ecosystem?*
	Estimated time allocated: 5 minutes.

Table 3.4: SSI protocol step 2, individual perceptions of web technologies

The third step of this process (Table 3.5) was to investigate the actual motivations for web technologies. These also include the process through which awareness of web technologies was achieved, as well as the reasons why it was selected for the implementation of services.

#	Questions
1	*Why did you choose web technologies as the foundation of your business, instead of, for instance, looking for other sources?*
2	*How web technologies facilitate the discovering entrepreneurial opportunities?*
3	*Did you talk and discussed with other people/organisations in this field before initiating your business? If yes, how and to which extent did they influence your choice?*
	Estimated time allocated: 15 – 20 minutes

Table 3.5: SSI protocol step 3, motivations of using web technologies

After motivations to use web technologies have been inquired, the next step of the SSI was initially designed for investigating the processes for designing the actual entrepreneurial discovery activity

and for achieving sustained discovery of this source. These types of information were built using data from the interviewee's lived experience as a starting point (step 4), as a representative of an organisation that used web technologies for the discovery of entrepreneurial opportunities.

STEP 4: LIVED EXPERIENCE INFLUENTIAL FACTORS

#	Questions
1	*Which were the skills that were needed to discover opportunities in web technologies ecosystem?*
2	*Which were the resources needed to design and deliver the web technologies service?*
3	*Which were the main factors that influenced the discovery of entrepreneurial opportunities in your organisation's processes and practices?*
4	*Which were the obstacles that you have encountered to put in place a web technologies service-oriented business?*
5	*Was any external action critical in the design and delivery of your service?*
	Estimated time allocated: 20 minutes.

Table 3.6: SSI protocol step 4, lived to experience influential factors

The next step (Table 3.7) was defined to take advantage of the opportunity to engage with people with extensive expertise in the field under analysis. At this stage, I directed to build on the generative potential of the subject in an admiring form of investigation (Cooperrider and Whitney, 2005). As explained in Schultze and Avital (2011), the appreciative interviewing process is designed as a retrospective inquiry that catalyses a prospective act. In this manner, the interviewee undertakes a journey in which he or she has the opportunity to discuss his or her most outstanding personal perspectives (step 4) in order to produce hopeful ideas and intended futures regarding the diffusion (or not) of web technologies for the discovery of entrepreneurial opportunities.

Finally, SSI's last stage is the exit step. Potential further interactions were also briefly discussed here (a question was asked in the form of "would you recommend that someone else is interviewed within or outside your organisation? ").

STEP 5: OPINION FACTORS AS DOMAIN EXPERT AND PRACTITIONER	
#	Questions
1	*In your opinion, which are the factors that would encourage people to use web technologies for the discovery of entrepreneurial opportunities?*
2	*In your opinion, which are the factors that would prevent people to use web technologies for the discovery of entrepreneurial opportunities?*
3	*Which other external factors, in your opinion, would increase the use of web technologies for the discovery of entrepreneurial opportunities?*
	Estimated time allocated: 20 minutes.

Table 3.7: SSI protocol step 5, opinion factors as domain expert

Several academic recommendations were gathered from the review of the IS literature on SSI and taken into consideration in the design and implementation of these processes. These are: that each interview should last approximately 1 hour (Quaddus and Xu, 2005); the interview must be transcribed the same or the next day to reflect on the language of the body and other fresh memories (Quaddus and Xu, 2005). Additional aspects involve dressing properly, showing empathy, listening relaxed and responding appropriately (nodding, smiling, etc.) (Myers and Newman, 2007); make sure that there are no breaks during the performance (Myers and Newman, 2007). The interviewee is also advised to use mirroring questions and answers. Mirroring includes taking the words and phrases used in the construction of a subsequent question or comment by the interviewee (Shim et al., 2002).

At the beginning of the SSI process, what was explained in Stake (2006) as the "situationally of the quintain", the relevant case-base context around the phenomenon to be researched, was defined for all cases. Additional elements to be considered and deepened through the SSI process emerged from the information gathered through this process. In other words, the original SSI protocol was further enhanced with new aspects of experiences. At the time of the structuring of the protocol, these were not considered and were thought to improve the quality and completeness of the data

collection process. One aspect common in cases, for example, was their international experience. Case A delivers its services in Ireland and Italy, Case B in Ireland and USA, and Case C operates in Ireland and worldwide (see Table 3.2). Hence, it became relevant to explore the differences that are in place in the process of using web technologies for the discovery of entrepreneurial opportunities.

Also, additional questions were added to step 4 of the protocol to investigate the presence of variables that are taken into account when targeting new cities. Another question was added as to which city is considered the best in its experience and which one is the worst and why the interviewee thinks so. In the end, additional questions about individual cases were added to the protocol from the specific situation. These are detailed in the chapter related to the specific case (Chapters 4 for cases A, B and C). It is noted that interviewees from cases A and B agreed to be audio recorded. In Case C, the CEO explicitly requested not to record him and the other interviewees.

3.10.5 Addressing the method's potential obstacles

In information systems literature a range of eight potential pitfalls are acknowledged to be concerned with the SSI method (Myers and Newman, 2007; Fontana and Frey, 2000; Hermanns, 2004; Miles and Huberman, 1994). These are:

1. Interview artificiality
2. Lack of trust
3. Lack of time
4. Entry level
5. Hawthorne effects
6. Knowledge building
7. Language ambiguity
8. Elite bias

These potential pitfalls were similarly addressed in all cases. Table 3.8 provides details of each potential pitfall and the actions I have taken to address them personally. Also, the literature recognises that interviews may go badly concerning the interviewer's possibility of upsetting or unintentionally insulting the interviewee (Hermanns, 2004). Fortunately, none of the interviewees

felt insulted or offended in this research. The framework (Myers and Newman, 2007) was adopted to describe the interviews throughout the cases. This was intended to describe SSIs in their entirety. It was extracted from the theory of face-to-face interactions (Goffmann, 1959) derived from the dramaturgical model. Qualitative SSIs are understood as a drama:

1. The stage: this variable includes the location of the interview, but also the dresses, ranks, sex and age of the people (i.e. actors) participating and other things that could be used, such as pens, notes or recording equipment.
2. The actors: usually they are the interviewer and the interviewee.
3. The audience: you can see both actors as an audience. In general, the academic community can also be regarded as an audience.
4. The script: The interviewer script has a questioning framework (SSI protocol).
5. The entry: Impression management is vital; the aim is to minimise social dissonance and comfort the interviewee.
6. The exit: Leaving the stage could mean preparing for the next performance. All the cases interviews are described according to this model.

Table 3.8: Potential pitfalls of qualitative interviews

	Potential pitfalls	**Description**	**Actions undertaken for all the cases**
1	Artificiality of the interview (Myers and Newman, 2007)	The interviewee is a stranger, and needs to create opinions under time pressure.	The purposes of the research had been previously detailed. I also asked to allocate two hours for each SSI in order to avoid time pressure concerns.
2	Lack of trust (Myers and Newman, 2007)	This potential pitfall might result in the interviewee's the choice to not divulge sensitive information.	The clarification of the ethical aspects of this research ensured the subjects that no speculative use (or that can negatively impact the case) of the the data collected would be undertaken.

3	Lack of time (Myers and Newman, 2007)	It might result in incomplete data gathering.	No time constraints were fixed, and the time allocated was almost twice the time estimated.
4	Level of entry (Myers and Newman, 2007)	It might be difficult to reach the managerial level.	This risk did not exist as I approached the CEO and Founder of each case.
5	Hawthorne effects (Myers and Newman, 2007)	The researcher may intrude upon the social setting and potentially interfere with people's behaviours.	The investigation was focused on the interviewees' experiences and ideas. By not stating personal opinions, I sought to ensure I did not intrude upon the cases social settings.
6	Constructing knowledge (Fontana and Frey, 2000)	After gathering the data, the researcher has to construct the knowledge and the interviewee might be in a the situation in which he or she has to reflect on aspects that he or she had never considered so explicitly before.	A specific meeting was scheduled for re-visiting interpretations from the data collected (validation meeting) and ensure that correct interpretation of the data has been achieved.
7	Ambiguity of language (Myers and Newman, 2007)	It is not always apparent that interviewees fully understand the questions.	No misunderstandings happened during the processes as the language was kept simple and mirrored the companies and subjects' own language.
8	Elite bias (Miles and Huberman, 1994)	If only high status people are interviewed, a broader understanding of the phenomena might be missed	Data coming from all levels of the organisations complemented the data collected from the interviews. In addition, this data contributed in refining the interview protocol.

3.10.6 Single Cases – Validation

The last step was the validation stage for each case study. No two observers construct knowledge in the same way in interpretive case studies (Stake, 2006) and therefore complete and total confirmation is not possible. To limit the possibility of misinterpretation, redundancy of data collection and procedural challenges to explanations are two of the most common strategies (Denzin, 1989). In the data collection phases, the former was addressed. A validation effort was implemented as part of the latter. Stake (2006) stresses its value regarding an "assurance process" (p.33) by examining critically what is being said and interpreted. Validation is therefore meant here as an attempt to ensure the right information and interpretation was gained. There are two possible results according to Stake (2006):

1. Confirmation that observation means what we believe it means.
2. Ideas about observation are interpreted differently by different people.

I understand that a further possibility should be linked to this assessment. It relates to the possibility of identifying the need to collect more information if one or more statements are found to be incorrect or unclear.

According to the methodology developed for this study, this validation phase occurred after all the data collected was analysed qualitatively, and initial findings were organised for each case. At this point, the last meeting was planned at the sites of the cases with the primary objective of making sure that the data collected were correctly interpreted. These meetings aimed to review the complete process of analysis, which resulted for each case in the definition of many tentative assertions about links, factors, and variables between factors influencing the discovery of entrepreneur opportunities by web technologies. When validation of these tentative assertions was obtained, they were translated into final assertions on each case. In the case of tentative assertions, however, which were discovered to be unclear, inconsistent or incomplete, a decision was made to

delete these from the findings or to inform the participants of the cases of the need for more data collection.

Also, a comprehensive review of all concepts retained during the analysis was carried out because there was not sufficient evidence to justify their inclusion in the initial findings. It is reported that this phase of research was also meant to address potential limitations concerning single researchers conducting inductive multiple case studies (Stake, 2006).

This final meeting with each case ensured that the information gathered was correctly interpreted — the analysis of the collected data received generally positive feedback. However, some changes were proposed by the subjects of the cases and subsequently addressed in the final findings on each case. During these processes, the subjects were continually asked questions such as "would you like to add something in connection with this aspect?" From the generally silence received, it could be concluded that no more data gathering was necessary, and the final results could be outlined in each case.

All data collection techniques used in this research have been outlined in this section. It is noted that further data collection was carried out during the validation stage during the cross-case analysis phase. This study phase is described in section 3.17. Table 3.9 summarises the collection of data in the three cases studied.

Table 3.9: Single cases data collection summary

	Case A	**Case B**	**Case C**
People encountered	4	6	6
Positions	CEO, the developer, lead developer, business developer.	CEO, developer, business developer	Manager, employee
Number of meetings	5	9	8

Observations	8 hours	2 hours	3 hours
Number of SSIs	2	2	4
Interview participants positions	CEO, product manager, ICT manager and Business Manager	CEO, product manager, ICT manager and Business Manager	CEO, product manager, ICT manager and Business Manager
Total duration of interviews (recorded)	3.5 hours	4 hours*	5 hours
Number of internal documents	3	4	3
Number of external documents	7	7	8
Validation meeting	2 hours	3 hours	3 hours

*it is noted that for Case C three interviews were not recorded.

3.11 Trust Worthiness of Multiple Case Studies

Guba and Lincoln (1980) developed criteria for the trustworthiness of qualitative research, and argued to replace terminology for achieving rigor, reliability, validity, and generalisability with dependability, credibility, and transferability. Critiquing their work, (Morse et al., 2002) argue that recommendations for where, why, and how to use these strategies have not been developed, and how well they achieve their intended goal has not been examined. Morse (2015) recommends that qualitative researchers return to the terminology, using rigor, reliability, validity, and generalisability, and ensure rigor through prolonged engagement, persistent observation, and thick, rich description; inter-rater reliability, clarifying researcher bias and triangulation.

Construct validity, internal validity, external validity and reliability must be taken into account as in all research (Yin, 2013; Stake, 2006; Eisenhardt and Graebner, 2007). All of these aspects have been

achieved through a variety of research activities/techniques described in this document and briefly revised in this section.

The validity of the construct has traditionally been defined as an experimental proof that a test measures the structure it claims to measure (Brown, 2000). Following Yin (2013) and Stake (2006), validation efforts were thus undertaken both in each case and at a cross-case analysis level. Also, records of the data collected and the building chain of evidence during the duration of this multiple case study project have been considered to be the key components. Another last suggestion to improve the validity of the construct is to use many sources to provide further evidence (Eisenhardt, 1989; Miles and Huberman, 1994). This principle highlights the variety of data sources used in this project.

Internal validity concerns the degree of inferences of the researcher in determining causal relations (Yin, 2013). The coding procedures used to analyse data were therefore designed and carried out to "create and assign categories and explore links between them" (Dey, 1999, p. 146). In IS research, this specific approach is used to help “interpretive researchers establish causal relationships that ultimately lead to theory" (Andrade, 2009, p.49). Furthermore, I followed Eisenhardt’s (1989) suggestion of "enfolding literature" to place the final inductive results in cases. As explained in section 3.18, the pattern matching logic was used and the results were subsequently strengthened (Eisenhardt, 1989; Yin, 2013). This concept is partly linked to external validity, which represents the generalisation of the results from the various cases (Yin, 2013). In interpretative studies, the role of generalisation is controversial (Walsham, 1995). Section 3.15 provides a thorough reflection on these issues. However, external validity is set to increase again by applying pattern matching logic to analyse the interpretations collected from the cases (Yin, 2013).

Finally, about the reliability of case studies, Yin (2013) and Miles and Huberman (1994) recommend two research activities: the development of a case study protocol and a case study database. In this project, a protocol has been developed for the overall multiple case methodologies, the single case

study and the primary data collection methods used. Also, all original data and information on the cases were collected and stored and continuously retaken when the findings were constructed.

In this second part of Chapter 3, the research methodology used in this research has been detailed with a particular emphasis on the individual cases. The multiple case study research protocol was initially introduced. The focus of the chapter was shifted to the individual cases (it is noted that sections 3.14-3.18 are dedicated entirely to the cross-case analysis). After the presentation of the case selection criteria, the protocol of the single case was formulated, including the definition of the various stages involved in the investigation of each case. The data collection techniques used was described as a further level of granularity. Details on the implementation of these methods are given in the chapters dedicated to each case study in the three cases. In the end, the trustworthiness aspects of this multiple case study have been outlined and addressed. The next section deals with the method of data analysis and the respective processes in each case.

3.12 Single Cases: Qualitative Data Analysis

For multiple case studies, it is suggested that two stages of analysis be carried out (Stake, 2006; Eisenhardt, 1989). The first stage covers single case data and the second stage covers the cross-case perspective. This section focuses on analyses for individual cases. Sections 3.14-3.18 are provided with the methods and techniques used in the cross-case analysis.

Analysis of data means “the search for data patterns” (Neuman 2005, p. 426). When a pattern has been identified, the researcher goes from the explanation of a historical event or social environment to a more general interpretation of its significance. This is in line with the final objective of inductive case studies, "to discover patterns, to determine meanings, to build conclusions and to construct theory" (Patton and Appelbaum, 2003, p.67). Data analysis is at the core of inductive case studies, but it is "the hardest and least codified part of the process" (Eisenhardt, 1989, p.539). It is difficult because it is not necessarily a mechanical or technical exercise, but a creative, intuitive and innovative process of inductive reasoning, thinking and theorisation (Basit, 2003). Miles and

Huberman (1994) suggest that appropriate techniques be chosen and that a subsequent analysis strategy is developed before gathering data. These techniques must be chosen based on the research objective. Patton (1990) argues that the aim of analysing data from interviews and documents (i.e. the primary information sources for this research) is the identification, coding and categorisation of patterns embedded in these data.

The significant threat is that all qualitative analytical methods mainly involve textual analysis (Myers, 1997). These texts are crucial to insight generation (Pettigrew, 1988). In this research:

- Interviews were transcribed. The three interviews in Case C were not recorded - I used a research assistant (note-taker) to write down responses of interviewees to ensure no information is missing and that data analysis is not affected.
- Observational data, informal meetings, documents and the cases' websites were available in textual form. Discussions on site were gathered and stored in field notes.

The qualitative data from the cases were therefore textual, non-numerical and unstructured.

3.12.1. Coding

This research aims at identifying factors and associated variables as well as the links between factors that contribute the discovery of entrepreneur opportunities by technology-based organisations. This means that the analysis process aimed at encapsulating it into meaningful categories and links from a broad range of data collected from each case. As the analysis proceeds, the amount of data taken into consideration is expected to decrease. However, this process does not mean that the data becomes smaller and manageable because less needs to be dealt with, but rather efficiency in organising and interpreting the data (Kaplan and Maxwell, 2005).

The term "coding" is used for this process in the literature (the terms "data condensation "and "data distillation" have also been used to characterise this process (Tesch, 1990). It includes the subdivision of data and the assignment of categories (Dey, 1993). Darke et al., (1998) provide a

meaningful definition of the word " coding " that meets the aims of this study in particular; they define coding as " the assignment to a selected unit of themes and concepts, such as a sentence from the recorded interviews [as well as documents and field notes].

The concepts are merged into linked categories, links between categories are found and validated against the information, and selective coding efforts are made to integrate the categories into a theory that explains the phenomenon under investigation (Darke et al. 1998, p.284). Coding and analysis are not synonymous, although coding is a key part of the analysis (Kaplan and Maxwell, 2005). Coding is one of the crucial steps held during analysis to organise and make sense of textual information (Basit, 2003). Codes are considered to be ties between data locations and sets of concepts or ideas, and in this way, they are heuristic devices that allow the researcher to go beyond the data (Coffey and Atkinson, 1996). Overall, the coding is appropriate in regards to the interpretative character of the study. In essence, coding makes it easier to organise, collect and interpret data and leads to conclusions based on this interpretation (Lockyer, 2004).

Another choice is whether coding is manual or electronic (e.g. the coding is appropriately facilitated by the use of specific software. I consider manual coding to be the most suitable way to analyse this study. This decision was informed by working on some application examples in both directions and by personally testing one of the software (NVivo). Due to the large amount of data to be analysed, the use of software is recommended in quantitative research. An optimal decision does not exist for qualitative research. Some variables that may affect this option are recognised as the availability of time and resources and project size (Basit, 2003). I chose open manual coding mainly because my interpretation and control of the results are improved in my opinion, rather than in a scenario in which software is used. This process generally involves six key steps (Stake, 2006; Miles and Huberman, 1994; Walsham, 1995; Darke et al., 1998; Berg, 2001). The following are:

1. Review transcripts and other documents manually, line by line and phrase by phrase, to reveal essential patterns/themes and to generate keywords/phrases (inductive method).

2. Produce these keywords/phrases/labels/categories. Classify factors with a high level and corresponding variables.
3. Look for relationships between the factors from each data source.
4. Create raw tables of variables of factors and their connections in each case.
5. The phase of validation and discussion of retained concepts.
6. Develop the final case-related model of the application.

These steps were developed to this study in Figure 3.4 (adapted from Stake, 2006; Maccani, 2016). This process should be inserted in the box "analysis" in the design of the single case study protocol

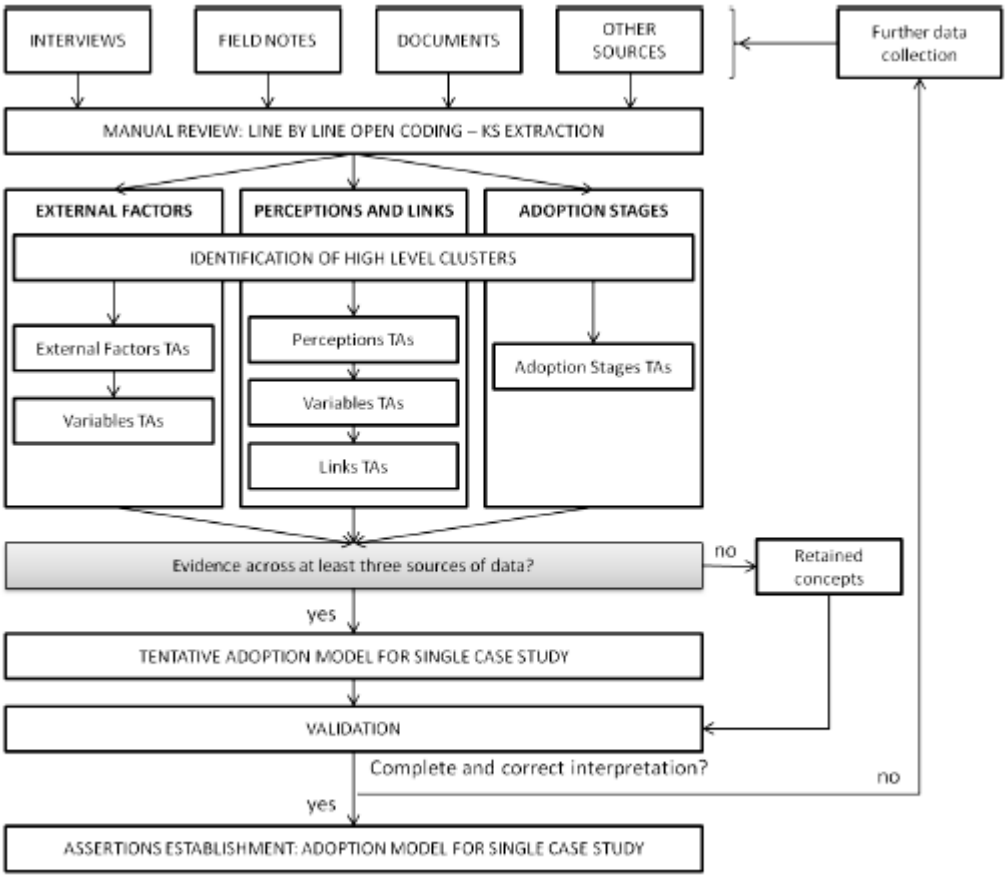

Figure 3.4: Single case qualitative analysis

The first step was to review these pages line by line with all the information available as text. Dey (1993) argues that the early stages of any initial data categorisation are slow and tentative. The transcripts of semi-structured interviews (SSI) were initially considered. The decision to start with

this data source was made when a review of the collected documents and field notes was carried out, and the SSI process was informed.

Glaser and Laudel (2004) argue that what they call ' extraction' is the key and central part of the process (p. 194). During this process, the earlier material was reduced, and a new information base separate from the original text was created. These concepts are stated in this document as key statements (KS). A code was assigned to each KS in the form of "# of the question, #of statements" to keep track of all the evidence collected. This labelling process for the KS became vital when the original data obtained at the single and cross-case analysis phases were repetitively reverted. Such KS (i.e. codes) are regarded as tags or labels for the assignment of units of significance to the descriptive or inferential data created during this study (Glaser and Laudel, 2004). Codes are generally attached to pieces of words, phrases, sentences or entire paragraphs of different sizes, linked or not connected to a particular setting (Miles and Huberman, 1994). Mayring (2000) defines the summary process as attempts to lower the material to maintain the critical content and to produce a manageable corpus that still reflects the original material by abstraction.

The aim was, therefore, to extract all the key topics and then categorise them concerning the main concepts of technology entrepreneurship. Some of the KS was found to be linked to one or more of these factors from the line-by-line review. They were regarded as critical because they provide information on possible links between these factors. An example of KS falling into this factor is (from Case A) "ideas in response to perceived market needs". This statement includes information on other factors (i.e. in the first analysis that a data standard needs to be formulated) which leads to perceptions. (i.e. the perceived usefulness of web technologies which will make “people” using it for entrepreneurial opportunism discovery purposes).

The analysis was carried out separately among sub factors. Initially, the initial KS was grouped in all categories based on their similarity. This activity was carried out in order to define sub factors in each factor to have more manageable analytical units. When these clusters were dealt with

individually, many concepts emerged from the grouping of similar KS, data from the gathered documents and field notes.

The next step in each cluster was to explain, clarify and annotate the identified factors. From this activity, tentative assertions (indicated as TAs in this document) on each case for the resulting factors or factors were developed (some clusters found a single tentative factor, while others were further broken down into additional categories), variables and links supported by substantial proof (i.e. at least three data sources). It is stated that KS about links were addressed as part of the analysis of perceptions, consistently aligned with the role of theory in this study (see section 3.6).

The various evidence sources were not strongly confirming some of the TAs. At this stage of analysis, these were emphasised and retained. During the final validation meetings, their inclusion or exclusion was addressed. In other words, some of the variables needed additional data to investigate their relevance in the opportunity discovery process of the particular case. A dedicated session was therefore assigned in the final validation phase to examine these variables in depth.

A tentative use model for the single case in question was developed through the aggregation of all TAs defined about factors, variables and links. These preliminary findings were included in the validation meeting along with the ensemble of retained concepts (see subsection 3.10.6). The initial tentative model was examined and modified accordingly. If certain tentative aspects were discovered to be vague or incomplete and/or new concepts surfaced from these interactions, consideration was given to the prospect of additional data gathering processes. On the other hand, when the right and complete interpretation of the gathered data was made sure, the validated TAs was translated into actual claims.

After the validation meetings, for each case, thick descriptions of factors, variables and links between factors affecting the discovery of entrepreneurial opportunities by web technologies were

available and represented the input for the next phase of this study, i.e. analysis of data across cases. The writing of the case study report was the last step in each case study.

3.13 Single Case Study Report

Stake (2006) defines a case study report as "a summary of what has been done to try to get answers [to the research question], what assertions can be made with a certain degree of confidence and what more needs to be studied" (p.14). The question of how to present fieldwork is considered vital in all research but is asserted "particularly critical in interpretive case studies" (Walsham, 1995, p.78). In this regard, the subject report contains facts as well the researcher's interpretations of some people's interpretations.

A recognised challenge in writing the results of qualitative analyses is to maintain the balance between description and interpretation. Patton (2005) argues these reports should provide "a sufficient description to enable the reader to understand the basis for an interpretation and to provide the reader with sufficient interpretation to understand the description" (p.503). The primary challenge is to what extent these aspects should be considered (Zhang and Wildemuth, 2010). Also, according to Walsham (1995), an interpretive case study report should cover both field data gathering and data analysis. I argue that a case study report should contain: the selected research site; the reasons for this decision; the number of interviewees; the hierarchical or professional positions they held; the other data sources considered; over what period the study was done; how field interviews and other data have been recorded; how they have been analysed; and how the iterative process between field data and theory has taken place (p.79). A case study report was prepared for each case from these considerations. These documents contained five main sections:

1. Introduction: this section explained why the case was appropriate, as well as an overview of all the interactions between me and the case participants and all the data collection methods used.

2. Contextual data: All general information about the organisation and its context was reported here. It involves organisation history, organisational structure, information about its employees, experiences and roles within the organisation and an explanation of the case's work on' discovering entrepreneurial opportunities through web technologies'.

3. Data analysis and interpretation: the entire process of coding.

4. Meeting(s) of validation.

5. Case study assertions: the final version of the usage model for the specific case was outlined in this last section. Each component has been provided with the emerging thick descriptions.

When these case study reports were completed, they were sent to the respective CEOs for review.

3.14 Cross Case Analysis

The single case study reports were finalised at this stage of research (see Chapter 4). The next step was to analyse the cases studied in order to develop cross-case assertions (CCAs). These constitute the main contribution of this research to the academic conversation on the role of web technologies in the discovery of entrepreneurial opportunities across cases. The results of the cross-case analysis were also the starting point for placing the findings of this research in the literature on technology entrepreneurship.

The cross-case analysis for this research was developed (mostly) from Stake's (2006) approach. Among the options proposed in his book, "track 2" was chosen because it focuses on "cross-case assertions" rather than emphasising the "quintain's situationality" (track 1).

Track 1 is interpreted not to affiliate with the philosophical positions taken in this study. It is described as "the path that emphasises the different situations and case findings" (Stake, 2006, p.6). Moreover, one of the key activities in this track is explained as the usefulness and findings of rating cases concerning their significance in understanding the quintain (Stake, 2006). I believe all cases are equally crucial to understanding the phenomenon of interest and that if critical positions were

assumed; the contribution of "rating" cases to this objective would be a relevant approach. However, general concerns arise from the literature in connection with cross-case analysis using an interpretative perspective. Thus, some considerations about the consistency of this process with the philosophical foundations assumed for this research are needed before beginning work on the cross-case analysis process.

3.15 Philosophical Consistencies of Cross Case Analysis

Although cross-case analysis is recognised as appropriate for inductive studies (Eisenhardt, 1989) and the methods of Stake's (2006) approach "fall within the interpretive/constructivist paradigm" (Lauckner et al., 2012, p.5), there is an consistent discussion in the literature on the need for consistency of case comparison under the interpretative philosophical background. This debate is based on the difference between profoundly contextualised and specific case knowledge and research based on multiple cases (Foreman, 1948; Allport, 1962; Molenaar, 2004). This means, "counter arguments arise from an epistemological conviction that case knowledge arises from a thick descriptive study of the specifics of a case" (Khan and Van Wynsberghe, 2008). Comparisons are therefore thought to be uncertain as case knowledge, including knowledge not relevant to comparisons (Peattie, 2001).

The main problem with the concept of generalisability arises (Khan and Van Wynsberghe, 2008). Unlike the positivist's understanding of generalisability, however, new concepts have arisen to expand and increase the impact of a single case beyond the case itself (Yin, 2013; Becker, 1990; Smaling, 2003; Flyvbjerg, 2006). For example, although the results of case studies cannot be generalised in a probabilistic context, they may still be applicable to other contexts (Goetz and Lecompte, 1984). Khan and Van Wynsberghe (2008) give a list of references in the context of interpretive research, including that of Stake's (2006) model, "that can be implemented to rationalize cross-case analysis" (p. 7). The paper thus emphasises the importance of considering

practical concerns for case study researchers before beginning work on cross-case analysis processes. Three aspects include:

1. Maintaining the essence of the cases: Tesch (1990) argues that the breadth of the meaning arising from each case's peculiarities is in danger of being lost when the data is restricted to allow comparison between cases. Stake (2006) argues that the similarity and uniqueness of a case can be learned. Specifically, " by providing extensive contextualised case details [see Chapter 4] and cross-case analysis findings [see Chapter 5], researcher can preserve the uniqueness of a case and demonstrate its value through a cross-case analysis " (Khan and Van Wynsberghe, 2008, p.7).
2. Reduce or remove the contextual case: in the cross-case analysis, the contextualised roots of each case are in danger of being lost when compared with cases. However, according to Ayres et al., (2003), the reduction of specific contextual details is in line with the objective of carrying out a cross-case analysis, i.e. Identify themes throughout cases. For this project, it is useful to concentrate on the conceptual understanding of cross-case comparison by Tesch (1990). It is viewed as "decontextualising and recontextualising cases." The proposed process is, therefore: (1) separate case study data into units of meaning (decontextualised as separate from each case), and 2) re-contextualise them as they are integrated and grouped into themes later on.
3. Choice of appropriate cases to compare: the criteria for the selection of cases have been defined in section 3.8. Concerning cross-case analysis, the literature suggests that some cases in case-oriented methods should be studied (as compared to variable-oriented methods that are not compatible with the aims of this research) and it is possible to compare cases if they are different in different contexts.

In this research, these three points were addressed. Particular attention was given to points (1) and (2) above in the cross-case analysis process. To be consistent with the scope of this study, the uniqueness of each case and the related context was maintained when the findings of the cases were merged, and CCAs were developed. Thick descriptions enriched these CCAs results.

These descriptions were made in the specific cases which led to the establishment of the assertions. All factors and variables not included in the cross-case findings (as there was no evidence from the three cases studied) were retained as contributions to the specific context in which they arose.

Based on these considerations and the proposed methods (Stake, 2006) (Eisenhardt, 1989; Eisenhardt and Graebner, 2007; Lauckner *et al.* 2012; Darke *et al.* 1998), this study used five main steps to analyse and finalise the cross-case findings. The following steps are:

1. Review the specific transcripts of each case with the factors, variables and links developed.
2. Combine the findings of the case. Use the "merging" concept (Stake, 2006) to integrate variables, factors and links and develop Cross- Case Tentative Assertions (CCTAs).
3. Validate across the cases.
4. Develop the final Cross-Case Assertions (CCA) and the related combined model of the role of web technologies for EOD.
5. Position these assertions in the literature and determine contributions that arise (i.e. enfolding literature (Eisenhardt, 1989)).

These steps are described in the following sections.

3.16 Merging Findings of Cases and Development of CCTA

Following a thorough investigation of each case study report, the scope of the second step (see above list) was to group the findings according to their similarities from the individual cases. "For combining findings into clusters/groupings [the researcher], the finding strips are combined one by one according to their similarities. Similar findings are closely linked in the topic; those not similar are put farther apart. Even if findings are contradictory, any two that are on the same topic are placed in the same cluster (Stake, 2006). The "finding strips" mentioned above are referred to as the assertions made in each case. The analysis for factors, sub factors and variables was carried out separately.

The first step was a comprehensive review of all the individual case reports aimed at identifying all the factors that arose and seeking instant correspondence between cases. This refers to the first de-contextualisation process described above (Tesch, 1990). Three possible situations were identified for each factor: (1) the factor appears in all 3 cases; (2) the factor appears in 2 of the 3 cases; (3) the factor appears only in 1 case. These situations were translated into various cross-case analysis levels. Different strategies were adopted at each level:

- **Level 1**: The analysis focused on merging similar variables into the factors that emerged in the three cases at the first level. It was expected that these involve final assertions in cases.
- **Level 2**: Concerning the second (i.e. factors derived from 2 of the 3 cases), more confirmation was attempted across variables from other "missing case" factors (i.e. the case for which the relevant factor did not arise). If further evidence was found, the resulting factor was determined, and a CCTA was developed. Otherwise, reflections were postponed throughout the case phase to validation.
- **Level 3**: All the variables within the remaining clusters were taken as the unit of analysis attempting at the definition of further factors concerning the third level of cross-case analysis (i.e. factors appeared from only one case). In other words, all variables were listed and grouped according to their similarities. For the concepts supported by substantial evidence in the three cases, CCTAs were developed from the clusters that arose. As suggested by Stake (2006), those that could not be combined were retained.

Figure 3.5 (on next page) summarises this process. There were two possible results for each level of analysis: (1) if adequate evidence was found across cases for a relevant concept (i.e. factor, variable, or link), this was translated into a CCTA; (2) where sufficient evidence was not found across cases for a particular concept, this was retained at this point in the analysis. It is noted that Level 1 concepts were added as additional analytical units for Level 2, and the same was done between Level 2 and Level 3.This activity was carried out because in the first instance these retained concepts could be seen as specifically related to the contexts from which they arose. Before concluding in this way,

however, the relevance of these concepts was attempted among other factors. For example, since the models of the individual cases were created independently, a scenario in which a relevant variable happened in different factors as possible in each case.

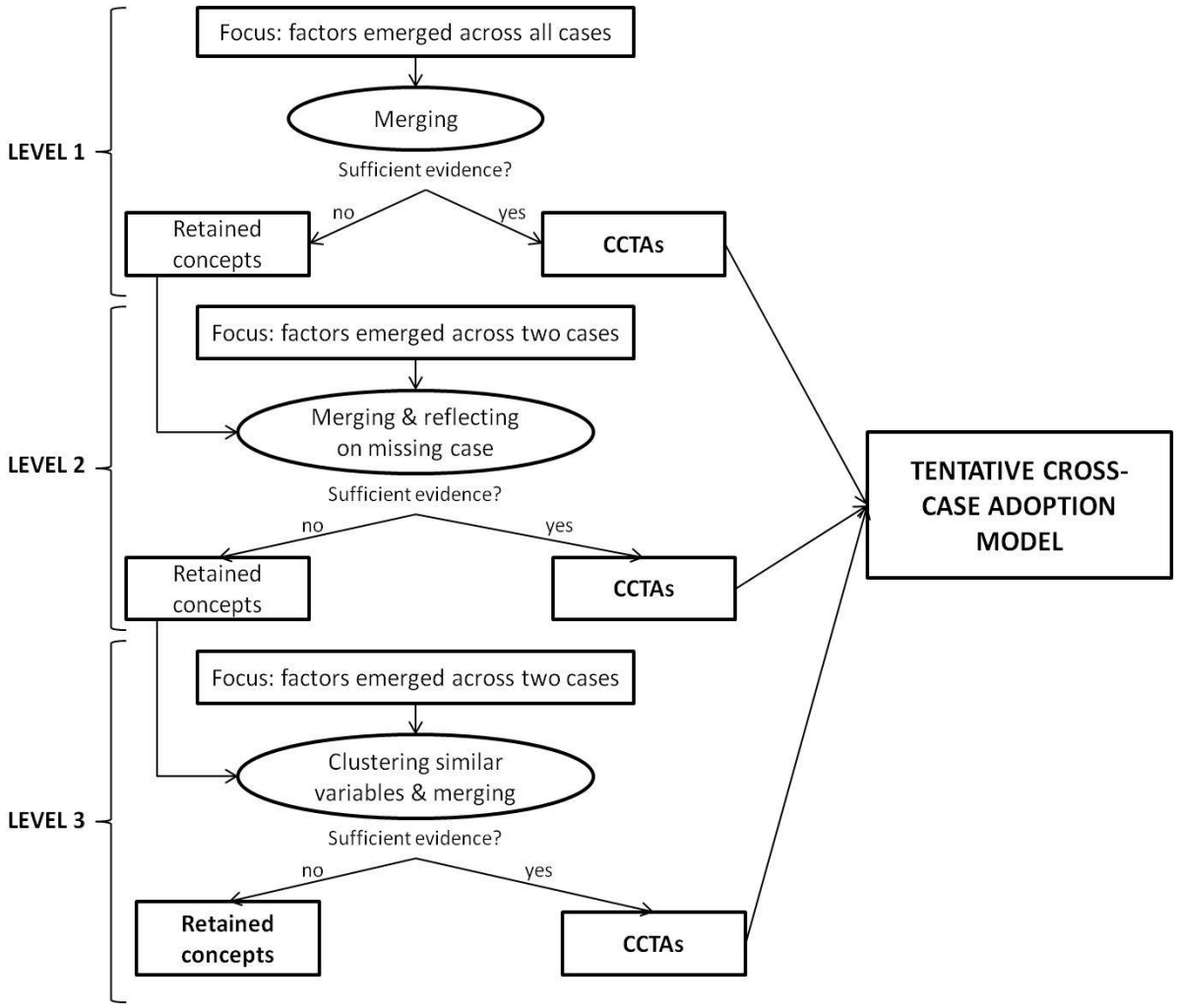

Figure 3.5: Levels of cross-case analysis; development of CCTAs (Adapted from Maccani, 2016)

CCTAs were developed as a result of these steps. These assertions included one or more of the combined findings. According to Stake (2006), each CCTA was developed with the following consideration: "a single focus, orientation and evidence to support the quintain" (p.62). Through the aggregation of these CCTAs, an initial model describing using of web technologies across cases was developed. This, along with the set of concepts retained after level 3, represented the validation input throughout the case stage.

3.17 Validation Across Cases

Following the protocol designed for this research study (see section 3.7), a further stage of the cross-case analysis was conducted with the aim of confirming the conclusions (about the quintain) drawn from the merger of the findings of the individual cases studied. This process and its objectives can be related to those used to validate the results in individual cases (see section 3.10.6). In the same way, the aim was to ensure that the resulting picture was as clear and meaningful as possible. "The picture is the picture of the quintain that was not directly studied, and the cases that were there. It is a kind of validation step and follows a classic strategy –seeing whether new views match what is already well known about the case and the quintain "(Stake, 2006, p.77).To do so, Stake (2006) suggests that going further "afield" should go on (p.77). Therefore, additional fieldwork was carried out consistently with the multiple case study protocol (see section 3.7). The starting point for this phase was the initial findings obtained in the case analysis process up to now. CCTAs represented these factors, variables and links between factors that influence the discovery of entrepreneurial opportunities through web technologies in different cases. Also, the variables retained in the previous steps were reconsidered in this phase.

For this validation, three main objectives were therefore defined:

1. The comprehensive review of the preliminary findings: this research stage is designed to ensure proper interpretation (Stake, 2006). Stake (2006) argues that we must compel them at this stage [i.e. Participants in this process] to tell them what the findings mean (p.77).
2. More investigation of and discussion of the retained variables and factors as to whether they should be counted or considered context- dependent.
3. Leverage the expertise of the participants for collecting additional data about the discovery of entrepreneur opportunities through web technologies.

3.17.1 Validation of Participants

What is critical in this process is that the right participants are selected. The primary requirement for participants in this effort was the representation of the various stakeholders in the overall ecosystem of web-based services. In order to achieve the goals of this validation stage, a certain level of expertise was required from these people. Thus, subjects involved in this effort needed to have knowledge about web technologies and entrepreneurship, and a certain level of experience in this field, in order to be able to: 1) interpret and support the preliminary findings of this research; (2) provide experiential opinions that motivate the inclusion or exclusion of the factors and variables retained in the previous steps; and (3) provide additional comments, critiques, and details about the use of web technologies for the discovery of entrepreneurial opportunities. In addition to being used extensively in qualitative research for information-rich participants (Miles and Huberman, 1994; Patton, 2005; Devers and Frankel, 2000; Sarantakos, 2012), a purposive sampling allows the researcher to select suitable respondents with research knowledge so that the study benefits most (Baccarini et al. 2004, p. 289).

Further, the "list of purposeful strategies is virtually endless" (Palys, 2008, p.697), and the specific strategy should be selected from the study's objectives. There have been several attempts to categorise various purposeful sampling strategies (Sandelowski 1995; Coyne 1997; Kuzel 1999; Patton 2005).In order to select participants in this validation effort, a combination of two strategies was selected. These are (1) maximum sampling variation (Patton 1990; Sandelowski 1995; Coyne 1997); and (2) sampling of stakeholders (Palys, 2008).

The fundamental principle behind maximum sampling variation is to get a deeper insight into a phenomenon from all angles (Patton, 1990). The literature recognises that purposeful sampling approaches offer guidance for sampling, but often rely on some awareness of the environment being studied. This knowledge was developed in this research by inductively investigating several cases. Palys (2008) argues that maximum possible variation sampling includes "searching for people who

cover the spectrum of positions and perspectives in regards to the study phenomenon" (p.697). The maximum variation sampling was used to create a broader picture of the phenomenon. This is appropriate for this research stage. In summary, the results of this research are validated through interactions with individuals at all levels who use web technologies for business in technology-based organisations.

On the other hand, stakeholders sampling “involves identifying who the major stakeholders [of the phenomenon of interest] are” (Palys, 2008, p.697). In this study, a variety of critical entities and stakeholders were identified by reflecting on the results of both the individual cases and the preliminary cross-case results. In particular, the actors/entities that emerged as playing a key role in this ecosystem are technology entrepreneurs; innovation experts; people involved in business management; researchers; and other actual or potential web technologies users. Six subjects in each case were selected and approached following these techniques. The overall group was diverse across the various entities and stakeholders in this ecosystem. In particular, the following subjects were chosen:

Subject 1(S1) = Digital marketing manager

S2 = ICT manager

S3 = Business innovation manager

S4 = CRM manager

S5 = CEO

S6 = Business development manager.

Thus, the maximum variation of stakeholders across the various entities identified in the web-based services ecosystem was consistently achieved using the sampling methods used. Table 3.10 presents a summary of those participants.

It includes their background, the level of participation in the ecosystem of web technologies and the duration of the validation meeting (excluding the time spent introducing me and my research). It is noted that conversations were audio recorded. It was highlighted that the data gathered is for research purposes only, and the interviewee and the case appear anonymously in this academic thesis and possible future academic publications related to it (See Appendix 8, consent form). All interactions occurred through face-to-face meetings and conditions similar to those created for the SSIs in the individual cases (see subsection 3.10.5). Only in one case (see table 3.10 below for S6) did this interaction occur by virtual calling.

As far as the actual process was concerned, all subjects were first contacted. The aim of this research was presented in the event of positive feedback on their availability for this research. Also, a document including a synopsis of the research aims, the cases and the preliminary findings were given to the subjects before the actual validation meeting. This allowed: (1) considerable time savings when the actual validation process was carried out; and (2) offering the subjects' time to reflect with my study, case studies and cross-case interpretations and findings. This document was shared before the meeting for 4 of these 6 subjects. These two activities were carried out on the remaining subjects on the same day. The following sub-sections show the specific activities implemented.

Table 3.10: Participants in validation across cases

No.	Background	Role	Description	Interview duration
S1	Freelancer / entrepreneur	Digital marketing manager	Developing and managing campaigns for digital marketing. Monitoring the company's social media/web 2.0 strategies.	45 minutes
S2	IT	ICT manager	Manage and maintain all ICT systems - primarily with a focus on site	50 minutes

			infrastructure, web technologies and data centre deployment.	
S3	Industry researcher	Business innovation manager	Responsible for product development, day - to - day business performance management and support for the company's innovation agenda, including web technologies.	80 minutes
S4*	Researcher	CRM manager	Working closely with all departments to ensure that the CRM works efficiently in all aspects of the business. Monitoring direct customer communications through the web and social media tools. Monitoring and maximising customer value strategies for life.	110 minutes
S5*	Entrepreneur	CEO	Responsible for managing a company's overall operations and resources and for making important business decisions regarding the implementation of the evolving web.	95 minutes
S6*	Business	Business development manager	Identify new customers ' sales leaders, pitch	25 minutes (by virtual call)

			goods or services and maintain a good working relationship with new contacts. Communicating developments of new products to prospective customers often via web technologies.	

*Summary paper was given before the meeting

3.17.2 Review of the initial cross-case findings and an additional collection of data

The following process was the same for all the participants. The first step was to clarify the ethical aspects of such interactions. After the subjects became familiar with this research and its objectives, the history of the cases, the services and the findings, the recorded period began. The reason why particular attention was paid to the actual cases was motivated by the fact that constant references were made to the original evidence supporting these statements (i.e. the cases) when discussing the cross-case preliminary findings. The first step was, therefore, to present all the initial results, factor by factor, variable by variable, and link by link. When they discussed their relevance (enhanced by questions such as "Would you like to add something to your experiences to this aspect?"), these concepts were related to their personal experiences. The thick descriptions obtained from the integration of the findings of the three cases were thus enriched with those that emerged at this stage — this phase of the process involved about 80% of each interaction on average.

In general, strong confirmation has been found among the presented preliminary factors, variables and links. When each CCTA was presented, a significant number of comments were made by the subjects approached. The cross-case findings (see Chapter 5) report highlighted the aspects which emerged at this stage. This has led to an increased understanding of the previously derived factors, variables and links. On the other hand, these subjects have merely confirmed the importance of

many factors, variables and links. After validation of factors, variables and links were achieved; these were translated into final cross-case assertions (CCA) from CCTA.

3.17.3 Retained Variables Review

Then familiarity with the individual cases, the cross-case preliminary factors, variables and links was achieved, all the variables previously retained were discussed. Two different situations were possible for each of these 41 variables and 3 usage sub-factors:

1) The variable was integrated into the final findings as a result of the additional data collected from these subjects.
2) The subjects agreed that the variable had to be excluded because its relevance is limited to its actual context.

Five variables and one sub-factor were included in the final cross-case results as a result of the analysis of this step. Finally excluded from the findings of the cross-case were remaining variables and sub-factors. Their relevance was determined to be limited to the particular context in which they arose.

In summary, these eight interactions resulted in significant research results:

- The final conceptual model and the interpretations based on the findings of the individual cases were strongly validated by all the subjects involved.
- Two tentative external factors were combined into one.
- Five of the variables previously retained were included in the final findings.
- There was an additional link within the model.
- Confirmation of the retention variables and subfactors (Appendix 10, 11, 12) was achieved.

The subjects have helped to enrich the understanding of certain factors, variables and links. These contributions are emphasised in Chapter 5 (including the reference of the specific contributor) when the cross-case findings are presented.

In conclusion, CCAs were formulated for those factors, variables and links for which validation was achieved. The final conceptual model for web technologies has subsequently been inductively developed as an enabler of EOD.

3.18 Cross-Case Assertions Positioning Within the Literature

The final phase of the cross-case analysis (and of this undertaking) was tied in with positioning the cross-case discoveries within the literature. As indicated by both the methodology intended for this study (Eisenhardt, 1989; Eisenhardt and Graebner, 2007; Miles and Huberman, 1994; Quaddus and Xu, 2005; Berg, 2001) and its inductive nature (Huff, 2008), all the CCAs figured were positioned within the relevant literature. This procedure was likewise named as "enfolding literature" (Eisenhardt, 1989). Through this procedure, explicit contributions to the current information base were thoroughly identified.

This activity was directed in connection to the two significant bodies of literature this study intends to add to, i.e. technology entrepreneurship and web technologies. An extensive review of theories related to technology entrepreneurship and of the web technologies literature informed this process. The inductively generated findings from this multiple case study were compared with the current understanding of the discovery of entrepreneurial opportunities and of how web technologies influence them.

Concerning the technology entrepreneurship literature, all aspects that emerged from this study were compared with those mentioned across the papers considered for the SLR process (see Chapter 2). In this way, more specific contributions could be outlined.

Concerning technology entrepreneurship theories in information systems, the method selected for applying this "theoretical lens" to the findings was pattern matching logic (Yin, 2013). Yin (2013) recommends the usage of this technique to relate the identified patterns (observed patterns, i.e. the findings across cases) among concepts identified in the literature or theory (theoretical patterns).

This technique to link data with the existing literature is well established and acknowledged to be appropriate for inductive and interpretive studies (Cambpell, 1975). It is defined as involving "the comparison of predicted patterns and/or effects [i.e. from technology entrepreneurship theories] with the ones that have been empirically observed [i.e. the inductive findings of this multiple case study], and the identification of any variances or gap" (Baskarada, 2014, p.16). Through this process the theoretical contribution to the technology entrepreneurship as an academic conversation emerged.

The activities and specific procedures used for these activities are presented in Chapter 5, i.e. when cross-case findings are discussed.

3.19 Chapter Conclusion

This chapter has described how the research philosophy and methodology were selected for this study. The study uses qualitative multiple case studies research methodology including semi-structured interviews, informal observations and archival method to collect data. The qualitative case study methodology was chosen because little was known about the phenomenon under investigation, and the purpose of the study was to develop a theory of entrepreneurial opportunity discovery in the context of web technologies.

4. WITHIN-CASE ANALYSIS

4.1 Introduction

This chapter provides analysis and results of the data collected for the three individual cases. This chapter provides details of data sources for all three cases, followed by the data analysis techniques used to analyse the data. Finally, the chapter presents a within-case analysis of the three cases.

The findings are derived from the interview data, observations and archival data. The archival data was collected through the organisation's documentation available publicly and on their websites.

This research investigates the factors that contribute to entrepreneurial opportunities discovery (EOD) for technology-based organisations and the role of web technologies for EOD.

This chapter is organised as follows; Section 4.2 provides details of different data sources for each case. Section 4.3 describes data analysis techniques used to analyse the data. Sections 4.4, 4.5, and 4.6 provides within-case analysis and results for all three cases respectively. Section 4.7 provides a conclusion for the chapter.

4.2. Data Sources

Data sources include semi-structured interviews, observations and archival data. (1) The sixteen semi-structured interviews were conducted overall for all three cases (Table 4.1. provides the inventory of interviews). (2) Research assistant (note-taker) wrote down responses of three interviewees in Case C. (3) The archival data were gathered through cases' websites and documentation about the cases available publicly. I audio recorded the interviews and transcribed them turning into 224 pages of double-spaced transcripts — the first round of interviews for case A was conducted in late 2014 and early 2015. The initial data was collected and analysed, the interview protocols and questions were revised. The second round of interview for case B was conducted in mid-2015, followed by data analysis and interview protocol and questions re-visited. The third round of interviews for case C was conducted in late 2015 and early 2016. All interviews were conducted face-to-face. I used an event tracking technique proposed by Eisenhardt (1989) to facilitate the interviewees' recall of events of the past.

Table 4.1. Data Inventory of Interviews

Case / Company	Location	Year Founded	Age	No. of Interviews	Interview Details				
					Date	Time	Type	Informant	Informant

						(Mins)			ID
A	Dublin, Ireland	2010	7 years	5	04/10/14	40	Face-to-Face	Founder	Case A, I1
					05/11/14	45	Face-to-Face	Co-Founder	Case A, I2
					25/02/15	50	Face-to-Face	Chief Technology Officer	Case A, I3
					31/03/15	40	Face-to-Face	Digital Marketing Manager	Case A, I4
					02/06/15	90	Face-to-Face	Digital Marketing Manager	validation meeting
B	Galway, Ireland	1984	33 years	7	05/05/15	30	Face-to-Face	Product Manager	Case B, I1
					15/05/15	37	Face-to-Face	Business Development Manager	Case B, I2
					15/05/15	55	Face-to-Face	ICT Manager	Case B, I3
					15/05/15	51	Face-to-Face	ICT Manager	Case B, I4
					03/06/15	43	Face-to-Face	Data Analytics Manager	Case B, I5
					03/06/15	30	Face-to-Face	Chief Technology Officer	Case B, I6
					13/08/15	80	Face-to-Face	ICT Manager	validation meeting
C	Dublin, Ireland	1956	61 years	7	01/10/15	33	Face-to-Face	Social Media Manager	Case C, I1
					15/10/15	38	Face-to-	Business Innovation	Case C, I2

							Face	Manager	
					19/11/15	45	Face-to-Face	Business Innovation Manager	Case C, I3
					09/12/15	40	Face-to-Face	Business Innovation Manager	Case C, I4
					12/01/16	40	Face-to-Face	Customer Relationship Manager	Case C, I5
					25/02/16	35	Face-to-Face	RandD Manager (Industry Solutions Development Team)	Case C, I6
					20/04/16	90	Face-to-face	Business Innovation Manager	validation meeting

4.3. CASE A REPORT

4.3.1. Case A Introduction

The case A organisation was founded in 2010 in Dublin, Ireland. It provides marketing related digital services and has the mission:

> *"To continuously leverage customer experience in the global markets, helping brands, retailers and content owners to better listen-engage-gain insights-measure-publish-advertise." (Case A, Documentation, 2015)*

The case A organisation is a high-quality information technology (IT) firm that provides private and public organisations marketing services to gain actionable insights about their customers. They offer products designed to help retailers achieve emotional actionable insights about their customers. These products are based on innovative semantic technology and enhance customers' satisfaction and association levels with the advertising firm. Some of their products are specifically designed for

academic institutions such as universities and provide feedback on students' learning experience using customized voting and rating systems especially for e-learning platforms — the case A organisation was chosen as one of the 100 global hot, innovative companies by The World Summit on Innovation and Entrepreneurship (THEWSIE) 2012 (THEWSIE, 2012). It secured funding of €1 million from Irish and Italian investors by 2014.

Organisation and Structure

Case A is a small private IT firm that employs 30 staff with annual revenue of €3 million. The majority of the staff are IT and business professionals with expertise in marketing, project management, consumers psychology and software development. It has only one main branch based in Dublin, Ireland. It has a structure like any other digital marketing consultancy firm with five core functional groups: (1) statistical analytics group, (2) software development group, (3) research and development group, (4) marketing strategist group and (5) program management group.

4.3.2. Contextualisation of Method

I collected data from three sources mainly – documentation, interviews and observations. I reviewed the documents first. In total, 2 internal and 4 external documents were consulted and reviewed. Appendix 12 provides details of the content of each document, its length and creation date. Then interviews were conducted with four of the employees of case A organisation (see Table 4.1 for details). All those employees were involved either directly or indirectly in the entrepreneurial process for the case A organisation. In parallel, information observations were also conducted. Before making arrangements for the interviews at case A organisation, I requested them to allow me for such observations. The case A organisation's staff let me observe the internal environment of their organisation as well as see the role of web technologies in their business processes. I also had information chats with a few of the employees.

All the interviews were conducted at case A organisation. The interview meetings went pretty well. I recorded the interviews with the permission of the interviewees which saved me quite a lot of time. I structured my notes the said day within three hours of the interview finished time which helped me a lot in carrying out initial reflection and interpretation of the interviews' notes. The interview protocol and interview questions were updated, first after reviewing the documents and then after each interview whenever important concepts and themes emerged.

The Context of the Case A Organisation

The case A organisation is providing marketing consultancy and emotional feedback services since 2010. The organisational culture of the firm is very informal. The firm strongly believes in continually utilising web technologies especially social media platforms to better understand online customers' emerging trends. A business innovation manager advised:

> *"Social media platforms such as Facebook and Twitter, provide an excellent corridor to acquire knowledge about online customers' emotional and behavioural experiences about daily life events."*

Chief technology officer reported on the effectiveness of social media platform regarding reaching out to the masses of online customers:

> *"So imagine tomorrow morning Facebook opens an enterprise app store. We will be interested in participating in this because of the reach this platform can have. So this is the case of evolution of web – Facebook creating an opportunity for a lot of other marketing practitioners like our company."*

Owing to its innovative ways of enhancing customers' emotional experience and collecting, analysing and reporting on their feedback, case A organisation has won several awards since its birth. It won 'Top Irish Start-up' award in 2011, 'Global Hot 100' award in 2012 and 'Top 10 Semantic Tech Start-up' Award in 2013 (Case A, Documentation).

4.3.3. Case A Analysis

I followed the method of analysis for case A mentioned in Chapter 3. I reviewed all the transcripts of interviews, observational notes and the case A documentation sentence by sentence. I extracted key statements (KS) (see Appendix 9). However, after the first cycle of analysis, I grouped one hundred and sixty-four key statements (including statements for relationships) for overarching concepts such as Individual attributes, organisational factors, environmental factors and web technologies as an enabler. I ended up with eight clusters for Individual attributes concept (see Table 4.2), five clusters for organisational factors concept (see Table 4.3), one cluster for environmental factor (see Table 4.4) and nine clusters for the role of web technologies as an enabler of factors (see Table 4.5).

Table 4.2: Case A Individual attributes analysis

Cluster	No. of KS	Tentative factors	Tentative variables	Retained variables
Entrepreneurial alertness	6	1	4	1
Prior knowledge	36	1	5	2
Leadership	3	1	3	1
Risk taker	2	1	3	1
Pursuit of continuous learning	5	1	4	2
Imagination	5	1	4	1
Sociability	4	1	4	1
Cognitive ability	2	1	3	1

Table 4.3: Case A Organisational factors analysis

Cluster	No. of KS	Tentative factors	Tentative variables	Retained variables
IT infrastructure	7	1	2	1

Systematic search	2	1	2	1
Social capital	6	1	3	2
Entrepreneurial culture	17	1	5	1
Research collaboration	2	1	4	1

Table 4.4: Case A Environmental analysis

Cluster	No. of KS	Tentative factors	Tentative variables	Retained variables
External Pressure	13	1	5	1

Table 4.5: Case A web technologies as enabler analysis

Cluster	No. of KS	Tentative factors	Tentative variables	Retained variables
Entrepreneurial alertness	3	1	4	1
Pursuit of continuous learning	3	1	4	1
Collaboration among employees and stakeholders	12	1	3	2
Market Reach	7	1	4	1
Entrepreneurial culture	3	1	4	1
Systematic search	3	1	3	2
Sociability	4	1	4	1
Knowledge	11	1	4	1
EOD	6	1	2	0

4.3.4. Validation Meeting

At the end of the analysis of case A, a validation meeting was conducted with one of the case A organisation's employee (see Table 4.1). This interviewee was first briefed about the research, and then I provided her with the findings of my study (i.e., analysis of case A) and supporting evidence for that. I mainly asked her to provide her feedback on the few themes that I could not find many

key statements and also obtained her feedback on the relationship among the factors that I established based on the data. The interviewee appreciated my efforts and agreed with my findings.

4.3.5. Case A Findings

Table 4.6 provides a list of key statements references for each factor and the status on its validation.

The following sections provide findings of the analysis and relevant key statements from documents, interviews and observations. See Appendix 9 for sub factors, variables and key statements.

Table 4.6: Case A Assertions

Overarching Concept	Factors	Validated?
Individual factors	Entrepreneurial alertness	Yes
	Prior knowledge	Yes
	Leadership	Yes
	Risk taker	Yes
	Pursuit of continuous learning	Yes
	Imagination	Yes
	Sociability	Yes
	Cognitive ability	Yes
Organisational factors	IT infrastructure	Yes
	Systematic search	Yes
	Social capital	Yes
	Entrepreneurial culture	Yes
	Research collaboration	Yes
Environmental factors	External Pressure	Yes

Web technologies as enabler	Entrepreneurial alertness	Yes
	Pursuit of continuous learning	Yes
	Collaboration among employees and stakeholders	Yes
	Market Reach	Yes
	Entrepreneurial culture	Yes
	Systematic search	Yes
	Sociability	Yes
	Knowledge	Yes
	EOD	Yes

4.3.5.1. Individual Attributes

Prior research on EOD points out several traits of entrepreneurs that are deemed necessary for their ability to help entrepreneurs identify new entrepreneurial opportunities. These traits include entrepreneurial alertness, creativity, need for achievement, and diverse skill set (Ardichvili et al., 2003; Baron, 2006; Garg et al., 2011). Furthermore, Baron (2006) reports that risk-taking individuals are more capable of seeing the bigger picture of opportunities than the ones who tend not to take the risk.

The findings of this research revealed that several Individual factors are critical for entrepreneurial managers in technology-based organisations. Some of these traits are the ones identified in prior literature, and several others are not mentioned in the prior literature.

(1) Entrepreneurial Alertness

Entrepreneurial alertness allows an entrepreneur to notice something (i.e., opportunities or business problems) that non-entrepreneurs are not able to notice. It has been argued in prior studies that an entrepreneur develops a different mental model than that of non-entrepreneur which allows him to look at the information in "atypical ways" (Gaglio and Winter, 2009, p. 307). The results reveal that entrepreneurial alertness is considered an essential attribute of entrepreneurs by the informants of company A. The Founder stated;

> To be able to discover opportunities, I think one has to evaluate the available information different from the standard approaches. (Case A, I1, 04/10/14)

However, it is stated by one of the informants that entrepreneurial alertness on its own may not be that useful and enough at helping the entrepreneur in discovering new opportunities. Instead, several other factors need to be present such as entrepreneurial environment and necessary knowledge. The Digital Marketing Manager remarked;

> Entrepreneurial alertness can only work when there is a suitable environment around an entrepreneur. An entrepreneur has also to be proactively searching for opportunities. (Case A, I3, 25/02/15)

He further pointed out;

> Notably, there has to be enough resources and support available to the entrepreneur. (Case A, I3, 25/02/15)

The Founder of the company A was also of the point that alertness depends on other factors such as prior knowledge and experience. He commented;

> Knowledge and experience are, I believe, two crucial factors that help the entrepreneur notice new opportunities. (Case A, I1, 04/10/14)

(2) Prior Knowledge

The systematic literature review of prior research on entrepreneurial opportunity discovery (Chapter 2) points out prior knowledge as the most critical factor that influences EOD. Prior research suggests that prior knowledge of markets, customer's problems and ways to serve customers is critical for the identification of entrepreneurial opportunities (Shane, 2000). The findings of this research also suggest that prior knowledge is perceived vital for EOD for technologies-based organisations, especially the importance of knowledge of new technologies was emphasised by the Chief Technology Officer of company A, who explained;

> Knowledge of new technologies can enable our firm to enter into new markets due to the extension of knowledge brought along allowing for new markets to be attained. (Case A, I3, 25/02/15).

It is especially interesting to note that company A being a small-scale enterprise stresses more upon continuous learning and exploring new opportunities based on the knowledge. Therefore, the Chief Technology Officer pointed out;

> We encourage continuous learning but also look for entrepreneurial spark gained from other experiences. (Case A, I3, 25/02/15)

The Digital Marketing Manager highlighted the same point;

> Staff are encouraged to self-learn new systems themselves as this reinforces new learning and evaluation skills. (Case A, I4, 31/03/15).

Interview observations also suggest that company A stresses immensely on their staff members to continuously update and acquire new knowledge as well to utilise that knowledge in leveraging it in their collaborations with the company's customers, partners and developing new connections. The following quote from interview observations points out to that;

> The organisation appeared to have the mindset of a truly networked organisation as it has successfully created positive links between social media applications use and many measures of social capital. In that networked organisation - the employees' expertise, knowledge and interests are very much visible to peers, customers, strategic partners. This is helping in the creation of organisational learning, knowledge sharing, innovation and entrepreneurship (Case A, Observations, page 2).

The analysis also revealed further dimensions of prior knowledge being created and used in company A.

The staff at company A uses a blogging platform to keep track of what the staff are doing and sharing and accumulate that tacit knowledge. They then have a process of refining that knowledge and sharing it with their existing and new employees in the form of explicit knowledge. For example, I observed;

> The blogging platform in Company A is used to express and capture employees' tacit knowledge. It was noticed that executing the entrepreneurial tasks in a public forum pushed employees to put concerted effort and articulate how they execute tasks. It was noted that this is making employees turn their tacit knowledge into explicit knowledge because of awareness that the peers are observing their actions, and they pushed themselves to be hardworking and appeared competent. (Case A, Observations, page 1).

It was further pointed out by the Chief Technology Officer that tacit knowledge was quite critical for the entrepreneurial activities to take place in a company;

> The strength of the entrepreneurship lives in the will to create and thus it is necessary that human capital is an arrangement, to acquire knowledge in diverse domains in the creation of the start-up. (Case A, I3, 25/02/15)

Explicit knowledge is also considered equally vital in company A. It was highlighted by one of the informants that graduate degrees in fields relevant to the company were one of the prerequisites in getting a job at the company. The Chief Technology Officer commented;

> In my organisation formal education is a must have, which coupled with a tech science degree is a handy resource for injecting talent into the company. (Case A, I3, 25/02/15)

Company A does their hiring proactively in a way that they would hold events at different business schools in its city and would conduct short interviews to evaluate the knowledge and passion of the students. The Digital Marketing Manager remarked;

> In year 3 our Company engages with potential graduates before they qualify from a university, we often offer placements before graduation. (Case A, I4, 31/03/15)

Knowledge of Anticipated Customer/Market Needs

The findings suggest company A engages pro-actively in using new web technologies such as big data analytics to acquire knowledge about customers and markets' needs. Their focus is not only on the current needs or problems of their customers, but they also specialise in predicting what would be their customers' needs in future. The Digital Marketing Manager said;

> To ensure high level and quality of communication and collaboration with all the stakeholders, to use web technologies along with predictive analytics to know what the customers' exact needs are and what their needs could be in future and to exploit emerging web 's capabilities to find new business leads. (Case A, I4, 31/03/15)

It seems that in company A, it is prevalent among the employees that through the deeper understanding of customers' anticipated needs; new entrepreneurial opportunities can be discovered. For instance, the Digital Marketing Manager indicated;

> Every single problem for a customer can become a service sold. We have to contact them ASAP and be as available as possible. (Case A, I4, 31/03/15)

This approach of discovering new entrepreneurial opportunities by anticipating customers' needs have also been explained in their documentation as well as sold to their clients as a service. One of the company's services is providing insights on their clients' customers. The documentation available on the company's website reads;

> Our expertise is at your service to understand who your customers are and how they feel about your offer. (Case A, Documentation, Website)

Knowledge of Anticipated Means to Satisfy Customers/Market Needs

According to the Digital Marketing Manager, knowledge of anticipated customers' needs provides better entrepreneurial opportunities when it is combined with the knowledge of the potential solutions for those anticipated needs or problems. They conduct brainstorming sessions to discuss such potential solutions to the anticipated problems. The Digital Marketing Manager explained;

> We do Internet watch and make lists of problems encountered by people in daily life. Based on these analytics, we try to think of means that would satisfy such needs. (Case A, I4, 31/03/15)

The Chief Technology Officer shared his experience about the effectiveness of identifying potential market needs for EOD. He pointed out;

> Any of the start-ups I have worked with have come up their ideas in response to a market condition or a perceived market need. (Case A, I3, 25/02/15).

An interesting quote found in the company's documentation was that when customers' needs are anticipated, and the solutions to such anticipated needs are proposed, it leads to high levels of customers' satisfaction. It was stated in the documentation available online;

> We aim to help brand owners achieve a high level of intimacy with their clients and being consistent at delivering high customer satisfaction. (Case A, Documentation, Website).

(3) Leadership

Following prior studies, this research also found that leadership is a vital trait that entrepreneurs should possess. The Founder pointed out that given the importance of leadership for entrepreneurship, it should be taught to students at the college or at least university levels and hence makeup to their explicit knowledge. He commented;

> Leadership is an essential attribute of an entrepreneur or any manager who is involved in the entrepreneurial activity, and it should be taught to students at college level. For College projects, all students should be given the role of the project manager by having a rolling project manager at different stages. (Case A, I1, 04/10/14)

(4) Risk Taker

The risk-taking trait has also been pointed out to be vital for EOD in prior studies. The findings suggest that entrepreneurs should have confidence in taking calculated risks and not worry too much about the results. The Digital Marketing Manager stated;

> Comfort with risk is most important, then the opportunity will follow. It is a matter of identifying the consumer need before others. (Case A, I4, 31/03/15)

(5) Pursuit of Continuous Learning

Pursuit of continuous learning has been found to be a vital factor and characteristic of entrepreneurs. One of the interviewees highlighted the importance of this factor and said:

> We encourage continuous learning but also look for entrepreneurial spark gained from other experiences. (Case A, I3, 25/02/15)

He further explained:

> Individuals in our organisation improve their evaluation process through experience and continuous learning (Case A, I3, 25/02/15)

(6) Imagination

An unusual trait that was revealed in the findings is imagination. It appears that there is some innate subjective vision that lies inside the mind of entrepreneurs and guides them in identifying new opportunities. The Founder explained this interesting factor;

> Though knowledge is critical in discovering new business leads, entrepreneurial imagination can also be vital. Knowledge-based opportunities can be found by looking at the facts, while imagined opportunities are generally subjective and exist in entrepreneurs' minds. However, they could be explored further by conducting a systematic search or sharing with one's peers. (Case A, I1, 04/10/14).

However, it seems the Chief Technology Officer agrees with the Founder's statement on the role of imagination in EOD only partially. He suggested that creativity is moderating the relationship between imagination and EOD. He remarked;

> A creative entrepreneur can imagine more opportunities than a less creative entrepreneur. (Case A, I3, 25/02/15).

(7) Sociability

Sociability has also been found to be a vital factor and characteristic of entrepreneurs. One of the interviewees highlighted the importance of this factor and said:

> Entrepreneurs should be cheerful and show friendliness towards people they meet because it may lead to developing long-term relationships (Case A, I4, 31/03/15).

(8) Cognitive Abilities

Cognition has been argued to have played a vital role in the discovery of new entrepreneurial opportunities in prior studies. However, it seems like cognition has been treated something like a 'characteristic of a black box namely brain'. A fascinating insight that was revealed by the findings in this research was the role that conscious efforts at connecting different dots (of information) play and lead to new ideas. According to the Founder of the company A;

> In our organisation, we are encouraged to make conscious efforts to discover new opportunities. For example, regular brainstorming sessions are held where we are encouraged to use our cognitive abilities to solve problems and come up with innovative solutions. (Case A, I1, 04/10/14)

It is evident from the above quote and in the context of the company A, that if an individual is well equipped with formal relevant knowledge, is provided with creative and encouraging environment and offered opportunities such as brainstorming sessions where he/she is exposed of diverse sets of information, there are high chances that he/she would come up with new ideas.

4.3.5.2 Organisational Factors

Following subsections provide findings for this concept.

(1) IT Infrastructure

With the emerging technologies mainly based on cloud computing, it seems that services such as infrastructure-as-a-service and platform-as-a-service have enabled small companies to acquire the IT

capabilities which once used to cost large sums of money. This has helped small companies' especially technology-based companies, to compete with the big players in the market. The Founder explained;

> If companies have benefitted from the web technologies regarding having an IT infrastructure, it is small companies. Now small companies can rent IT infrastructure using – thanks to cloud computing. (Case A, I1, 04/10/14).

Technological advancements especially web technologies have also enabled small companies to access tools enabling them to provide various services and offer different products to their customers. For instance, the Co-Founder commented;

> We use a variety of tools to gather and share support materials and knowledge with our customers and with each other through a variety of online platforms to keep all parties informed and involved in the development process. (Case A, I2, 05/11/14)

It was notably observed that several new technologies were being used within the company.

> The use of cutting-edge technologies indicated that the organisation places a high value on state-of-the-art technologies especially web technologies and provide the resources to sustain/improve it that way. (Case A, Observations, Page 2).

(2) Systematic Search

The results suggest that company A uses systematic search in finding new business leads. The Digital Marketing Manager explained;

> We do search for work, but also designers come to us to have content built. In searching for work, the sales team will find clients for us that wish to have content created. (Case A, I4, 31/03/15)

(3) Social Capital

Social capital is another critical factor that positively influences EOD (Ardichvili et al., 2003; Baron, 2006; Garcia-Cabrera and Garcia-Soto, 2009). Social capital enriches entrepreneur's knowledge by harnessing them with information (Alvarez and Busenitz, 2001), it also makes them resourceful (Shane and Venkataraman, 2000), and both are crucial elements that help entrepreneurs in identifying new entrepreneurial opportunities. Entrepreneurs who establish connections with people from different ways of life and keep themselves engaged with them in productive communication are more likely to discover new entrepreneurial opportunities than the ones who keep themselves to themselves (Tang, 2010). Another significant benefit of social capital is that it can provide entrepreneurs with the resources that they are lacking, which can be crucial for the process of EOD (Fuentes et al., 2010).

In the Web context, the enrichment of one's social capital depends on the engagement and effective use of social media platforms. The study's findings suggest that people responsible for identifying entrepreneurial opportunities in technology-based organisations consider it crucial to be engaging in multiple social media platforms.

Company A claims to utilise social media platforms for its connectedness on almost all fronts of its business. For instance, my observation of the company's organisational culture revealed that;

> The Company A logos “social media connectedness” and “connectedness using emotions to connect users, customers, brands" were displayed everywhere in the organisation. Also, internal blogging is moderately used and proved to be giving the organisation many social and informational benefits. Social benefits include getting a better idea on the organisation and creating a close community and relations, with some employees told that they had formed new connections with other blog users outside the system. (Case A, Observations, Page 2).

It seems that the company aims to establish both high qualities of connections as well as to establish as many connections as possible. According to the Digital Marketing Manager;

> Our company invests heavily on its social capital, and we consider it vital for our company's growth. We are now seeing developments of the separate networks that have opened up new information that we are starting to harmonise. (Case A, I4, 31/03/15)

He further pointed out;

> However, that does not necessarily mean that the quality of our network is not essential. (Case A, I4, 31/03/15).

(4) Entrepreneurial culture

Entrepreneurial internal environment refers to the environment Internal to an organisation that facilitates and encourages entrepreneurial activities. It may also be referred to as organisational culture. The internal environment seems to play a vital role in positively influencing EOD. The findings suggest that company A takes several measures to ensure that the internal environment facilitates creativity and entrepreneurial activities. The Founder of the company stated;

> We try to make it easier to be creative, by allowing employees design their working environments; we have whiteboards on our walls where people can share ideas, and we have small meeting rooms to enable more intensive meetings with a stronger output. (Case A, I1, 04/10/14)

I observed that the company has an open setting that encourages interaction among employees. Apart from that, the furniture also lets the employees divide and reshape their working spaces. For instance, it is noted in the observations;

> The employees were not boxed into cubicles. There was an open office environment with minimum barriers to foster collaboration to do good and productive work in an open office concept. Complete with moving walls, the organisation's commitment and enthusiasm to entrepreneurship, innovation and creativity were evident by the writings on all sorts of non-traditional surfaces. (Case A, Observations, Page 1).

I also noticed that the company's mission statement promoted creativity and was posted on several places. It was noted;

> Company A's mission statement was also visible in many places in the organisation: "work environment that promotes personal satisfaction, human relations, and ideas. (Case A, Observations, Page 1).

The Co-Founder commented on the internal environment as follows;

> It may sound crazy, but we have found that having funky furniture, informal atmosphere within our organisation can facilitate creativity. (Case A, I2, 05/11/14)

I also observed;

> The meeting rooms were not sterile instead they appeared to be a place intentionally designed to encourage conversations on ideas and innovation. (Case A, Observations, Page 1).

Further to this, the company's website also states its approach in promoting a collaborative, creative and cheerful environment. It is stated;

> Our team combines the Italian brand culture with the vibrant Irish digital ecosystem. We believe in creating a happy work environment that promotes personal satisfaction, human relations, and ideas. (Case A, Documentation, Website).

(5) Research Collaboration

Although research collaboration has been identified as an essential factor that can help entrepreneurs and firms in identifying new opportunities, the findings of Case A did not reveal many insights on the significance of this factor for the company A. According to the Digital Marketing Manager;

> As a small but growing firm, we would adhere to the collaboration of research as open source has helped us immensely through our product creation and diversity. (Case A, I4, 31/03/15)

It seems given that company A is not only a young company but also small, the maturity of research collaboration has not yet been achieved. Though from the above quote, it is quite evident that the significance of research collaboration has been recognised to some extent.

4.3.5.3. Environmental Factors

External environment refers to the environment external to an organisation. Mostly external environment refers to a social-economic culture in the country an organisation is based and is bound by the policies and procedures of that country.

It seems there was a well-established appreciation of the external environment among the company A's staffs - willingness to take advantage of the available policies and regulations. For instance, the Founder remarked;

> Business ventures are grounded in context; they should take advantage of the current social climate to shape their creation (Case A, I1, 04/10/14)

The Co-Founder indicated that changes in the external environment could lead to the discovery of new entrepreneurial opportunities. He explained his point by giving the following example;

> Food and drink businesses need to be sensitive to current local trends to be successful (vegan communities, fast-food for families, and late-night takeaway in clubbing areas). (Case A, I2, 05/11/14)

The Digital Marketing Manager pointed out that the new web technologies are enabling new small business to tap into emerging markets that result in less competition from the big players. He stated;

> Operating in an emerging market means that there is a higher risk involved but less competition from bigger companies which can provide an edge though it also means there is a need to legitimise the market to the consumer. (Case A, I4, 31/03/15)

Several environmental factors can influence EOD. These factors can be economic, cultural, regulatory (e.g., government policies) and can be internal or external to an organisation.

(1) External Pressure

A new factor that was highlighted by different informants of company A is external pressure. The external pressure can be perceived at the firm's level as well as at individual levels. However, because I was interested in examining the factors that contribute to EOD and the role of web technologies for EOD, I tried to ask them to follow up questions on the influence of external pressure as perceived at individual levels. It was revealed that external pressure offers challenges as well as new opportunities. For example, the Founder of the company A explained;

> All technology-based business face external pressure these days that is good in a way that it makes them take measures to innovate rapidly. For example, if our competitor starts using the latest technology to serve its customers, we must have to either adopt that technology or even think of better alternatives. Mobile pay is a good example. Just imagine of a cashless and card-less environment. Such an environment will bring new opportunities as well as challenges. (Case A, I1, 04/10/14).

Also, there seems to be a welcoming approach to the external pressure by the staff especially involved in entrepreneurial activities. The founder further indicated;

> We welcome pressure and demands from different stakeholders such as our customers, partners and competitors regarding improving our processes. That is good indeed. It opens up new opportunities. (Case A, I1, 04/10/14)

However, a different view about the external pressure was offered by the Co-Founder of the company A, who stated;

> I think the more a firm becomes mature in its internal processes primarily related to technologies, the less likely it becomes to receive pressure from its external stakeholders. (Case A, I2, 05/11/14)

It seems that when a company is involved in partnerships and have quite an effective feedback mechanism, there are chances that it receives feedback on its operational agility and capacities, which in turn guide a company to improve its internal processes. This in itself may offer micro-level innovation regarding the enhancement of internal business processes and let a company align them with the requirements and demands of its partners and customers.

Company A seems to involve in welcoming external pressure pro-actively and take it up not only positively but also as new learning. For instance, it is stated in the company's documentation (i.e., website);

> *LISTEN*: Find out customers' opinion, keep them informed and get to know their emotional state. (Case A, Documentation, website)

4.3.5.4. Web technologies and EOD

As described in Section 4.4 that company A heavily relies on different web technologies for the services and products they offer, it becomes apparent that such heavy usage of web technologies also help them identify new opportunities. The heavy usage of web technologies has been observed;

> In a light informal conversation with employees, it was overwhelmingly expressed by them that they like to use web technologies especially those that are evolving rather than using old technologies which may prevent them from doing their job with more effectiveness. (Case A, Observations, page 2).

From the observations, documentation and interview data, it was found that the Company A uses web technologies as an enabler of a various business process such as internal and external collaboration, reaching out the emerging markets, and finding new entrepreneurial opportunities.

(1) Entrepreneurial alertness

Web technologies can facilitate entrepreneurs in taking initiatives proactively. The founder of the case A organisation pointed out:

> Entrepreneurs can use web technologies to evaluate different sets of information concurrently leading them which can, in turn, enhance their agility of identifying new leas. (Case A, I1, 04/10/14).

(2) Pursuit of continuous learning

Similarly, web technologies can also make it easy for entrepreneurs to acquire new information and knowledge more conveniently and effectively. The founder of case A organisation said:

> Web technologies have made it possible for us to obtain and share knowledge on the go. (Case A, I1, 04/10/14)

(3) Collaboration among Stakeholders

When new technologies are brought into organisations, employees need to know how they can effectively utilise them for their daily work-related tasks. These changes directly affect their cognitive frames which they have developed during their work life and equip them with new information that may lead to the discovery of new opportunities (Baron, 2006). The findings suggest that for technology-based organisations, use of latest web applications has become inevitable. This use of various web applications helps organisations to increase collaboration among their employees and between the organisation and its external stakeholders. The Founder explained;

> To ensure high level and quality of communication and collaboration with all the stakeholders, to use web technologies along with predictive analytics to know what the customers' exact needs are and what their needs could be in future and to exploit emerging web 's capabilities to find new business leads. (Case A, I1, 04/10/14)

It was also observed that web technologies were being used to enhance collaborations among employees;

> The working culture was not intense or independent rather employees were engaged in collaboration, laughter and playing games. (Case A, Observations, page 3).

Also, the technologies are being used to establish direct contacts with their customers. The Co-Founder indicated;

> Direct interaction through media is becoming more important in interacting with customers. (Case A, I2, 05/11/14)

The same was stressed upon by the Digital Marketing Manager;

> We have to use new ways of staying in touch and getting clients now through social media like LinkedIn or Facebook (Case A, I4, 31/03/15).

Another interesting observation was the full use of social media by all the employees of the company. It was observed;

> Contrary to the negative preconception of social media technologies usage, it was freely and openly used without being over-emphasised on the control of so-called security prone web. (Case A, Observations, page 3).

(4) Market Reach

The findings revealed that Company A is also using web technologies to reach out to emerging markets. The Digital Marketing Manager explained;

> So imagine tomorrow morning Facebook opens an enterprise app store. We will be interested in participating in this because of the reach this platform can have. So this is the case of evolution of web – Facebook creating an opportunity for a lot of other marketing practitioners like our company. (Case A, I4, 31/03/15)

The Chief Technology Officer also stressed it;

> Due to the low cost associated with web technologies, small companies like us can also use these technologies to enter into new markets such as big data analytics. (Case A, I3, 25/02/15)

The Company's documentation also points out to the usage of predictive analytics used to reach out to new customers.

> *MEASURE*: Use predictive analytics techniques to increase customer responses.
> *PUBLISH*: Personalize customer experiences and the customer's content to understand the value of communicating with users. (Case A, Documentation, website).

(5)Entrepreneurial culture

Web technologies have made it possible to affect and enhance the entrepreneurial culture of organisations positively. The Chief Technology Officer remarked:

> Web technologies make it easier to share knowledge among employees (Case A, I3, 25/02/15)

It was also stressed upon by Digital Marketing Manager, who said;

> Web technologies improve the positive internal environment by providing employees technologies for sharing their knowledge with their colleagues instantly and also ask them for advice. (Case A, I4, 31/03/15)

(6) Systematic search

Similarly, web technologies have improved the quality and speed of search that we make. The Digital Marketing Manager pointed out:

> Using technologies, we can now find new business leads quite quickly and efficiently (Case A, I4, 31/03/15)

(7) Sociability

Because web technologies have made it possible to connect to other people in ways that were not possible before, it also positively influences the sociability of people. The Chief Technology Officer remarked:

> Web technologies have improved the way we can connect with other people. (Case A, I3, 25/02/15)

(8) Knowledge about Customers

The web technologies at company A were also being used as an enabler of collecting knowledge about customers, and their needs. It appears that they are not just using the technologies to collect demographics; they are collecting knowledge about their customers' experience and emotional responses. For instance, the Chief Technology Officer remarked;

> So our business is based on providing alternatives to promotional items at events, so we need to know what exactly annoys our users to create the best experience when using our products. (Case A, I3, 25/02/15)

Also, the Digital Marketing Manager pointed out;

> Social media platforms such as Facebook and Twitter provide an excellent corridor to acquire knowledge about online customers' emotional and behavioural experiences about daily life events. (Case A, I4, 31/03/15)

The use of web technologies was also observed across other services that help the company enhance their relationship with customers such as sales services and customer-facing innovation. It was observed that;

> Company A is using social networking applications for information search, blogging, customer relations, sales services, digital marketing, entrepreneurship and customer-facing innovation. (Case A, Observation, page 3).

And found in the documentation;

> *ENGAGE*: Creation and exchange of user-generated content. Use human emotions such as joy, trust and curiosity to build loyalty and desire for products and services. (Case A, Documentation, website).

Company A has also developed their web-technologies-based tools that collect knowledge about their clients' customers. The Chief Technology Officer explained;

> We have designed our tool that analyses emotional responses from the online forums. We then communicate such knowledge to our clients and propose them recommendations for their products and services. (Case A, I3, 25/02/15)

(9) Entrepreneurial Opportunities Discovery

Apart from several factors revealed by the findings that influence EOD I also found an explicit quotation from the informants on the potential of web technologies on identifying new opportunities. For instance, the Chief Technology Officer commented;

> I think that the evolution of the web is opening up new doors to new entrepreneurial opportunities every day, look for example at Salesforce.com. (Case A, I3, 25/02/15)

It was also observed that the company has a people-centric approach at the heart of its operations. For example, it was observed that;

> It appeared that the organisation has a *people-centric vision of web technologies* to create a unifying environment– where end users are getting the experience they want and are using the stuff they use at home, but at the same time, the control on it exists by web policymakers in organisations. (Case A, Observations, page 3).

The people-centric approach has been argued to be the most significant factor by Apple's founder Steve Jobs. He once mentioned in one interview that initially Apple followed an approach of developing a technology, and then selling it to its customers. However, the better and more effective

approach was later adopted by Apple - which was first to understand what customers want and then using a reverse-engineering approach to develop technologies around that.

4.3.6 Summary of Contributions of Case A

It appears from the analysis of the Case A that the factors that I identified from literature (Chapter 2) are considered essential for EOD even in technology-based organisations. Further to this, I found that several other factors were considered vital for the discovery of new entrepreneurial opportunities. This section provides a brief overview of these new factors (See also Table 4.3).

Table 4.7. Summary of Contributions of Case A

New Factor	Description
Pursuit of continuous learning	A continuous effort carried out by entrepreneurs in learning new things
Knowledge of anticipated customers' needs	The needs that customers might not know themselves.
Knowledge of anticipated means to satisfy customers' needs	The solutions to anticipated customers' needs.
External pressure	Pressure from an organisation's customers, competitors and partners that can be perceived as firm as well as individual level
Entrepreneurial culture	An entrepreneurial culture that encourages entrepreneurial activities and thinking within an organisation
Imagination	The ability to think of new opportunities without having prior knowledge.

(1). Pursuit of Continuous Learning

Though prior research has emphasised the importance of prior knowledge for EOD, the results propose that having prior knowledge is not sufficient for EOD. Instead, there should be a continuous pursuit by the entrepreneurs working for technology-based organisations to acquire new relevant knowledge (two out of four informants working for Company A commented on that).

(2). Knowledge of Anticipated Customer/Market Needs

Knowledge of customers' needs has been found vital for EOD in prior research. However, the findings of this research revealed that because technology-based organisations have to stay ahead of their game due to rapid technological advancements, the organisations need to anticipate customers' needs that they might themselves not be aware of. In order to achieve this, the organisations need to be pro-active and should employ available state-of-the-art tools to perform predictive analytics (Company A's documentation and their Digital Marketing Manager provided evidence for this).

(3). Knowledge of Anticipated Means to Satisfy Customers/Market Needs

Another exciting factor revealed by the findings was the knowledge of anticipated means to satisfy customers' needs. It appears that Company A not only devotes its resources on anticipating customers' needs, it also put substantial effort and resources in figuring out anticipated solutions to such needs and problems. It was highlighted by the Chief Technology Officer of Company A that when knowledge of anticipated customers' needs was combined with knowledge of anticipated means to satisfy those needs, not only new entrepreneurial ideas can be discovered, a high level of customers' satisfaction can also be achieved.

(4). External Pressure

The data also revealed that within Company A, pressure from the external environment such as pressure from its customers and partners is perceived positively and channelled into discovering new opportunities. It was also found that external pressure could lead to innovative enhancements to the existing processes of a firm as indicated by the Co-Founder of Company A.

(5). Entrepreneurial culture

Another environmental factor apart from the external pressure is an organisational culture of an organisation. The findings revealed that there was substantial emphasis given to the internal environment of the company concerning its role in facilitating creativity. Even the furniture used in the company was "funky" and loosely arranged. The informants pointed out that open spaces where employees could interact with each other could lead the employees in coming up with new ideas.

(6). Imagination

Imagination was another compelling factor that was revealed by the findings. Imagination is an innate subjective vision that lies in the mind of an entrepreneur and most cases do not require conscious effort at all, yet guide the entrepreneur in discovering entrepreneurial opportunities as pointed out by the Founder of Company A.

4.4. CASE B REPORT

4.4.1. Case B Introduction

Case B is an American multinational technology company based in San Jose, California with offices all over the world (e.g., in Ireland). It designs, manufactures and sells networking equipment. It is widely considered to be the largest networking company in the world. The products and services mainly focus on three market segments—enterprise and service provider, small business and the home. While routing and switching remains the core business, it has tapped into many other areas in the last decade and has become a market leader. These include VOIP, datacentre and virtualisation, collaboration and cloud services. Being a world leader in network technologies, it is poised to become the most significant player in the emerging web technologies market.

Company's current strategy is based on following principals that it has demonstrated over the years:

"Digitization. Disruption. Innovation. Transformation. "

Organisation and Structure

Case B is a large company with a worldwide presence — it employees over 71,000 people across all continents. Business operations are managed via regional organisations also called theatres. These include US, Canada, Asia Pacific, Emerging markets (China, India)/Europe and Latin America. Technology operations are managed through various business units (BUs).

Operating Environment

Case B Company offers products and services to a very diverse audience. These include but not limited to the following industries:

- Education
- Energy
- Financial Services
- Government
- Healthcare
- Manufacturing
- Public Sector
- Retail

Majority of its sales happen through channel partners and vendors. The company provides extensive training programs and sales campaigns to partner companies. It is mostly done through a central marketing and social media team. This team works with all business units and builds a prospecting and sustaining programs, manages social media strategy and operations, and develops content that influences prospects and customers. It partners with key industry organisations to create marketing strategies and creative tactics to reach market segments and develops promotions to assure retention, cross-selling and up-selling of its products and certifications.

Organisational Objectives

A summary of Case B Company's objectives are given below:

- Dedicated to innovation as the path to growth and sustainability of market leadership
- Know our customers inside out so we can help them understand the outcomes
- Partner with customers to securely digitise and transform their entire businesses
- Collaboration as the engine to create more valuable, intimate and loyal interactions in organisations

Social Media applications usage in Case B Company

Case B Company uses almost all the available social media applications such as Wikis, blogs, RSS feeds, social bookmarking, tagging, and discussion forums.

4.4.2. Contextualisation of Method

Like case A, I collected data for case B from three sources mainly – documentation, interviews and observations. I reviewed the documents first. In total, 5 internal and 3 external documents were consulted and reviewed. Appendix 12 provides details of the content of each document, its length and creation date. Then interviews were conducted with four of the employees of case B organisation (see Table 4.1 for details). All those employees were involved either directly or indirectly in the entrepreneurial process for the case B organisation. Like case A, informal observations were also conducted. Before deciding for the interviews at case B organisation, I requested them to allow me for such observations. The case B organisation's staff let me observe the internal environment of their organisation as well as see the role of web technologies in their business processes. I also had information chats with a few of the employees.

All the interviews were conducted at case B organisation. The interview meetings went well. Like case A, I did not have any problem in getting the permission of the interviewees for recording interviews. Hence, I recorded the interviews which saved me quite a lot of time. I structured my notes the said day within three hours of the interview finished time which helped me a lot in carrying out initial reflection and interpretation of the interviews' notes. The interview protocol and interview questions were updated, first after reviewing the documents and then after each interview whenever essential concepts and themes emerged.

4.4.3. Case B Analysis

I followed the method of analysis for case B mentioned in Chapter 3 as I did for case A. I reviewed all the transcripts of interviews, observational notes and the case B documentation sentence by sentence. I extracted three hundred and seventy-four key statements (KS) (see Appendix 10). After the first cycle of analysis, I grouped two hundred and seventy-four (including statements for relationships) for overarching concepts such as Individual factors, organisational factors, environmental factors and web technologies as an enabler. I ended up with ten clusters for Individual factors concept (see Table 4.8), nine clusters for organisational factors concept (see Table 4.9), one cluster for environmental factor (see Table 4.10) and nine clusters for the role of web technologies as an enabler of different factors (see Table 4.11).

Table 4.8: Case B Individual factors analysis

Cluster	No. of KS	Tentative factors	Tentative variables	Retained variables
Entrepreneurial alertness	5	1	3	2
Prior knowledge	39	1	6	0
Leadership	6	1	2	1
Risk taker	3	1	2	2
Pursuit of continuous learning	4	1	3	1

Imagination	7	1	4	1
Sociability	4	1	3	1
Knowledge of demographic changes	16	1	4	1
Divergent thinking	6	1	4	1
Cognitive ability	8	1	2	1

Table 4.9: Case B organisational factors analysis

Cluster	No. of KS	Tentative factors	Tentative variables	Retained variables
IT infrastructure	15	1	2	1
Systematic search	6	1	3	1
Social capital	8	1	4	1
Occupational identities	14	1	3	2
Diversity of individuals' skills set	6	1	3	2
Readily available knowledge	3	1	3	2
Sociability	4	1	2	1
Entrepreneurial culture	21	1	3	2
Research collaboration	9	1	3	2

Table 4.10: Case B Environmental analysis

Cluster	No. of KS	Tentative factors	Tentative variables	Retained variables
External Pressure	16	1	4	1

Table 4.11: Case B web technologies as enabler analysis

Cluster	No. of KS	Tentative factors	Tentative variables	Retained variables

Entrepreneurial alertness	3	1	3	2
Pursuit of continuous learning	4	1	4	1
Collaboration among employees and stakeholders	22	1	4	1
Market Reach	10	1	4	1
Entrepreneurial culture	3	1	3	2
Systematic search	4	1	3	2
Readily available knowledge	3	1	3	2
Sociability	4	1	5	0
EOD	19	1	3	2

4.4.4. Validation Meeting

Like case A, at the end of the analysis of case B, a validation meeting was conducted with one of the case B organisation's employee (see Table 4.1). This interviewee was first briefed about the research, and then I provided him with the findings of my study (i.e., analysis of case B) and supporting evidence for that. I mainly asked him to provide his feedback on the few themes that I could not find many key statements and also obtained her feedback on the relationship among the factors that I established based on the data. The interviewee appreciated my efforts and agreed with my findings.

4.4.5. Case B Findings

Table 4.12 provides a list of key statements references for each factor and the status on its validation. Following sections provide findings of the analysis and also relevant key statements from documents, interviews and observations. See Appendix 10 for sub factors, variables and key statements.

Table 4.12: Case B Assertions

Overarching Concept	Factors	Validated?
Individual factors	Entrepreneurial alertness	Yes
	Prior knowledge	Yes
	Leadership	Yes
	Risk taker	Yes
	Pursuit of continuous learning	Yes
	Imagination	Yes
	Sociability	Yes
	Knowledge of demographic changes	Yes
	Divergent thinking	Yes
Organisational factors	IT infrastructure	Yes
	Systematic search	Yes
	Social capital	Yes
	Occupational identities	Yes
	Diversity of individuals' skills set.	Yes
	Readily available knowledge	Yes
	Sociability	Yes
	Entrepreneurial culture	Yes
	Research collaboration	Yes
	Web-based brainstorming	Yes

Environmental factors	External Pressure	Yes
Web technologies as enabler	Entrepreneurial alertness	Yes
	Pursuit of continuous learning	Yes
	Collaboration among employees and stakeholders	Yes
	Market Reach	Yes
	Entrepreneurial culture	Yes
	Systematic search	Yes
	Sociability	Yes
	Knowledge	Yes
	EOD	Yes

4.4.5.1 Individual attributes of Entrepreneurs

The findings revealed several characteristics related to the individual attributes of entrepreneurs that the informants considered important for discovering entrepreneurial opportunities. The observation data and documentation also provides evidence of the role of individual characteristics for EOD.

(1) Entrepreneurial Alertness

According to the ICT Manager, an entrepreneur should be pro-active in detecting and exploiting changes around him/her. He explained;

> An entrepreneur should be alert to see the changes happening around him. Those changes can be in technologies, markets, customers' needs, government policies. If he can track down those changes, opportunities would follow automatically. (Case B, I3, 15/05/15)

It was also observed that in Company B, the employees are pro-active and are constantly looking for new opportunities;

> Case B as a networked organisation - the employees' expertise, knowledge and interests are very much visible to peers, customers, strategic partners. "We are always looking to explore new opportunities to enhance our global teams' communication, which is why we are launching our innovation and Entrepreneurship Center". (Case B, Observations, Page 2).

The ICT Manager also stressed it;

> A positive attitude of an entrepreneur towards EOD would lead him to find one. (Case B, I3, 15/05/15)

(2) Prior Knowledge

Company B is sizeable technology-based enterprises have well-established knowledge repositories and resources. It has also been ensured that processes are in place for all the staff members to have proper access to those repositories. The Data Analytics Manager indicated;

> The stock of knowledge is openly available throughout my organisation to improve integration within the team. (Case B, I5, 03/06/15)

It appears that there is a common understanding in Company B that knowledge can play a vital role in identifying new opportunities, especially the depth of knowledge. The ICT Manager remarked;

> Having an in-depth knowledge of a field makes it easier to spot opportunities. (Case B, I4, 15/05/15)

Tacit and Explicit Knowledge

Company B's documentation suggests that focus is given to both tacit and explicit knowledge in the company. For example, it is noted in the documentation;

> Advances in technology are shifting demographics and increasing global competition. Given this, Smart Work and Learning are merging, making learning integral to personal and professional development. Because of this, people are learning to do their jobs in two ways: 1) through explicit knowledge, which takes place informal learning situations, and 2) through tacit knowledge, which occurs when people work with more experts and learn the nuances of a job (informal learning). Both types of learning methods have a place and will need to be accessible on demand. (Case B, Documentation 5, Page 4).

Apart from giving importance to both tacit and explicit knowledge, it is ensured in Company B that the tacit knowledge is shared among all the staff and to enable that the company has developed their in-house tools. The documentation reads;

> Facilitate the development of a "knowledge exchange," enabling sharing of resources globally among learning hubs in each of their manifestations. Using tools such as ABC is a way of sharing tacit knowledge more widely through electronic communities of practice in a connected world. (Case B, Documentation 6, Page 10).

Further, the ICT Manager explained that when new knowledge is combined with past experiences, the chances of discovering new opportunities become high. He explained;

> Identification of entrepreneurial opportunities, to me, is a part of acquiring new knowledge and combines it with your past experiences. (Case B, I4, 15/05/15)

This point of the influence of pairing new information with tacit knowledge on opportunities discovery was also elaborated by the Chief Technology Officer, who said;

> Applying new frames of reference to an existing problem or market can reveal exciting opportunities. (Case B, I6, 03/06/15).

Knowledge of Anticipated Customer/Market Needs

Customers and markets needs are used for guidance when it comes to developing solutions, services and products at Company B. The Business Development Manager commented;

> In my organisation, the customer or prospect is the very origin of the solutions. It is quite relevant for us that any product we could serve has to be desired by the market. (Case B, I2, 15/05/15)

In order to gain the most recent knowledge about customers and market needs, the company has a well-established mechanism to collect and analyse feedback from their customers.

> They ensure the sense of personal ownership in feedback. Proper analysis is done in customer transaction which helps to understand the customer and maintain loyalty.

The Data Analytics Manager further stated;

> We use quality feedback questionnaires to involve our services and make sure the gap between expectations and reality is as small as possible. (Case B, I5, 03/06/15)

Therefore, the usage of big data analytics is employed by Company B to perform an in-depth analysis of the feedback that they receive from their customers. According to a note in the documentation;

> Service calls to fix problems or to perform traditional maintenance are time-consuming and not usually the means to promote customer intimacy. Take advantage of more in-depth diagnostic and planning services to anticipate customer needs. (Case B, Documentation, Website, Weblink 1)

Knowledge of Anticipated Means to Satisfy Customers/Market Needs

Once the potential customers' problems are identified, the Business Development Manager explained that the next steps would be to conduct meetings and seminars in the company to discuss potential solutions to those problems. He commented;

> We have dedicated resources for events and meetings where future potential problems of our customers are discussed as well as their potential solutions. (Case B, I2, 15/05/15)

It appears that although many emphases are given on explicit and implicit knowledge especially related to technologies, there are also many emphases devoted to overall business knowledge. The Data Analytics Manager highlighted it;

> Knowledge of technologies is fundamental. However, it is a broader understanding of business-related concepts that enable a person to come up with solutions to problems faced by customers. (Case B, I5, 03/06/15).

For example, it was observed that being a purely technology-based organisation, Company B is investing large sums of money and resources in the development of new technologies all the time.

> Case B is building social media technologies and other emerging technologies such as VOIP, Datacentre and Virtualization, Collaboration and Cloud services. Being a world leader in network technologies, it is poised to become the most significant player in the emerging Internet of Things (IoT) market. (Case B, Observations, Page 1).

Especially those technologies are being developed to enhance communication among internal and external stakeholders. It was noted in the observations;

> Encourage communication between customers: intrigue bloggers and customers. Encourage sharing through competitions. (Case B, Observations, Page 1).

However, the primary objective of developing those technologies is to ensure that customers' needs are understood properly and solutions are developed according to those needs. It was noted in Company B's documentation; only informed solutions would lead to better relationships with customers. The documentation reads;

> Improve productivity and develop a more integrated relationship with customers through the next generation of highly automated remote monitoring and analysis services. These services allow you to provide both products and proactive insight based on best practices tailored to your customers' unique needs, usage patterns, and infrastructure. (Case B, Documentation, Website, Weblink 1)

(3) Leadership

Leadership skills are considered very important by large companies like Company B. It was found from the analysis that Company B holds several events where leaders from large companies gather and share their experiences. It was stressed that leadership skills have become far more critical than ever.

> In today's dynamic world with changing global demands, CEOs can benefit as never before from the experience and insight of their peers. The Company B CEO Leadership Council brings together CEOs from Fortune Global 500 companies, along with their chief technology strategists. The event is interactive and fast-paced, rich with opportunities to collaborate and discuss the most timely and transformative issues facing today's leaders. (Case B, Documentation, Weblink 8).

The Chief Technology Officer further indicated its significance;

> Leadership is critical especially when you are in a corporate setting due to its management structure. Bad management can lead to large sections of the company failing. (Case B, I6, 03/06/15).

(4) Risk Taker

I did not find enough data that would suggest the significance of risk-taking attribute for EOD. However, it was observed during the informal conversation that calculated risks were being taken in Company B.

> We innovate everywhere to create fresh ideas and opportunities. Bold risks shape the future. We understand every failure is a success if we learn from it. (Case B, Observations, Page 3).

(5) Pursuit of Continuous Learning

According to the ICT Manager of Company B, the staffs are encouraged and are provided with resources to be engaged in continuous learning. He commented;

> Individuals in our organisation improve their evaluation process through experience and continuous learning (Case B, I5, 03/06/15)

(6) Imagination

The ICT Manager of case B organisation highlighted the importance of imagination for entrepreneurs by saying:

> A quality engagement in thinking about opportunities is at the core of being able to find new leads (Case B, I5, 03/06/15)

It was also noted in the documentation analysis that Company B believes in the role of imagination in discovering new opportunities. It was stated in the documentation;

> I offer my heartfelt congratulations to our Company B's colleagues who have injected their imagination into the latest chapter of their own story – designing an unmatched core networking foundation for the next generation Internet. Honestly, it is advantageous to work with people who aspire to achieve bold goals. (Case B, Documentation, Weblink 7).

The ICT Manager indicated that for an entrepreneur to discover entrepreneurial opportunities there are many other factors apart from the logic that are required. He said;

> Entrepreneurs who are driven not only by logic but emotions and compassion are more likely to imagine new business opportunities. (Case B, I4, 15/05/15)

Another ICT Manager also commented;

> Many businesses came into existence only in the imagination of (Case B, I3, 15/05/15)

(7) Sociability

According to Business Development Manager:

> Entrepreneurs should be open to criticism because that would help them see what they initially were not able to see. (Case B, I2, 15/05/15)

(8) Knowledge of Demographic Changes

It seems knowledge of demographic changes is getting increasing attention of technology-based companies. They are not only targeting the aged members of the community who were not the big users of many technologies, yet they still use those technologies to some extent. Further to this, the increasing focus is also being given to anticipating future changes by considering how today's

generation would behave and act in the coming years. The Business Development Manager explained;

> Mostly the focus of web-technologies based companies is to look for opportunities among youngsters being the primary users of web technologies. However, many companies ignore the fact that new opportunities can be found at looking at the usage patterns of these technologies by older people. (Case B, I2, 15/05/15)

The ICT Manager's comment solidifies the same concept;

> Young customers will become senior customers in 10-20 years. Age will change their habits, limit their capabilities, even may change their perceptions of things. There are new opportunities lie there, if we start thinking of those constraints beforehand. (Case B, I4, 15/05/15)

The Data Analytics Manager suggested that once knowledge of demographic changes has been acquired, action concerning devoting resources to develop solutions that would meet the needs and demands of future generations need to be developed. He said;

> The opportunities arising from the changes in the demographics of your customers require that we allocate resources and have processes in place to develop new solutions. (Case B, I5, 03/06/15)

Company B's documentation proposes that demographic changes can also lead to innovative improvements in existing business processes. For example, it was stated;

> Several socio-economic trends like globalisation and demographic changes are also contributing to the transformations in the workplace for Elroy and his peers. (Case B, Documentation, Weblink 10).

It was further highlighted in the company's documentation that particular and careful attention is being given to demographic changes and its impact on the changing needs and technologies. It was stated;

> Digitisation goes beyond connectivity. It gives you the ability to secure data, act on data and deliver value based on data," says Oliver Tuszik, general manager Company B Germany. "Digitization benefits countries, cities, companies and every one of us. It creates competitiveness, improved public services and better quality of life, particularly amongst the demographic changes over the next years. We want to make our contribution to this transformation, in addition to our ongoing investments." (Case B, Documentation, Weblink 11).

(9) Divergent Thinking

The findings suggest that Company B encourages their employees to think out of the box. For example, it was stated in the documentation;

> Divergent – Thinking out thinking that moves outward from the problem in many directions. (Case B, Documentation 3, Page 12).

The Business Development Manager also pointed out;

> We encourage our staff to involve different events and seminars and communicate with people from different backgrounds. It is because we believe that would let them think one thing from the different point of views. (Case B, I2,)

(10) Cognitive Abilities

The findings revealed that Company B emphasises integrated learning and the ability to develop a holistic view of things. It was noted in the documentation;

> Learning has to be holistic and integrated, about social and emotional well-being as well as cognitive development. (Case B, Documentation 4, Page 16).

The Business Development Manager further elaborated this point. He said;

> Entrepreneurial cognition is an essential attribute of an entrepreneur. However, it should follow with a proper entrepreneurial action to exploit any identified opportunity. (Case B, I2, 15/05/15)

The ICT Manager also remarked;

> Cognitive abilities need to be developed for being able to see opportunities. (Case B, I4, 15/05/15)

4.4.5.2 Organisational Factors

(1). IT Infrastructure

Regarding the company's IT infrastructure, given a sizeable IT-based organisation, I was expecting a less emphasis on the role of IT infrastructure for EOD in Company B. However, it is interesting to note that IT infrastructure is considered the backbone and there is a zest of continuous enhancements for IT efficiency. The ICT Manager commented;

> By seeing how we need to adapt our IT infrastructure as we scale our company it allows us to learn about inefficiencies and problems which we can then opportune upon. (Case B, I3, 15/05/15)

The Business Development Manager pointed out the extended role of IT infrastructure that it does not only enable internal interactions and collaborations; it also connects the company with the external world. He quoted;

> Being able to connect with and share resources with consumers, decision makers, and internal staff members is an integral part of any business, IT infrastructure can help make this easier. (Case B, I2, 15/05/15)

I further noted that IT infrastructure was also used to reflect the IT-face of the company to its visitors by deploying virtual receptionist. It was observed;

> To enhance safety and security, they are investigating the use of optical tools to monitor the number of people who enter and leave the building. Another plan is installing a "virtual building receptionist," an interactive screen in the lobby that can answer basic questions, page employees to come out and meet their visitors, provide temporary badges to visitors, and connect visitors to a live receptionist in another building when needed. (Case B, Observations, Page 2).

The Company's documentation also provided evidence for the usage of IT infrastructure for communication and collaboration. It was stated;

> The foundation of streamlined communications is an advanced network infrastructure, which makes it easy for your employees to collaborate among themselves and with partners. (Case B, Documentation, Weblink 2).

The documentation also highlights the facilitating role of IT infrastructure in the integration of different entities of the company. It was stated;

> Today, the network is a strategic platform in a world that demands better integration between people, information, and ideas. The network works better when services, together with products, create solutions aligned with business needs and opportunities. (Case B, Documentation 1, Page 4).

(2) Systematic Search

It appears from the findings that Company B substantially employs data analytics and other web technologies to conduct a systematic search in pursuit of finding new opportunities. For example, it was observed;

> Company B uses in-house web technology, Webx, for social networking, information search, blogging, customer relations, sales services, digital marketing, entrepreneurship and customer-facing innovation. (Case B, Observations, Page 3).

The Chief Technology Officer was also of the view that systematic search can lead to the identification of new opportunities. He commented;

> If we devote our resources to look for opportunities actively, we will definitely find them. (Case B, I6, 03/06/15)

He further highlighted that systematic search could also guide us finding existing flaws in our existing processes. He quotes;

> Systematic search allows one to see flaws more clearly and efficiently. (Case B, I6, 03/06/15)

(3) Social Capital

Company B. also appreciates social connectedness. It seems both strong and weak social ties are considered equally important. The Chief Technology Officer remarked;

> It is all about the connections you make and whom you meet will help you succeed. (Case B, I6, 03/06/15)

However, one exciting thing that I noted was the emphasis of establishing connections with prestigious universities and institutes by Company B. I think it might be easier for the Company B because of them being a large enterprise and their ability to offer prestigious institutes something valuable. The company's documentation stated;

> The future of networking is in wireless – it is a requirement in the workplace and something everyone needs to be effective. Given this fact, and our strong ties to the MIT community, you can imagine our excitement in sharing that today, MIT's CSAIL is now officially a customer of Meraki. CSAIL decided to switch from its primary networking vendor, a well-known provider, because of a growing number of complaints about reliability, performance and manageability. MIT will deploy 80 Meraki MR14 access points to improve reliability and performance throughout the building for more than 800 faculty, staff, and students. (Case B, Documentation, Weblink 14).

It was further elaborated by the Chief Technology Officer who pointed out;

> Collaborations with prestigious universities can bring tangible benefits in the form of new business opportunities. (Case B, I6, 03/06/15)

It was evident from the documentation that establishing weaker ties was looked at positively in a way that it was a common belief that breadth in connections had particular advantages such as diversity in teams. According to the documentation;

> The strength of weak ties highlights the importance of diversity in the areas of brainstorming, problem-solving and ideation. The more diverse the group, the better they are at these tasks. (Case B, Documentation, Weblink 15).

(4) Occupational identities

Occupational identities in Company B were managed on an individual basis - one person would be responsible for one and only one role. It seemed that such exclusive assignment of roles was perceived for high levels of performance and productivity as explained by the Business Development Manager;

> Assigning unique roles to different individuals is considered very important in our organisation. It also helps our staff involved in entrepreneurial activities to keep focused on a given task at hand. (Case B, I2, 15/05/15)

The explicit assignment of roles to personnel also ensured that they fully understood what was expected of them. The ICT Manager remarked;

> Making expectations from individual staff members clear is very important and can save them from expressing different behaviours. (Case B, I3, 15/05/15)

However, one exciting thing that I found was that staff members were encouraged to take up different roles during their employment, but one role at a time. It was stated that such an approach would broaden the vision of the staff necessary for identifying new opportunities. Another ICT Manager explained;

> Managers, who have been involved in different job roles, seem to be more appreciative of the challenges that come with different roles and have broader knowledge and vision, which I think makes them more efficient at identifying new opportunities. (Case B, I4, 15/05/15)

The staffs were encouraged to take bold steps when it comes to taking the initiative and making decisions. It was observed;

> They developed the idea of employee involvement - "very often it is the most efficient to work with just the person involved, without the formality of passing through every layer of management" So they came up with the concept of Decision-Making Team. They lived by the employee empowerment motto of "Don't ask for permissions, ask for forgiveness later". (Case B, Observations, Page 2).

Also, the staffs were encouraged to attend different types of sessions and communicate with other members involved in different roles other than from theirs. For example, it was observed;

> Sessions like birthday breakfast, new hire session with others were encouraged to engage with people with different roles. (Case B, Observations, Page 2).

(5) Human Capital

The variety of skills of individuals is vital for building an innovative team and human capital.

Human capital has always been considered for the success of all businesses. However, the findings of this research suggest that for large technology-based organisations, diversity of individuals' skill set is the most critical human capital that is considered necessary for EOD.

It was stated in the company's documentation that the human capital of the company has a diverse skill set.

> Some specialists in our voice and video operations team are very good at traditional call routing, but also have a fundamental skill set across other technologies. Other people from a traditional voice background are now focusing on the management of video systems. (Case B, Documentation, Weblink 6).

The analysis of documentation also further elaborates that the need to have such diversity is so critical that the company's documentation provides specific advice to its customers and partners on how to find a diversified human capital for their organisation. It was stated;

> For our customers and partners who have trouble finding qualified employees to staff your voice operations, I can sympathise with your situation. If I could find someone with the perfect resume for UC operations today, their skill set would include: For voice, knowledge of traditional voice call routing principles and techniques, including dial plans, because voice routing is very different from data routing. For voice and video, knowledge of routing/switching and QoS techniques and their impact on application performance. Understanding of end-to-end UC infrastructure provisioning and management. Enterprise

background with video systems. Scriptwriting skills to automate monitoring and management tasks. (Case B, Documentation, Weblink 6).

(6) Readily Available Knowledge

The usefulness of web technologies to make information and knowledge readily available, regardless of time and location, is another exciting finding.

For example, it was observed;

A significant number of pages on the web were used for internal use by the Company (Case B Observations, Page 3). The Data Analytics Manager remarked;

Web 3.0 standards systems seek contextualised knowledge to help people in their jobs by pointing to series of analyses and potentially useful information (Case B, I5, 03/06/15).

(7) Sociability

Since web technologies have enabled organisations to connect their employees in ways that were not previously possible, they also have a positive influence on people's sociability. The Chief Technological Officer noted:

Web technologies have improved how organisations connect with other employees and employees' social interactions in the workplace are improved (Case B, I6, 03/06/15).

(8) Entrepreneurial culture

There is a positive and encouraging approach that could be seen and felt throughout the Company B's organisational culture. All employees especially involved in entrepreneurial activities were told to speak their heart out without any judgement and fear of criticism. For example, the ICT Manager remarked;

> Encouraging our staff that no idea is a bad idea and to share them in meetings or on whiteboards. We want people to be different. (Case B, I4, 15/05/15)

The same concept was expressed by another ICT Manager who said;

> An encouraging and positive environment is the key if we want our entrepreneurial managers to perform optimally. (Case B, I3, 15/05/15)

I noted that several measures were taken by Company B to ensure that the organisational environment is positive, creativity-promoting and encouraging.

> Scale office space usage and create work areas that foster and promote employee inclusiveness, collaboration, and innovation. Use space more effectively with highly secure access to corporate resources, high-quality video and audio, and support for multiple devices. (Case B, Documentation, Weblink 4).

I further observed that employees were even involved in playing different games during their work hours. For example, I noted;

> The working culture was not intense or independent rather employees were engaged in collaboration, laughter and playing games. (Case B, Observations, Page 2).

There was this passion among the informants and few people that I talked to that they wanted to keep up the legacy of their company. For example, I noted;

> The employees possessed strong beliefs maintaining their legacy for decades to come. (Case B, Observations, Page 2).

However, a strange comment that I came across during informal conversation with an employee was;

> They designed their office space under the traditional assumption that employees would work in their cubicles during regular work hours and would need assigned workspaces with their desks, PCs, and phones. The result was that meeting rooms were often in short supply, while offices and cubicles remained vacant 65 per cent of the time on average. Most employees had cubicles; only those managers with eight or more employees (direct reports) had private offices. (Case B, Observations, Page1).

However, it was soon realised in the early days of the company that their employees should be provided with the broader range of choice concerning their workspace options, and the focus should be on the completion of their jobs and not forcing them to do their jobs in certain ways. It was observed;

> They resolved to build a work environment based not on titles, but rather on the needs of individuals, by giving all employees a broad choice of workspaces and technology tools to do their jobs. "Rather, employees are given an innovation task and a deadline, and how you complete that task is up to you. We ask them to work on the fail-fast method. Employees would have the freedom to choose their environment based on the requirements of their current task."(Case B, Observations, Page 2).

It was also evident from the company's documentation that various measures were being undertaken to encourage interaction and collaboration among its employees. The documentation stated;

> Newer forms of interaction have the potential to foster more significant levels of collaboration. Improve individual and collective performance, leading to innovation that creates competitive advantage. (Case B, Documentation, Weblink 3).

Also, it was observed that employees' satisfaction was given priority throughout the company;

> By creating a "connected workplace," as the team dubbed the project, they hoped to achieve measurable business benefits such as reducing real estate costs, in addition to increasing business productivity and employee satisfaction. (Case B, Observations, Page 2)

(9) Research Collaboration

The findings suggest a substantial emphasis by Company B on research collaboration. In order to achieve this, the company takes several initiatives such as establishing collaboration with universities and institutes worldwide. For example, it was noted;

> Company B aims to empower researchers and students throughout Canada with the necessary tools to improve ongoing research collaboration and foster more open innovation to accelerate the adoption of transformational solutions. (Case B, Documentation, Weblink 12).

The analysis of the documentation also reveals that research collaboration can lead to EOD. For example, it was stated;

> By improving research collaboration within the university, and between universities, companies, and governments, we can improve the ability to innovate. (Case B, Documentation, Web-link 13).

The ICT Manager indicated that his company works on several fronts to establish research collaborations. He said;

> The company strives to gain prime position in technological advances and scientific research by reaching out to other companies, institutions and seminars around the world. (Case B, I4, 15/05/15)

(10) Web-based Brainstorming

The findings revealed an exciting use of web technologies. For example, Company B has developed its web-based tools that facilitate web-based brainstorming to create new ideas and find solutions to existing or anticipated problems.

It was observed;

> Company B's has a device that can fit your pocket and can be used as a whiteboard. It was entirely developed in-house (Case B, Observations, and Page 4).

This device can also be used to;

> Schedule a meeting in the app, and you will automatically get what you need to prepare for the meeting. It creates a team space so you can create the agenda, get all the right people involved, share content, and chat back and forth. The chances are good that the meeting itself will be shorter and better; in the end, you may not even need to meet at all. (Case B, Observations, Page 4).

Moreover, the brainstorming can also be managed through this device. For example,

> Brainstorming throughout the meeting can be captured and easily saved within the Company B Spark space. Post-meeting comments, follow-up action items or notes from the meeting in the same space. Everything needed for continued collaboration is in one place. (Case B, Observations, Page 4)

4.4.5.3 Environmental Factors

Similar to Case A, the findings of Case B also revealed several environmental factors that were deemed essential for EOD.

The findings suggest that staff at Company B see external changes positively and are of the view that such changes can lead to new entrepreneurial opportunities. The Product Manager remarked;

> As external circumstances change, the opportunities for new, markets or extensions in existing markets arise, as an entrepreneur, it is essential to realise these opportunities and capitalise on them. (Case B, I1, 05/05/15)

He further explained the influence of external changes in creating challenges and opportunities for the companies. He quoted;

> There is a debate that UK would hold a referendum on whether to remain in EU or leave it. If the outcome of such a referendum is UK leaving the EU, it will create challenges as well as opportunities for the technology-based firms. (Case B, I1, 05/05/15)

(1) External Pressure

The relationship with its external stakeholders is seen as a commitment by the Company B. It was stated in its documentation;

> Any commitment or promise by Company B to a customer or partner that is outside of Company B's approved terms, whether intended to be legally binding, is a "side commitment." (Case B, Documentation 2, Page 25).

These partnerships and commitments are highly regarded and valued by the company and were echoed by the Business Development Manager who said;

> Suggestions from our partners and customers have helped us improve our operational processes on several occasions. (Case B, I2, 15/05/15)

I also observed the approach that was being followed at Company B concerning establishing partnerships and maintaining them was a continuous commitment and learning. I noted that;

> Learning through Acquisition and Partnership - Continuous learning has been a part of their culture. (Case B, Observations, Page 1).

4.4.5.4Web technologies and EOD

The findings suggest that web technologies are being used at Company B as an enabler of several of their processes. Following sections provide an overview of these findings.

(1) Entrepreneurial alertness

The habitual or unconscious use of web technologies at the workplace of Company B gives the impression that entrepreneurial vigilance is effortless.

The ICT Manager pointed out:

> Employees are more likely to use their alertness skills and to find solutions to problems if they perceive that their social media team environment is supportive, i.e. with the necessary resources and managerial assistance (Case B, I4, 15/05/15).

(2) Pursuit of continuous learning

There was a positive approach that could be seen throughout Company B for continuous learning and to acquire new relevant knowledge.

The Business Innovation Manager remarked:

> We must be aware that new knowledge is acquired using technology - enhanced learning methods (Case B, I2, 15/10/15).

It was observed;

> The company changes and improves its web tools on a regular basis (Case B Observations, Page 2).

(3) Collaboration among employees and stakeholders

Company B encourages staff to interact, collaborate and share. It provides them with the necessary means to do that. Most of these mean include web technologies such as internal blogs and instant messaging services. The Product Manager stated;

> The blogs and instant message are a great way to interact with people having the same interest. It brings people together, ideal for leisure and business, depending on how you use it. (Case B, I1, 05/05/15)

The ICT Manager also indicated the vital role of web technologies for communication and collaboration purposes. He remarked;

> Social Media and networks can provide an unintimidating means to connect with others. (Case B, I3, 15/05/15)

The Data Analytics Manager stressed upon the need to use web technologies for analytics to improve collaboration and relationships with customers. He said;

> Of course, if your business is to provide a service that a user pays for, it is essential that it be tailored to the best possible extent to give the user a productive service and experience, so that the analysis of this will make a better service or product that in turn leads to a more successful business. (Case B, I5, 03/06/15)

The Chief Technology Officer pointed out that the usage of web technologies has improved not only the quality of connectedness, they have also helped companies extended that connectedness.

> The internet allows interconnectedness and management on a scale previously made impossible by communication issues. (Case B, I6, 03/06/15)

It was also observed that interaction enabled by web technologies also make a difference in the quality of interaction and convenience of having such interactions. For example, it was observed;

> They conduct team building events facilitated by web applications for interaction. (Case B, Observations, Page 3).

It was further observed;

> Employees get in touch and share ideas through an in-house Web 2.0 platform called Webx. The same platform is used to connect with customers. Customers to customer's communication are done through the same platform. (Case B, Observations, Page 3).

Also, other technologies are being used for effective and efficient communication;

> They use unified communication technologies in the workplace. (Case B, Observations, Page 3).

The findings also revealed that Company B strives to achieve streamlined communication with the help of web technologies for better, quicker dissemination of information. It was stated in the documentation;

> In the global economy, streamlined communications between employees, partners, and customers give companies a substantial advantage over competitors because they can disseminate updates more quickly, react faster, and serve customers better. (Case B, Documentation, Weblink 2).

(4) Market Reach

The results revealed that web technologies could be used for several different kinds of applications serving on many fronts' even geographically located at large distances. For example, it was stated in the documentation;

> The Emerging Markets team within Company B, capable of advising customers in their local languages, is drawn from premier consulting and technology firms in each area. The

> Company B resources, best practices, and intellectual capital developed in Europe, Asia Pacific, and the United States further supplement the team's efforts. Services range from sharing best-of-breed Internet practices with senior executives to offering Internet-enabled business transformational advisory services such as strategy development, Net-Readiness assessments and Internet capabilities assessments. Additional advisory services assist customers with the benchmark, ROI, and business case development; roadmap and initiative portfolio development; setting up governance models and metrics; and establishing an end-to-end architecture for rapid execution and results from the measurement. (Case B, Documentation, Weblink 5).

Also, it was also observed that;

> Case B is the worldwide leader in IT that "helps companies seize the opportunities of tomorrow by proving that amazing things can happen when you connect the previously unconnected". (Case B, Observations, Page 3).

The Product Manager also indicated;

> Technological advancements have enabled us to reach out to people located in villages across the glove. (Case B, I1, 05/05/15)

The ICT Manager also stated;

> Digitisation and globalisation have made it possible to reach out the customers located in remote areas. (Case B, I3, 15/05/15)

(5) Entrepreneurial culture

Web technologies have positively influenced the Company B's entrepreneurial culture.

> We play a lot of video games while working with our web tools. This makes our culture exciting and lively. We engaged in collaboration, laughter and playing games (Case B, I6, 20/02/16)

I observed;

> Those employees were involved in playing creative games during their work which helps them improve their creative skills (Case B, Observations, Page 2).

(6) Systematic search

The findings show that Company B mainly uses data analysis and other web technologies to carry out a systematic search to find new opportunities. For example, it was observed;

> It also appears that Case B has developed some in-house applications that enable it to conduct systematic searches in a highly effective way (Case B, Observations, Page 3).

The Chief Technology Officer also believed that systematic searching could lead to new opportunities. He commented;

> We have a great Webx system. If we devote more resources on data analytics methods to find opportunities actively, we will definitely find them (Case B, I6, 03/06/15).

(7) Readily available knowledge

Another interesting finding is the ability of web technologies to make the data and knowledge available on demand irrespective of time, and location. For example, it was observed;

> The company used more than 40000 pages on the web for internal use. (Case B, Observations, Page 3).

(8) Sociability

It was found that Company B invests heavily on sociability. Web technologies are found to have positively influences the sociability of employees.

> Workers with sociability characteristics play a leading role in an organisation. These features enable employees to communicate ideas well and to gain respect for employees (Case B, I6, 20/02/16).

Chief Technology Officer remarked:

> Web technologies make it easier to share knowledge among employees (Case A, I3, 25/02/15)

(9) Knowledge about customers

The findings also revealed that web technologies are an enabler of collecting knowledge about customers as highlighted by the ICT Manager;

> Big analytics is quite essential to the innovativeness of our organisation and help us understand our customers better. (Case B, I3, 15/05/15)

Also, the Data Analytics Manager;

> Web technologies have made the job of data analysts much easier. We can now conveniently see patterns in customers' habits with almost no effort. (Case B, I5, 03/06/15)

(10) Entrepreneurial Opportunities Discovery

The data analysis offered several data points that show the potential of web technologies for the discovery of entrepreneurial opportunities.

The Business Development Manager stated;

> If people within an organisation have the information available to produce a better view of the work of that organisation, then they can more effectively innovate within that space. (Case B, I2, 15/05/15)

The ICT Manager explained the role of social media related web technologies for EOD. He said;

> Because of the rise of social media and the web, there are more ways to connect and collect information and see the effect this has on your business. (Case B, I4, 15/05/15)

Even a simple web application such as a blog can help companies reach out to their targeted audience worldwide as identified by the ICT Manager;

> A blog can help someone looking for information on a specific topic, targeted all around the world. (Case B, I3, 15/05/15)

It was also observed that web technologies were heavily being used to identifying customers' problems and achieve high levels of customers' satisfaction by offering solutions to their problems.

> Success attributed to its relationship with customers. Writings at several places - Customers come first. Customers' satisfaction is the assessment as a continuous process. Focus on identifying the problem area with customers". (Case B, Observations, Page 4).

Such a role of improved communication, collaboration and market reach have been stressed upon in the company's documentation as well as its importance for creating new ideas. It was stated;

> Cost and efficiency improvements can achieve only so much. Eventually, you need to identify new sources of revenue and market share. Improve collaboration to accelerate the development of ideas to support innovation, new products, process improvements, and growth. (Case B, Documentation, Weblink 3).

It was also observed that a high priority for customers was communicated throughout the company by posting writings on walls.

> Incremental innovative and futuristic approach with the customer is the top priority. The organisation's vision of entrepreneurship and innovation was evident in the writings on all sorts of non-traditional surfaces. (Case B, Observations, Page 4).

Also, it was observed that social media was being used to get customers' attention, enhance creativity and discover new opportunities. For example,

> I observed that instead of social media being a low-cost end of advertising for big businesses like Case B, it is, in fact, a very thought out plan and tactic to get consumers attention, do creativity and find new business opportunities. (Case B, Observations, Page 4).

4.4.6 Summary of Contributions of Case B

The analysis of Case B revealed that factors identified from literature (Chapter 2) as well as from Case A are considered essential for EOD for large technology-based organisations. Further to this, I found that several other factors were considered vital for the discovery of new entrepreneurial opportunities. This section provides a brief overview of these new factors (See also Table 4.5).

Table 4.13. Summary of Contributions of Case B

New Factor	Description
Knowledge of demographic changes	Knowledge that covers the influence of changes in demographics have on people's needs
Occupational identities	Specific job that an individual is expected to perform
Divergent thinking	Thinking out of the box
Diversity of individuals' skills set	An individual that possesses a different set of skills

Readily available knowledge	Knowledge that is accessible to its consumers on demand
Web-based brainstorming	Brainstorming that is facilitated by web technologies

(1). Knowledge of demographic changes

An interesting factor that was revealed by the analysis of Case B was knowledge of demographic changes. It seems that large technology-based organisations such as Company B engage actively in search for the challenges and opportunities that changes in demographics can bring to the needs and habits of their customers. I think because large companies like Company B offers several products and services typically and have a more extensive customer's base, it is highly likely for them to find opportunities by investigating the changing needs of their customers associated with their demographic changes.

(2). Occupational identities

Another critical factor that was revealed was occupational identities. It seems that this factor might have different implications small/medium versus large enterprises.

Large companies like Company B can afford to hire a significant number of employees that would increase their capability of having each responsible for just one role at a time.

(3). Divergent thinking

It seems large companies also encourage their employees to think out of the box and they take measures to motivate and encourage that.

(4). Diversity of individuals' skills set

Although large companies like Company B mostly require their employees to play a single role at a time. At the same time, they also seem to encourage their employees to be involved in different roles during the tenure of their employment as well as attend several events and seminars held in the company to enhance their diversity of skills set.

(5). Readily Available Knowledge

Case B's findings suggest that companies should develop knowledge repositories and make them available and accessible to their employees who can easily be achieved through the usage of web technologies.

(6). Web-based brainstorming

Brainstorming is not a new phenomenon, and it is not that companies had not used brainstorming sessions to find the solutions faced by the company or their customers. However, the findings of Case B revealed that brainstorming facilitated by web technologies could be more effective, productive, convenient and cost-effective.

4.5. CASE C REPORT

4.5.1 Case C Introduction

Case C Company is also a large American technology and consulting company. Its headquarters is in New York. Its products include hardware and software for a line of business servers, storage products, custom-designed microchips, and application software. Increasingly, Case C Company derives revenue from a range of consulting and outsourcing services.

Case C Company Organisational Structure

Case C Company's organisational structure consists of a board of directors responsible for the overall running of the company and board committees that cover specific areas of responsibility. Also, executive officers take care of hands-on operations and are the voice of the company. The board of directors ideally has between 10 and 14 members, though the certificate of incorporation specifies no fewer than 9 or more than 25. The board of directors is responsible for annual self-evaluation and evaluation of the CEO. Other executive officers handle various aspects of the international business including sales and distribution, strategic partnerships, global technology services, human resources, marketing and communications, research, software and systems, and other specific aspects of organisation and function.

Case C Company believes that a technology environment enabled for Web 2.0 and social media is essential to support an innovative and agile business enterprise that can compete effectively today and in the future.

Use of Web Technologies in Case C Company

Based on Case C's foresight of the potential business value of Web 2.0 technology as well as its own experience, it has produced a broad portfolio of Web 2.0 offerings. It has a bright, workable vision and the capabilities necessary to help create and implement a differentiating Web 2.0 strategy. (Case C, Documentation A, Page 1)

According to an ICT Manager about the usage of Web technologies;

Web 2.0 technologies are based on simpler programming models that can help accelerate time to market by improving the usability of enterprise assets. Web 2.0 is about using the Internet creatively, as a platform to foster innovation, speed and simplicity. It is not about using the Internet to provide isolated information silos designed primarily for posting or researching information, and for completing transactions.

He further elaborated;

We take social networking seriously to develop products and services, to enable sellers to find and stay connected with clients, to train the next generation of leaders, and to build awareness of how we can build a smarter planet among clients, influencers and other communities.

Aside from social networking applications, it also helps other organisations recognise and take advantage of the power and reach social networking can offer. As Case C continues to build expertise in enterprise social networking, their vision is on being a trusted adviser to clients as they make their transformation into a social business.

4.5.2. Contextualisation of Method

Like cases A and B, I collected data for case C from three sources also that include documentation, interviews and observations. I reviewed the documents first like other cases. In total, 4 internal and 4 external documents were consulted and reviewed. Appendix 12 provides details of the content of each document, its length and creation date. Then interviews were conducted with four of the employees of case C organisation (see Table 4.1 for details). All those employees were involved either directly or indirectly in the entrepreneurial process for the case C organisation. Like other cases A and B, informal observations were also conducted. Before making arrangements for the interviews at the case C organisation, I contacted organisation C requesting them to allow me for such observations. The case C organisation's staff also let me observe the internal environment of their organisation as well as see the role of web technologies in their business processes. I also had information chats with a few of the employees.

All the interviews were conducted at case C organisation like other cases. The interview meetings went pretty well. Similar to cases A and B, I did not have any problem in getting the permission of the interviewees for recording interviews. Hence, I recorded the interviews which saved me quite a

lot of time. I structured my notes the said day within three hours of each interview finished time which helped me a lot in carrying out initial reflection and interpretation of the interviews' notes. The interview protocol and interview questions were updated, first after reviewing the documents and then after each interview whenever essential concepts and themes emerged. However, for case C, only two main concepts emerged. Therefore, there were not many changes made to interview protocol and questions as compared to other cases.

4.5.3. Case C Analysis

Like cases A and B, I followed the method of analysis for case C mentioned in Chapter 3. I reviewed all the transcripts of interviews, observational notes and the case B documentation sentence by sentence. I extracted key statements (KS) (see Appendix 11). After the first cycle of analysis, I grouped two hundred and seventy-two (including statements for relationships) for overarching concepts such as Individual factors, organisational factors, environmental factors and web technologies as an enabler. I ended up with twelve clusters for Individual factors concept (see Table 4.14), nine clusters for organisational factors concept (see Table 4.15), one cluster for environmental factor (see Table 4.16) and nine clusters for the role of web technologies as an enabler of different factors (see Table 4.17).

Table 4.14: Case C Individual factors analysis

Cluster	No. of KS	Tentative factors	Tentative variables	Retained variables
Entrepreneurial alertness	6	1	5	1
Prior knowledge	28	1	5	1
Leadership	3	1	2	1
Risk taker	4	1	2	2
Pursuit of continuous learning	3	1	3	2

Imagination	6	1	3	2
Sociability	5	1	4	1
Knowledge of demographic changes	8	1	4	1
Divergent thinking	16	1	3	2
Entrepreneurial action	16	1	5	1
Entrepreneurial perception	18	1	6	0
Cognitive ability	2	1	3	0

Table 4.15: Case C organisational factors analysis

Cluster	No. of KS	Tentative factors	Tentative variables	Retained variables
IT infrastructure	12	1	3	2
Systematic search	5	1	3	2
Social capital	9	1	4	1
Occupational identities	13	1	2	2
Readily available knowledge	5	1	2	2
Web-based brainstorming	9	1	2	2
Entrepreneurial culture	8	1	3	2
Human capital	21	1	4	1
Research collaboration	9	1	4	1

Table 4.16: Case C Environmental analysis

Cluster	No. of KS	Tentative factors	Tentative variables	Retained variables
External Pressure	7	1	5	1

Table 4.17: Case C web technologies as enabler analysis				
Cluster	**No. of KS**	**Tentative factors**	**Tentative variables**	**Retained variables**
Entrepreneurial alertness	3	1	3	0
Pursuit of continuous learning	4	1	4	1
Collaboration among employees and stakeholders	11	1	3	1
Market Reach	8	1	4	1
Entrepreneurial culture	4	1	4	1
Systematic search	3	1	4	1
Readily available knowledge	4	1	5	0
Sociability	3	1	3	1
Knowledge about customers	8	1	2	1

4.5.4. Validation Meeting

Like cases A and B, at the end of the analysis of case C, a validation meeting was conducted with one of the case C organisation's employee (see Table 4.1). This interviewee was first briefed about the research, and then I provided him with the findings of my study (i.e., analysis of case C) and supporting evidence for that. I mainly asked him to provide his feedback on the few themes that I could not find many key statements and obtained her feedback on the relationship among the factors that I established based on the data. The interviewee appreciated my efforts and agreed with my findings.

4.5.5. Case C Findings

Table 4.18 provides a list of key statements references for each factor and the status on its validation. Following sections provide findings of the analysis and relevant key statements from

documents, interviews and observations. See Appendix 11 for sub factors, variables and key statements.

Table 4.18: Case C Assertions

Overarching Concept	Factors	Validated?
Individual factors	Entrepreneurial alertness	Yes
	Prior knowledge	Yes
	Leadership	Yes
	Risk taker	Yes
	Pursuit of continuous learning	Yes
	Imagination	Yes
	Sociability	Yes
	Knowledge of demographic changes	Yes
	Divergent thinking	Yes
	Entrepreneurial action	Yes
	Entrepreneurial perception	Yes
	Cognitive ability	Yes
Organisational factors	IT infrastructure	Yes
	Systematic search	Yes
	Social capital	Yes
	Occupational identities	Yes
	Diversity of individuals' skills set.	Yes

	Readily available knowledge	Yes
	Sociability	Yes
	Entrepreneurial culture	Yes
	Research collaboration	Yes
	Web-based brainstorming	Yes
Environmental factors	External Pressure	Yes
Web technologies as enabler	Entrepreneurial alertness	Yes
	Pursuit of continuous learning	Yes
	Collaboration among employees and stakeholders	Yes
	Market Reach	Yes
	Entrepreneurial culture	Yes
	Systematic search	Yes
	Sociability	Yes
	Knowledge	Yes
	EOD	Yes

4.5.5.1 Individual Factors

The analysis of Case C data revealed several Individual factors that are considered necessary for an entrepreneur to be able to identify new opportunities.

(1) Entrepreneurial Alertness

Entrepreneurial alertness is one of the cores Individual factors that entrepreneurs should possess to be able to identify new opportunities because if they are not alert those opportunities might disappear over time or might be taken by competitors. The R and D Manager stated;

> In the domain of technology-based industry, due to rapid advancements in technologies, the balance between needs and their solutions is continuously changing. There are opportunities right there if someone can detect them. (Case C, I6, 25/02/16).

The Business Innovation Manager suggested that in order to be aware of new opportunities, an entrepreneur should be involved in acquiring new information and reflecting upon it. He stated;

> Acquisition of new information and reflecting upon that is what makes an entrepreneur alert and ready to discover new opportunities. (Case C, I2, 15/10/15).

The Customer Relationship Manager suggested that motivation is an essential component for an entrepreneur to be entrepreneurially alert. He said;

> I think a highly motivated individual would always be ready to identify new opportunities. (Case C, I5, 12/01/16).

The Business Innovation Manager indicated that a positive outlook on things could also help entrepreneurs to identify new opportunities especially if they are looking to become self-employed. He remarked;

> A positive attitude towards becoming self-employed and optimistic outlook can help a person to identify new business opportunities. (Case C, I2, 15/10/15).

(2) Prior Knowledge

Like the other two cases, results of Case C also reveal that Case C Company also considers prior knowledge vital for entrepreneurs. The Social Media Manager reported;

> Having existing knowledge makes an entrepreneur more aware of possible pitfalls. (Case C, I1, 01/10/15).

According to the Social Media Manager, prior knowledge seems to equip the entrepreneurs to avoid making wrong decisions concerning identifying entrepreneurial opportunities. Such concern showed by the Social Media Manager might be because Case C Company being a large enterprise focuses more on the quality of entrepreneurial opportunities rather the quantity of the opportunities that can be identified. For example, one of the things that struck me was the fact that Case C company has set minimum value criteria (innovations for trillion dollar markets) to filter out ideas that may not have large enough economic potential. It appears entrepreneurship focus fit the size, capability and market maturity of the company - (Case C Observations, Page 4)

Further is was highlighted by the Business Innovation Manager that Case C company have a very structured approach to store knowledge accumulated by the organisation and consumed by its employees. He remarked;

> The use of shared folders and project management software is used to collaborate on specific projects. (Case C, I4, 19/11/15).

I observed that apart from formal education, Case C Company highly stresses upon the need to gain experience in whatever role its employees were engaged in. For example, it was observed;

> Entrepreneurial opportunities discovery is not merely the insightful mind of a single (or few) gifted individual, but rather the outcome of a defined process of inclusion that is nurtured specially to enable many. (Case C Observations, Page 4)

There seems to be a consensus among the managers of Case C Company that both tacit and explicit knowledge are vital for innovation and entrepreneurial activities. Case C Company has a well-defined approach to facilitate and encourage its employees to obtain formal knowledge of new technologies as well as an acquisition of new skills. The Business Development Manager explained;

> It is necessary to update their skills and knowledge regularly when you are a professional. In all sectors, too, because it is essential to follow with technology and innovations and the market (Case C, I2, 15/10/15)

Another Business Developed Manager also commented that not only those highly qualified personnel were selected for specific roles in their company; there were also in-house seminars and workshops that provide further opportunities for them to learn more. He indicated;

> Apart from prior formal qualification, we hold several in-house seminars and workshops to ensure that our staff members are well equipped with contemporary knowledge. (Case C, I3, 19/11/15)

Knowledge of Anticipated Customer/Market Needs

Like Case B, Case C's findings also reveal that anticipation of customers' needs is considered important for the progress of the company. There are several ways that Case C Company employs to anticipate its customers' needs. For example, by using web-analytics, it was observed;

> Experience is personalised for each user by making it possible to tailor sites that optimise and enhances the cross-selling and up-selling offerings based on known personal preferences. Because new media can be used to engage and immerse users in a highly tailored environment, a highly customised perspective about the specific needs of a customer can be developed. Organisations are consequently equipped with much greater insight into customer needs and desires. (Case C, Documentation C. p.3)

The Social Media Manager further emphasised the need of having their customers' needs at the very core of his organisation who stated;

> In my organisation, the notion of Customer problem is involved in the very fabric of our research for services to provide (Case C, I1, 01/10/15)

The R and D Manager indicated that every service or product that was sold in his company would be used as an opportunity to get feedback from their customers in order to improve their service or product. He said;

> For every bought product a survey will be attached to it allowing for the customer to give their feedback on it. (Case C, I6, 25/02/16)

Knowledge of Anticipated Means to Satisfy Customers/Market Needs:

Findings of Case C also reveal that not only Case C Company focuses on understanding the anticipated needs of its customers and future markets; it also puts lots of importance in investigating the anticipated means that could be identified in order to meet those customers and markets needs in future. It was observed;

> Putting ourselves in future and drawing a picture of what future markets would look like and how its components would affect the way people live their lives and do their work, has become vital to keep ourselves ahead of our competitors concerning identifying new business opportunities. (Case C, I1, 01/10/15)

Case C Company's documentation also reflected their focus on understanding and investigating means to solve problems of future related to its customers. Case C Company adopts various tools and approaches. For example; Case C Company employs Web technologies to enhance collaboration among its employees. It was noted;

> Collaboration tools allow enterprises to harness collective knowledge and experience -- sometimes called the "wisdom of crowds." Web 2.0 technologies can provide a useful platform for capturing the knowledge that cannot be captured in traditional structured enterprise data repositories (databases, data warehouses etc.). (Case C, Documentation, A, p8).

(3) Leadership

Leadership has also been said to be a critical individual characteristic that entrepreneurs should possess in order to succeed. The Business Innovation Manager said;

> Looking at the companies I have worked within the past leadership and drives of the entrepreneur are two critical attributes they should have (Case C, I3, 19/11/15).

(4) Risk Taker

A calculated Risk-taking is also an essential characteristic for entrepreneurs to have especially when they should not be afraid of failures instead try to learn from them as indicated by the Business Innovation Manager;

> While prior experience is an asset, it is more critical that attitude and willingness to take a risk and learn from failure are present (Case C, I2, 15/10/15)

(5) Pursuit of Continuous Learning

It appears that apart from having prior knowledge, small as well as large companies such as Case C Company encourage their employees to be engaged in a pursuit of continuous learning which might be due to the ever-changing nature of web technologies and information technologies that are at the core of these IT-based companies. It was observed;

> The Company is regularly changing and enhancing its web-based innovation tools, so everything we have seen in their innovation web presence is a continuing work in progress (Case C Observations, Page 4).

The R and D Manager remarked;

We have to keep abreast of concerning acquiring new knowledge (Case C, I6, 25/02/16).

The Business Innovation Manager also stressed the need for obtaining new knowledge for successful and effective innovation. He remarked;

> Constant learning is at the heart of our innovation processes (Case C, I3, 19/11/15).

(6) Imagination

Another important Individual factor highlighted by one of the Business Innovation Manager was to be able to imagine the implications of technology for different contexts as well as its application to different scenarios. He explained;

> Entrepreneurial imagination prompts an entrepreneur to do something about this and makes him explore different ways a service can be implemented in a different context that he feels compassionate about. (Case C, I3, 19/11/15)

It was further elaborated by the Customer Relationship Manager who said;

> Explicit and tacit knowledge, when combined, may lead to the development of ability in an entrepreneur that can help them see what other people cannot see (Case C, I5, 12/01/16).

(7) Sociability

In an organisation, employees with sociability features play a leading role. These characteristics allow employees to communicate ideas well and to respect employees.

> Company C has been found to invest heavily in sociability. Web technologies have been found to have a positive influence on workers sociability (Case C Observations, Page 3).

(8) Knowledge of Demographic Changes

The findings of Case C data reveal that Case C Company pays attention to the needs of different age groups and considers it as a way to identify opportunities to improve its products and services and to improve customers' satisfaction. One of Business Development Manager indicated;

> For example, we hold several events throughout the year in our organisation to discuss the needs of older people as well as encourage our staff to have empathy for the old generation. That will motivate them and make them think of possible problems and their solutions that older customers may face. (Case C, I3, 19/11/15)

The Customers Relationship Manager highlighted this fact further who said;

> As an entrepreneur manager, I think if changes in technologies can be seen in the light of changes in other factors such as demographic changes, there is a high chance that we can identify new opportunities. (Case C, I5, 12/01/16)

There seems to be a consensus across the organisation that in understanding the needs of different age groups, new entrepreneurial opportunities can be identified. At Case C company C it is particularly achieved by using Web technologies. The R and D Manager explained;

> Web technologies provide ideal ways to track the needs and demands of diverse age groups which when analysed properly may lead to the discovery of new opportunities (Case C, I6, 25/02/16).

(9) Divergent Thinking

It appears that the ability to be able to think out of the box is one of the most vital characteristics of entrepreneurs especially the ones who work in the IT domain. Synthesising various pieces of information seems to be an important component of divergent thinking as elaborated by the Business Innovation Manager;

> Our staffs are encouraged to keep updating their knowledge about the potential of technologies being used in our company. This helps them connect several pieces of information when it comes to generating entrepreneurial ideas. (Case C, I3, 19/11/15)

Further, it was also pointed out by the R and D Manager;

> Thinking out of the box, beyond established norms is a vital characteristic of an entrepreneur. (Case C, I6, 25/02/16)

Also, pointed out by another Business Innovation Manager;

> A person should be able to connect the different dots of information in order to generate new business opportunities. Most of the time business opportunities are there, and it is the entrepreneur who would be able to see them because he looks at things differently from others. (Case C, I2, 15/10/15)

The Customer Relationship Manager also indicated that the ability to connect old information with new could lead to generating new business ideas. He stated;

> Systematic search along with higher order cognitive abilities of entrepreneurs such as the ability to make use of old information in the light of new information are both highly important to come up with innovative ideas. (Case C, I5, 12/01/16)

(10) Entrepreneurial Action

An interesting factor that is not directly related to the identification of entrepreneurial opportunities but has been stressed upon by the interviewees of Case C is entrepreneurial action. The Business Innovation Manager said;

> Technologies can give birth to several opportunities. However, entrepreneurs should have to act in order to find those opportunities. (Case C, I2, 15/10/15)

This was also explained by another Business Innovation Manager who reported;

> Our managers involved in entrepreneurial processes are quite proactive. They are involved in talking to customers, understanding their needs, discussing various options to satisfy those needs, are aware of our firm's capabilities, resources and the value that we want to offer to our customers. All these efforts carried out in parallel would facilitate them in discovering new business opportunities. (Case C, I3, 19/11/15)

Also, was pointed out by R and D Manager too;

> Entrepreneurial opportunity cannot be completely appreciated without an appropriate action taken by the entrepreneur and his organisation which may involve evaluating the organisation's services, resources and customers' needs. (Case C, I6, 25/02/16)

The Business Innovation Manager also suggested that being proactive and actively engaging with customers and partners can lead to the identification of new opportunities. He stated;

> Sometimes active engagement with our potential customers and collaborations with our partners lead to new opportunities. (Case C, I3, 19/11/15)

The Customer Relationship Manager also indicated it;

> One important factor that can lead to the identification of entrepreneurial opportunities is to attend different events and seminars and meet new people, discuss with them what's happening in the industry and the world. (Case C, I5, 12/10/10)

I also observed that once a new idea is uncovered, they have a systematic way of evaluating and eventually commercialising it. (Case C Observations, Page 4)

(11) Entrepreneurial Perceptions

Entrepreneurial perceptions are developed when an entrepreneur possesses a bigger picture of what is happening around him/her especially related to customers/market's needs, ways to address those needs, technological knowledge, knowledge of the stakeholders and the business processes involved. I noted from the Case C Company's documentation;

> Co-creation is enabled by making it possible to enlist customers to shape new technologies, co-shape future offerings while accelerating the development of advanced technologies and solutions. (Case C, Documentation B, p1)

The R and D Manager also pointed out that in order to develop effective entrepreneurial perceptions; the entrepreneurs should also develop knowledge and deeper understanding of the collaborations of its organisation with its partner. He said;

> In our organisation, our staffs involved in entrepreneurial activities are briefed about different scenarios regarding collaborations with our partners at the start of their employment. Such briefings and training enhance the staff's ability to understand the nature of collaborations with our partners. (Case C, I6, 25/02/16)

Also, entrepreneurs should also be involved in planning-related activities as indicated by the Business Innovation Manager;

> Entrepreneur managers are also encouraged to involve in the strategic planning processes, so that can understand the strategic planning of our organisation. (Case C, I3, 19/11/15)

The R and D Manager explained how his company ensure to provide necessary resources and opportunities for their employees to equip them with the necessary knowledge, experience and skills that would positive help them develop entrepreneurial perceptions so that they can effectively identify new business opportunities. He reported;

> The most important aspect of training of the staff involved in entrepreneurial activities is their involvement in how the various technologies are being used in day-to-day operations. Such involvement provides the staff with necessary experience and hands-on understanding of the capabilities of different technologies, which in turn would increase the chances of them coming up with some new idea. (Case C, I6, 25/02/16)

I also observed that throughout Case C company, focus on entrepreneurship and innovation has been given. For example, as I began to explore the many pages of material:

I found there was a strong commitment within the company to develop an ecosystem of innovators (Case C Observations, Page 3).

> Another thing that struck me was the fact that Case C has set minimum value criteria (innovations for trillion-dollar markets) to filter out ideas that may not have large enough economic potential. It appears the entrepreneurship focus fit the size, capability and market maturity of the company - (Case C Observations, Page 4)

(12) Cognitive Abilities

Entrepreneurs should also have enough cognitive abilities to solve problems and be able to understand the problem and decompose it to simpler components. The R and D Manager indicated;

> Problem-solving and the ability to decompose complex information is one of the most important attributes of an entrepreneur. (Case C, I6, 25/02/16).

4.5.5.2 Organisational Factors

(1). IT Infrastructure

It appears that there is much focus on developing and maintaining in-house IT infrastructure at Case C company although cloud computing may provide other options such as acquiring IT platforms as a service. The Customer Relationship Manager explained;

> Although with the advances in cloud computing has made it possible for small companies to acquire sophisticated IT infrastructure, I still believe large organisations such as ours still need in-house sophisticated IT infrastructure to maintain our competitive advantage and more specifically to operationalise our new business ideas (Case C, I5,12/01/16).

It was further stressed upon by the Business Innovation Manager who pointed out the need of having in-house IT infrastructure by saying;

> By increasing the quality and quantity of our servers as we scale we can improve speed and efficiency for our users. (Case C, I2, 15/10/15)

I noted from the company's documentation that having sophisticated IT resources is considered to be the backbone of other services that Case C Company provides to its employees, customers and other stakeholders. I noted that;

> By making collaboration tools central to business processes, business benefits that will have a measurable positive impact on ROI such as Strengthening customer and partner relationships. Collaborative tools provide enterprises with an opportunity to establish

mutually productive relationships with customers and partners. (Case C, Documentation A, p10).

I also observed that there might be various business practices that are perceived to be quite crucial by the company and they might not want others to copy them in order to maintain their superiority in what they do. For example, it was observed;

> Individuals and groups are empowered to more efficiently and confidently share conversations, content and progress with the right people, at the right time—from almost any device. It features the latest security best practices—including authentication, intrusion prevention and physical security features—and supports analytics that can help organisations measure, understand and drive faster and more informed business decisions. (Case C, Observations, Page 2).

(2) Systematic Search

A systematic search is one of the approaches taken at Case C Company to identify new opportunities as indicated by the Business Innovation Manager;

> In the search for competition in our space, we find more of what we are trying to replace than whom we are competing with – it is easier to find those groups. However, we are unearthing more as we search. (Case C, I2, 15/10/15)

It also appears that Case C Company has developed some in-house applications that enable it to conduct systematic searches in a highly effective way. It was observed;

> Smart search capabilities leverage keyword inputs to identify the right menu-driven and other feature options to facilitate the development and sharing of the most appropriate analytics outputs without assistance from IT. (Case C Observations, Page 2)

(3) Social Capital

Social capital has been found to a positive relationship with EOD and can enhance resourcefulness and knowledge of the entrepreneurs.

We encourage our employees to attend various seminars and workshops that are held on a regular basis. By attending these events, they come to know each other's, discuss the problems that they are working on (Case C, I2, 15/10/15).

It also seems that Case C Company encourages its employees to use social networking platform extensively to engage with its customers. For example, the Business Innovation Manager said;

> Due to the increasing use of social networking platforms by the general public, our customers also expect us to engage with them through these Web technologies. Therefore, we also encourage our employees to use such technologies to interact with them (Case C, I3, 19/11/15).

It appears that focus at Case C Company is more on the quality of ties with its customers than on quantity. It was pointed out by the Social Media Manager;

Every transaction with our customers has perceived an opportunity to strengthen our relationship with them (Case C, I1, 01/10/15).

Above suggests that Case C Company focuses more on establishing strong ties with its customers.

(4) Occupational identities

It seems that though an employee might be responsible for more than one role, it has been found useful to assign them a specific role when brainstorming sessions are conducted to generate new ideas. For example, the Customer Relationship Manager remarked;

> What we have found useful is before the brainstorming sessions, we introduce a different set of scenarios in which our staff members have to play a role of the specific individual — for example, investor, customer, partner, the user. It has helped us create more ideas than without presenting such scenarios did. (Case C, I5, 12/01/16)

Another critical point was stated by the Business Innovation Manager who said;

> An interesting thing that our internal survey revealed was that managers who were less experienced but have been working in different roles were able to come up with more creative ideas than those who were more experienced but have been working on the same role. (Case C, I2, 15/10/15)

Also, when employees are asked to evaluate something, there is a tendency within the organisation that they do not put pressure on the employees that they have to come up with something instead employees are encouraged to evaluate the documents without pressure. I observed;

> Another positive for employees in Case C environment is to work on patents if they discover without necessarily evaluating an entrepreneurial opportunity. (Case C Observations, p2)

It was also observed that Case C Company has employees whose primary role is to identify new opportunities.

> Consciously pursued a culture of collaboration. Brain storming and idea sharing using various web tools. Creating roles for people whose primary job it is to analyse the data and find out opportunities (Case C Observations, Page 4)

(5) Readily Available Knowledge

Case C's findings suggest that it has developed knowledge repositories and made them available and accessible to their employees through the usage of web technologies.

> Another ability of web technologies to provide 24/7 information and knowledge on demand (Case C, I5, 12/01/16)

(6) Web-based Brain Storming

I also observed that Web technologies are actively being using to conduct online brain-storming sessions which were not possible before;

> The view that technology is primarily a driver of efficiency is an outdated concept there; management sees technology as an enabler of collaboration and relationships — those essential connections that fuel creativity and entrepreneurial opportunities creation. (Case C Observations, Page 2)

Web technologies have helped create Web-based platforms to facilitate Web-based brainstorming;

> Recognising that the workplace culture drives much of innovation, they have a collaborative web platform called Think-Place – a cultural change agent in the company. It provides a repository where staff and collaborators can contribute a new idea, provide input on existing ideas, or search for potential solutions. (Case C Observations, Page 4)

> This is further supported by an annual online jam session called Innovation jam where an open forum approach is used to draw in and converse with thousands of their employees worldwide and collaborators. (Case C Observations, Page 4)

(7) Entrepreneurial culture

Organisation's internal environment is equally important and should have the ability to facilitate, motivate and encourage entrepreneurial activities. Not only that the physical environment of an organisation should be aspiring and motivational as highlighted by Customer Relationship Manager;

> Co-working spaces and incubation for recent graduates help welcome aspiring entrepreneurs to a helpful environment (Case C, I5, 12/01/16).

Also, was noted in the company's documentation;

> The heart of Case C Company Web 2.0 and social media vision is to help businesses put together environments that enable employees to do their jobs better and faster—in support of user-driven business innovation and flexibility. (Case C, Documentation A, p.1)

Also, observed;

> At Case C Company, Web 2.0 and social media technologies already streamline and enhance people's day-to-day activities on a variety of levels. For example, people at Case C Company can customise the corporate address book according to their job needs and professional interests. Individuals can create a profile to let others know their areas of subject matter expertise and interests. People can then find one another based on simple searches or tagging. Also, they can create automatic feeds to receive updates for relevant information about technology trends, competitive information or educational classes. (Case C, Observations, p1).

However, also those employees are encouraged morally and have the support of their colleagues and seniors.

(8) Human Capital

The Case C Company mostly hires fresh graduates with an excellent academic record to ensure that they are well equipped with the necessary knowledge. However, once the graduate is hired, they have intensive programs to equip its employees with diverse knowledge mainly related to the company itself.

Diversity of individual skills was found to be an essential factor in developing human capital.

It is ensured that employees who are involved explicitly in entrepreneurial actives possess diverse knowledge which is provided to them through regular series of seminars and workshops. The Business Innovation Manager explained;

> Staff involved in entrepreneurial activities possesses formal education, as well as should be passionate and should possess a diverse set of skills and knowledge. (Case C, I2, 15/10/15)

He further elaborated;

> In our organisation, human capital is looked at concerning the breadth and depth of knowledge relevant to what our organisation does. By breadth of knowledge, I mean different people with the different skill set and by the depth of knowledge I mean that every individual should have expert level knowledge in at least one area. The definition of human capital in our organisation is different in a way that it does not limit itself to formal education and prior experience. Instead, we also stress upon if the individual's personality would correspond to the values of our organisation. (Case C, I2, 15/10/15)

The Customer Relationship Manager reiterated the same concept;

> Several seminars and workshops are held on a regular basis to ensure that our staff access the most recent knowledge and knowledgeable people and share their ideas. We have found that such events lead to the identification of new business ideas. (Case C, I5, 12/01/16)

Also, the R and D Manager who said;

> By diversifying the knowledge and skills of our employees, we open up the boundaries of their vision that would enable them to identify new opportunities (Case C, I6, 25/02/16)

(9) Research Collaboration

Research collaboration has also been found to be an essential factor in creating new entrepreneurial opportunities as indicated by the Business Innovation Manager;

> Research collaboration is vital to develop new and powerful creative opportunities in this day and age. Collaboration generates the `swap` of high dependency knowledge that should lead to creative opportunities. (Case C, I3, 19/11/15)

The Case C Company would actively initiate research collaborations by holding meetings with its partners as pointed out by another Business Innovation Manager;

> Our company would have two to three meetings per month sharing ideas and developments about our product line with sister companies around the world. Also in the GEC, there are monthly meetings to go through research collaboration. (Case C, I2, 15/10/15)

The Case C Company also engages with its customers in order to identify potential collaborative research projects. It was noted from the company's documentation;

> Research collaboration is enhanced by allowing end users and customers to engage through social computing. It facilitates introductions, transactions and teamwork between parties with common interests, and creates “knowledge” environments that facilitate discovery and action. (Case C, Documentation A, p.2)

4.5.5.3 Environmental Factors

The findings of Case C data reveal that Case C company is fully aware of the fact that changes happening in the environment would have a huge effect the usual way business is done and also on the almost every aspect of its business. It was noted;

> Supporting a distributed workforce, globally competitive companies are already providing collaboration tools to their geographically dispersed team members so they can collaborate and innovate continually. According to a study of leading companies sponsored by Case C Company, 90 per cent of employees currently work away from headquarters while more than 60 per cent work in locations that are different from their managers. (Case C, Documentation A, p11).

It was noted that other factors that cat affect an organisation from outside could be initiatives taken by governments that the companies have to comply. For example, the Customer Relationship Manager indicated;

> Sometimes the government introduces new policies that organisations in the private sector have to follow, and they can lead to new opportunities apart from the challenges, of course, that they impose (Case C, I5,12/01/16)

(1) External Pressure

External pressure is a critical factor among the environmental factors and may be exerted from various stakeholders external to an organisation. However, it seems that pressure related to its customers is perceived to be the most vital at Case C Company. The Customers Relationship Manager pointed out;

> Regular interaction with our customers and acquiring their feedback on how we are doing keeps us typically on our toes and putting extra effort into improving our processes. (Case C, I5, 12/01/16)

Among other external factors are the changes related to technologies and how those technological changes affect other stakeholders of an organisation. Therefore, as an IT-based company Case C company has to be flexible enough to be able to respond to such changes and that change should

reflect in its business processes. The company's documentation states improved response to change. Effective change occurs when people, processes and technologies shift in response to new realities in the market.

> To make this happen, many decisions need to be made and coordinated. Collaboration provides the basis for accelerating this process while improving the quality of the decisions. This explains why a recent Case C company research initiative found that 98 per cent of CEOs surveyed rank innovation through collaboration as their number one priority. Also, over 60 per cent of mid-size firms say that collaboration tools are imperative to their business success and growth. (Case C, Documentation, D, p2).

4.5.5.4Web technologies and EOD

Underlying Case C's approach to technology entrepreneurship is a belief that entrepreneurship itself has changed in the last decade with rapidly web technologies. On one of its web pages, they state:

> The very nature of innovation has changed in the early days of the 21st century. It is increasingly open, collaborative, multi-disciplinary and global. This shift means that the truly revolutionary innovations of our time — the ones that will create new markets, redefine old ones, and maybe even change the world for the better — require participation and investment across multiple constituencies. (Case C Observations, Page 3)

Case C company's products include a social networking application which opens up new ways to work with colleagues and improves engagement and productivity.

> It provides analytics-powered communities and profiles with files, blogs, wikis, document co-editing, forums, activities and meetings. (Case C, Documentation A, Page 2).

(1) Entrepreneurial alertness

The findings suggest that Company C's employees pro-active and are constantly looking for new opportunities. The R and D Manager remarked;

> We promote the unconscious use of web technologies in the workplace to find meaningful opportunities. The challenge for us is to continue to improve our seamless and intuitive Web tool user interface design (Case C, 25, 02/16).

The Business Innovation Manager pointed out importance of team work in entrepreneurial alertness:

> Employees are more likely to use their alertness and innovation skills if they feel that their team environment is supportive (Case C, I4, 12/10/16).

(2) Pursuit of continuous learning

The findings suggest that Company C encourage continuous learning. The Business Innovation Manager shared his views on the significance of continuous learning;

> Web technology makes it easier for us to more efficiently gain new information and knowledge. It enables us to acquire and share customizable knowledge (Case C, I5, 09/12/15).

(3) Collaboration among Stakeholders

Web technologies have led to the development of several tools that enhance collaboration among stakeholders. The Customer Relationship Manager elaborated;

> In our organisation, we take time to hear everyone's opinions and creative input. We enable this through having open opinionated forums such as a Slack channel for ideas and whiteboard sessions. (Case C, I5, 12/01/16)

The Case C Company also uses its Web technologies internally as pointed out by the Social Media Manager;

> Internal wiki helps to develop standards, using the database to solve a problem or gain knowledge on a product or service. (Case C, I1, 01/10/15)

Moreover, the Business Innovation Manager said;

> Internal wikis and blogs give a common access point to what previously was very hierarchy driven information. (Case C, I2, 15/10/15)

It was also observed that Web technologies enabled people to collaborate and co-create.

> Web 2.0 adoption changes the way end-users co-create value on experience networks. These Web 2.0-enabled experience networks empower people to collaborate, co-create, and experience personalised business processes as never before. (Case C, Documentation A, p.2)

Furthermore,

> To enable their collaborative approach, they operate a variety of web community-type platforms that reach out both internally and externally. (Case C Observations, Page 3)

(4) Market Reach

Web technologies have also made it easy to reach to customers, markets and other stakeholders quickly and in innovative ways. The Social Media Manager said;

> It has never been easier to reach out to our customers and partners. Thanks to Web technologies which made it possible. (Case C, I1, 01/10/15)

The same idea was also reported by the Business Innovation Manager who said;

> The increasing use of Web technologies in our communication internally and externally has enabled us to get the latest knowledge about the needs and wants of our customers, partners and other stakeholders. (Case C, I2, 15/10/15)

I also observed;

> Plenty of discussion about new cognitive features, industry solutions and insight cloud services introduced into Web analytics to enrich their capabilities and to add value to offerings from Business Partners. (Case C Observations, Page 2)

It was also observed that Case C Company is employing Web technologies to;

> Reaching out and drawing in customers to gain their views and discuss their problems, with the aim of producing new solutions. (Case C Observations, Page 4)

(5) Entrepreneurial culture

According to the Social Media Manager;

> Having a social networking platform specific to our employees does not only fulfil the need to be socially connected of our employees, but it also improves their productivity and engagement with their work (Case C, I1, 01/10/15)

(6) Systematic Search

The findings suggest that company C uses systematic search in finding new business leads. The Social Media Manager pointed out;

> Web technologies have enhanced the search quality and speed we make (Case C, I1, 01/10/15).

Similarly, Customer Relationship Manager remarked;

We use in-house web technology for social networking, blogging and searching for information (Case C, I5, 12/01/16).

(7) Readily Available Knowledge

Another significant contribution of web-technologies is that they make the required knowledge available irrespective of time and location.

It was observed;

> There was an excitement about emerging solutions in the area of Web 2.0 and Data Analytics. They have large volumes of unstructured data from which they will be attempting to learn in the coming years. (Case C Observations, Page 2)

Hence making it possible to communicate with their customers in a more informed and effective way;

> Their Web analytics tool infers user intent to accelerate visual development of business intelligence (BI) and statistical analysis outputs (Case C Observations, Page 2)

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(8) Sociability

Web technologies play significant role in sociability at Company C's workplace.

> Company B has been found to invest heavily in sociability (Case C Observations, Page 2).

Social Media Manager remarked:

> We collaborate extensively using our in-house web tools. Our technopreneurs are entrepreneurs who are technology savvy, creative and dare to be different (Case C, I1, 01/10/15)

(9) Knowledge about Customers

Web technologies have made it easier to collect knowledge about customers. The Social Media Manager stated;

> Not only that obtaining knowledge about customers have become crucial, but it also has become more accessible to obtain through web technologies. (Case C, I1, 01/10/15)

He further pointed out;

> Web analytics has enabled us to analyse our customers' interaction and feedback to better understand their needs (Case C, I1, 01/10/15)

Web technologies have also enabled employees to share their knowledge with their colleagues quickly and without any effort. It was observed;

> People can also use a central wiki to create collaborative Web sites. For instance, geographically dispersed teams working toward a common goal can all access a wiki—and project-specific information—through a single access point? The entire extended team can

easily monitor what's new for the project and share feedback and content. (Case C, Observations, Page 1).

(10) Entrepreneurial Opportunities Discovery

Web technologies have led to the development of tools that facilitate Web mining and analytics and help entrepreneurs identify new entrepreneurial opportunities. The Business Innovation Manager said;

> We research and scrape data from the web in order to identify current trends and predict where the industry is going. This leads to opportunity. By continually questioning things and looking for problems and coming up with new ideas it allows us to innovate for the future of our company. (Case C, I3, 19/11/15)

The Social Media Manager also added;

> User-generated content is the modern way of communicating allowing everyone to express themselves. A lot of new and useful information comes out if it. (Case C, I1, 01/10/15)

The Customer Relationship Manager elaborated the use of blogs to understand their services better.

> You can find blogs by engineers and designers which provides insights into their process that one would usually need to attend a course to find out. (Case C, I5, 12/01/16)

I also observed that;

> Their Web analytics provides iterative guidance to help knowledge workers develop well-suited models and discover the best data available to find the entrepreneurial insights they seek. (Case C Observations, Page 2)

The Case C Company has also;

> Plans to apply natural language processing on healthcare through Web 3.0 technology. This could be a game changer (Case C Observations, Page 3)

They have also developed data visualisation tools. Their data visualisation tool concurrently accesses many different algorithms, allowing technical end users to act as de facto statisticians. The ultimate goals: better and faster web data discovery, and better business decisions.

4.5.6 Summary of Contributions of Case C

The analysis of Case C revealed that factors identified from literature (Chapter 2), and Case A and B analysis are also vital for EOD for large technology-based organisations. Further to this, I found a couple of other factors that were considered essential for the discovery of new entrepreneurial opportunities. This section provides a brief overview of these new factors (See also Table 4.7).

Table 4.19. Summary of Contributions of Case C

New Factor	Description
Entrepreneurial Perception	Perceptions of entrepreneurs that are developed through the constant acquisition of diverse knowledge (e.g., knowledge of markets, customers, technologies, etc.) and help them identify new entrepreneurial opportunities.
Entrepreneurial Action	Action was taken by an entrepreneur/organisation to execute an identified entrepreneurial opportunity.

(1). Entrepreneurial Perception

An interesting factor that was revealed by the analysis of Case C was entrepreneurial perception. Entrepreneurial perception refers to Perceptions of entrepreneurs that are developed through the

constant acquisition of diverse knowledge (e.g., knowledge of markets, customers, technologies, etc.) and help them identify new entrepreneurial opportunities and is developed and informed through an iterative process of synthesizing pieces of information that entrepreneur gathers during his/her entrepreneurial journey. It seems that large technology-based organisations such as Case C company provides regular opportunities to its employees involved in entrepreneurial activates to get the latest knowledge through a series of seminars and workshops. Such employees are also encouraged to participate in Web-based brainstorming sessions so that they can share their understanding of different business processes and the opportunities that they identify. Such a process would help them refine their ideas so that those ideas could be executed.

(2). Entrepreneurial Action

Although I did not ask questions regarding entrepreneurial action, the interviewees still offered comments on the importance of entrepreneurial action in order to appreciate the potential of identified entrepreneurial opportunities fully.

4.6. Chapter Summary

The study investigated the factors that contribute to the entrepreneurial opportunities discovery for technology-based organisations, and the role of web technologies in EOD for technology-based organisations. The study involved semi-structured interviews, documentation and informal observations in Ireland. Analysis of interview transcripts, documentation and observations revealed several new factors that influence EOD.

Table 4.8 provides the new factors that were revealed by the data analysis of all three cases for this study.

Table 4.20. New factors identified by the analysis of all cases		
Case	**NO.**	**New Factor**
A	1	Pursuit of continuous learning
	2	Knowledge of anticipated customers' needs
	3	Knowledge of anticipated means to satisfy customers' needs
	4	External pressure
	5	Entrepreneurial culture
	6	Imagination
B	1	Knowledge of demographic changes
	2	Occupational identities
	3	Divergent thinking
	4	Diversity of individuals' skills set
	5	Readily available knowledge
	6	Web-based brainstorming
C	1	Entrepreneurial Perception
	2	Entrepreneurial Action

5. CROSS-CASE ANALYSIS

5.1. Introduction

This chapter presents the findings of the cross-case analysis and concludes at the development of a conceptual model by deriving from the findings and positioning them in the prior literature.

Section 5.1 reports the process of cross-case analysis, followed by sections 5.2, 5.3, 5.4, and 5.5 which report the main overarching categories detailing second-order themes. All these sections also include Cross-Case Assertion (CCA) and supporting evidence for each CCA.

The tables of evidence for each CCA include defined variables, their occurrences across cases, whether they were retained, and when the variable was validated. Then I defined each variable within the specific factor (i.e. CCA).

Section 5.6 provides a conceptual model. The conceptual model was developed from the findings of the case, and each factor and its relationship was discussed through the lens of prior literature.

The findings of the cross-case analysis reveal several new factors that directly or indirectly influence entrepreneurial opportunity discovery (EOD). Overall, I found fourteen new factors which have a direct or indirect influence on EOD. Mainly, web technologies were found to have a moderating role for few relationships between different factors and EOD. Web technologies were also found to have directly influenced a few other factors.

5.2. Cross-Case Analysis Process

I performed several activities to carry out cross-case analysis – I divided the factors into three levels; level 1 factors are the ones which were found in all cases; level 2 factors found in two cases; whereas level 3 factors were only found in one case (see Chapter 3 for details). Table 5.1 provides a

list of factors which were also found in all the cases. Table 5.2 provides a list of new factors found in all cases.

Table 5.1: Factors identified from literature across cases				
Factors	**Case A**	**Case B**	**Case C**	**Level**
Entrepreneurial alertness	**X**	**X**	**X**	1
Prior knowledge	**X**	**X**	**X**	1
Leadership	**X**	**X**	**X**	1
Risk taker	**X**	**X**	**X**	1
IT infrastructure	**X**	**X**	**X**	1
Systematic search	**X**	**X**	**X**	1
Social capital	**X**	**X**	**X**	1

Table 5.2: New factors across cases				
Factors	**Case A**	**Case B**	**Case C**	**Level**
Pursuit of continuous learning	**X**	**X**	**X**	1
Knowledge of anticipated customers' needs	**X**	**X**	**X**	1
Knowledge of anticipated means to satisfy customers' needs	**X**	**X**	**X**	1
External pressure	**X**	**X**	**X**	1

Entrepreneurial culture	**X**	**X**	**X**	1
Imagination	**X**	**X**	**X**	1
Knowledge of demographic changes		**X**	**X**	2
Occupational identities		**X**	**X**	2
Divergent thinking		**X**	**X**	2
Diversity of individuals' skills set		**X**	**X**	2
Readily available knowledge		**X**	**X**	2
Web-based brainstorming		**X**	**X**	2
Entrepreneurial perception			**X**	3
Entrepreneurial action			**X**	3

As shown in Tables 5.1 and 5.2, the analysis revealed a total number of 21 factors across all cases. Out of these 21, 13 factors were common to all three cases, 12 factors were found in two cases, while two factors were found in only one case. As explained in Chapter 3, based on this, I divided these factors into three levels of analysis.

Based on the systematic literature review and the definitions of these factors derived from the literature (e.g., for factors found in the literature) and data (e.g., new factors), all these factors were allocated to overarching categories referred to concepts for the remainder part of the thesis.

Table 5.3 provides definitions of new factors extracted from data.

Table 5.3: New Factors and their definitions	
New Factor	**Description**
Pursuit of continuous learning	A continuous effort carried out by entrepreneurs in learning new things
Knowledge of anticipated customers' needs	The needs that customers might not know themselves.
Knowledge of anticipated means to satisfy customers' needs	The solutions to anticipated customers' needs.
External pressure	Pressure from an organisation's customers, competitors and partners that can be perceived as firm as well as individual level
Entrepreneurial culture	An entrepreneurial culture that encourages entrepreneurial activities and thinking within an organisation
Imagination	The ability to think of new opportunities without having prior knowledge.
Knowledge of demographic changes	The knowledge that covers the influence of changes in demographics have on people's needs
Occupational identities	The specific job that an individual is expected to perform
Divergent thinking	Thinking out of the box
Diversity of individuals' skills set	An individual that possesses a different set of skills

Readily available knowledge	The knowledge that is accessible to its consumers on demand
Web-based brainstorming	Brainstorming that is facilitated by web technologies
Entrepreneurial Perception	Perceptions of entrepreneurs that are developed through the constant acquisition of diverse knowledge (e.g., knowledge of markets, customers, technologies, etc.) and help them identify new entrepreneurial opportunities.
Entrepreneurial Action	Action was taken by an entrepreneur/organisation to execute an identified entrepreneurial opportunity.

Table 5.4 shows the allocation of factors to overarching concepts.

Table 5.4: Overarching concepts and the Factors

Overarching Concept	**Factors**
Individual factors	Entrepreneurial alertness
	Prior knowledge
	Entrepreneurial action
	Sociability
	Leadership
	Cognitive ability
	Risk taker

	Imagination
	Divergent thinking
	Entrepreneurial perception
	Pursuit of continuous learning
Organisational factors	Occupational identities
	IT infrastructure
	Entrepreneurial culture
	Human capital
	Systematic search
	Social capital
	Readily available knowledge
	Market Reach
Environmental factors	External pressure
Web technologies (as an enabler of)	Entrepreneurial alertness
	Pursuit of continuous learning
	Collaboration among employees and stakeholders
	Market Reach

	Entrepreneurial culture
	Systematic search
	Readily available knowledge
	Sociability

5.1.1. Level 1 factors across all cases

At level 1, the cross-case analysis involves merging all the factors found across all three cases. As shown in Tables 5.1 and 5.2, eleven such factors were found in this cluster. As part of the analysis process, I addressed the merged factors separately. If I found strong evidence about a factor from all three cases, that factor was made part of CCTA. However, if I could not find strong evidence for a factor, that factor was retained for further stages of the analysis. The summary of this process is given in Table 5.5.

Table 5.5: Level 1 factors cross-case analysis

Overarching Concepts	**Merged factors / CCTAs**	**Variables**				
		Case A	**Case B**	**Case C**	**CCTAs**	**Retained**
Individual factors	Entrepreneurial alertness	4	3	5	3	1
	Prior knowledge	5	6	5	5	1
	Leadership	3	2	2	2	1
	Risk taker	3	2	2	2	1

	Pursuit of continuous learning	4	3	3	3	2
	Imagination	4	4	3	3	2
Organisational factors	IT infrastructure	2	2	3	2	1
	Systematic search	2	3	3	2	1
	Social capital	3	4	4	3	2
Environmental factors	External pressure	5	4	5	3	2

I formulated ten cross-case tentative factors (see Table 5.5). A total of 31 factors emerged as CCTAs while 14 variables were retained to be included in the analysis for further stages (i.e., level 2 and level 3 analysis).

5.1.2. Level 2 factors across all cases

At level 2, the cross-case analysis was carried out for the factors that were emerged from only two of the three cases (Case B and Case C). These factors include knowledge of demographic changes, occupational identities, divergent thinking, diversity of individuals' skills set, readily available knowledge and web-based brainstorming (see Table 5.2). At this level, the transcripts of Case A were revisited to reflect upon the factors which were not present in Case A. A summary of this analysis process is given in Table 5.6.

Table 5.6: Level 2 factors cross-case analysis						
Overarching Concepts	**Merged factors / CCTAs**	**Variables**				
		Case A	**Case B**	**Case C**	**CCTAs**	**Retained**
Individual factors	Knowledge of demographic changes	-	4	4	4	1
	Divergent thinking	-	4	3	3	1
Organisational factors	Occupational identities	-	3	2	2	1
	Diversity of individuals' skills set	-	3	4	3	1
	Readily available knowledge	-	3	2	2	1
	Web-based brainstorming	-	2	2	2	1

I formulated ten cross-case tentative factors (see Table 5.6). A total of 17 factors emerged as CCTAs while 6 variables were retained to be included in the analysis for further stages (i.e., level 3 analysis). The variables retained in at level 1 were not related to any of the factor here at level 2, and similarly, no retained variable at level 2 was related to the retained variables at level 1.

5.1.3Level 3 factors across all cases

At level 3 of the cross-case analysis, I listed all the remaining emerged variables for case one only (Case C). I added the retained variables to this list. This step was carried out to make sure that the variable which was not present in all cases did not belong to any of the factors from different cases. At this stage, I considered a total of 30 variables – 20 of them were retained from previous levels, and 10 belong to this level. I clustered and combined all the variables based on their similarities. In

the next step, I looked at the thick description of each factor that was generated at within case analysis level (Chapter 4). I used the definitions to group similar variables into one factor. The primary goal here was to find strong evidence for the definitions of these variables from all cases. I encountered three situations: 1). A new CCTA was formed because the emerging factor was new; 2). If the factor was similar to the one emerged at level 1 and 2, I labelled the factor as an emerged factor; and 3). If I did not find enough evidence for the variable, I left it for further reflections.

I found that the retained variables at level 1 and 2 did correspond to the variables emerged in Case C. These variables were grouped and tapped into a factor that I named entrepreneurial perception based on its definition mentioned in Chapter 4. However, variables belonging to the factor entrepreneurial action were all retained (e.g., the number was 4 variables) as I could not find enough evidence across cases. Table 5.7 provides details of the new tentative factor.

Table 5.7: Entrepreneurial perception related, level 3

Tentative Variable	**Variables Integrated**	**Original Factors**	**Cases**
Entrepreneurial perception	Ability to perceive what's happening around	Entrepreneurial perception	C
	Reflecting on new information	Ability to reflect on new information	B
	Ability to understand strategic planning	Entrepreneurial perception	C
	Hands-on understanding of new technologies	Ability to reflect on new information	A

I retained twenty-four variables at this stage belonging to single cases for which I could not find sufficient across case evidence. I planned to collect more data to decide whether these variables should be included in the final cross-case findings. I provide details of these decisions in the Cross-Case Assertions Section.

5.2 Individual Attributes Factors CCTA Development

Table 5.8 provides the list of factors which were identified across all cases. It also shows the level at which the factor came out of as a result of the analysis. Out of all eleven factors, eight emerged from all three cases, one from two cases and two from one case (i.e., Case C). I undertook three levels of analysis depending upon the distinction as shown in Table 5.8.

Table 5.8: Individual attributes factors across all cases

Individual attributes factors	**Case A**	**Case B**	**Case C**	**Level**
Entrepreneurial alertness	**X**	**X**	**X**	1
Prior knowledge	**X**	**X**	**X**	1
Entrepreneurial action			**X**	3
Sociability	**X**	**X**	**X**	1
Leadership	**X**	**X**	**X**	1
Cognitive ability	**X**	**X**	**X**	1
Risk taker	**X**	**X**	**X**	1
Imagination	**X**	**X**	**X**	1
Divergent thinking		**X**	**X**	2

Entrepreneurial perception			**X**	3
Pursuit of continuous learning	**X**	**X**	**X**	1

5.2.1. Level 1: Individual attributes factors across all cases

Table 5.9 shows the number of merged factors that appeared at level 1. A total of eight factors emerged. For each merged factor, I defined an inbound and an outbound link. A total of 18 links were identified between these merged factors.

Table 5.9: Individual attributes factors level 1

Merged factors / CCTAs	**Variables**				
	Case A	Case B	Case C	CCTAs	Retained
Entrepreneurial alertness	4	3	5	3	1
Prior knowledge (customer needs and ways to satisfy those needs)	5	6	5	5	1
Leadership	3	2	2	2	1
Risk taker	3	2	2	2	1
Pursuit of continuous learning	4	3	3	3	2
Imagination	4	4	3	3	2
Sociability	2	2	3	2	1
Cognitive ability	3	2	3	2	1

5.2.2. Level 2: Individual attributes factors across all cases

At this level, the analysis involved the analysis of factors from two cases (Case B and Case C). Those two factors are prior knowledge of demographic changes and divergent thinking. These factors were further reflected upon from the case that was missing (i.e., Case A). Table 5.10 provides a summary of this process.

Table 5.10: Individual attributes factors level 2

Merged factors / CCTAs	**Variables**				
	Case A	Case B	Case C	CCTAs	Retained
Prior knowledge of demographic changes	-	6	5	5	1
Divergent thinking	-	4	3	3	1

Based on the data analysis approach (e.g., Stake, 2006), if the factors are coming from two out of three cases, it is necessary to explain the significance of those factors. Such an explanation might be related to the case that was missing or by trying to make an argument based on other relevant factors. For example, prior knowledge has been argued to an essential factor in EOD literature.

However, given the focus of this research which is purely the use of web technologies by technology-based firms, it seems reasonable to assume that younger people would be more comfortable using evolving web-technologies. Based on this, it appears that knowledge of demographic changes for its implications for the evolving web-technologies is crucial. Similarly, thinking of the applications of technologies for different scenarios sound also a vital factor.

5.2.3. Level 3: Individual attributes factors across all cases

At this level of the cross-case analysis, all the remaining variables emerged from on case only are added to the list of variables retained in levels 1 and 2. The variables were combined based on their similarities. Table 5.11 provides an overview of the variables that were integrated upon reflection at level 3 analyses. Two new CCTAs also emerged, shown in Tables 5.11 and 12.

Table 5.11: Individual attributes related variables considered at level 3

No.	Variable	Original Factor	Case	Status
1	Evaluate new information	Entrepreneurial alertness	B	Integrated
2	Customers problems	Prior knowledge (customer needs and ways to satisfy those needs)	C	Integrated
3	Ability to guide	Leadership	B	Integrated
4	Comfort with risk	Risk taker	A	Integrated
5	Deep learning	Pursuit of continuous learning	B	Integrated
6	Active learning	Pursuit of continuous learning	C	Integrated
7	Thinking of opportunities	Imagination	A	Integrated
8	Engagement in thinking	Imagination	C	Integrated
9	Friendly nature	Sociability	A	Integrated

10	High order cognitive functioning	Cognitive ability	B	Integrated
11	Older people needs	Prior knowledge of demographic changes	B	Retained
12	Thinking differently	Divergent thinking	C	Retained
13	Find new leads	Entrepreneurial action	C	Retained
14	Active involvement	Entrepreneurial action	C	Retained
15	Engagement in creative events	Entrepreneurial action	C	Retained
16	Perceive planning	Entrepreneurial perception	C	New CCTA
17	Awareness of surrounding	Entrepreneurial perception	C	New CCTA
18	Hands-on understanding of new techs	Entrepreneurial perception	C	New CCTA

It is important to note that upon further reflection and revisiting the cases A and B to find out evidence for entrepreneurial perception; I found a couple of variables that seem to be closely related to the thick description of entrepreneurial perception. For example, "efforts to find different information" in Case A, and "looking for something new" Case B appear to be closely related to the definition of entrepreneurial perception.

“Perceptions of entrepreneurs that are developed through the constant acquisition of diverse knowledge (e.g., knowledge of markets, customers, technologies, etc.) and help them identify new entrepreneurial opportunities." Based on this, I defined included the entrepreneurial perception factor into the list of al merged factors.

Table 5.12 provides a summary of the allocation of variables which were integrated and the corresponding factor.

Table 5.12: Level 3 Individual Attributes Factors Analysis – Reallocation of Variables

Reallocated Variables	**Factors**	**Variables**
Evaluate new information	Entrepreneurial alertness	Reflecting upon new information
Customers problems	Prior knowledge (customer needs and ways to satisfy those needs)	Customers’ needs and ways to satisfy those needs
Ability to guide	Leadership	Ability to lead
Comfort with risk	Risk taker	No fear of calculated risk
Deep learning	Pursuit of continuous learning	Willingness to learn
Active learning	Pursuit of continuous learning	Always open to new ideas
Thinking of opportunities	Imagination	Thinking of new ways
Engagement in thinking	Imagination	Spend quality time on pondering

Friendly nature	Sociability	Show friendliness
High order cognitive functioning	Cognitive ability	Ability to understand complex problems

5.3. Organisational Factors CCTA Development

Table 5.13 provides the list of factors belonging to organisational factors category which was identified across all cases. It also shows the level at which the factor came out of as a result of the analysis. Out of all eight factors, five emerged from all three cases, while three emerged from two cases (i.e., Case B and C). I undertook three levels of analysis depending upon the distinction as shown in Table 5.13.

Table 5.13: Organisational factors across all cases

Organisational factors	**Case A**	**Case B**	**Case C**	**Level**
Occupational identities		**X**	**X**	2
IT infrastructure	**X**	**X**	**X**	1
Entrepreneurial culture	**X**	**X**	**X**	1
Human capital		**X**	**X**	2
Systematic search	**X**	**X**	**X**	1
Social capital	**X**	**X**	**X**	1
Readily available knowledge		**X**	**X**	2
Market reach	**X**	**X**	**X**	1

5.3.1. Levels 1, 2 and 3 analysis of Organisational Factors across all cases

As all the factors that belong to were either present in all the cases or at least in two cases, I combined the two tables presenting factors emerging at level 1 and level 2 analysis. Table 5.14 shows the number of merged factors that appeared at level 1. A total of eight factors emerged. For each merged factor, I defined an inbound and an outbound link. A total of 17 links were identified between these merged factors.

Table 5.14: Organisation factors level 1 and level 2

Merged factors / CCTAs	**Variables**					**Level**
	Case A	Case B	Case C	CCTAs	Retained	
IT Infrastructure	2	2	3	2	1	1
Systematic search	2	3	3	2	1	1
Social capital	3	4	4	3	2	1
Occupational identities	2	3	2	2	1	2
Entrepreneurial culture (web-based brainstorming)	4	3	5	3	1	2
Readily available knowledge	2	2	2	2	1	2
Market Reach	3	3	4	3	1	1
Human capital	5	4	6	4	1	1

Table 5.15 provides an overview of the variables that were integrated upon reflection at level 3 analysis.

Table 5.15: Organisation factors related variables considered at level 3

No.	Variable	Original Factor	Case	Status
1	Computing resources	IT Infrastructure	B	Integrated
2	Using technologies to find leads	Systematic search	C	Integrated
3	Connections	Social capital	B	Integrated
4	Number of business friends	Social capital	A	Integrated
5	Different Roles	Occupational identities	A	Integrated
6	Sharing knowledge	Entrepreneurial culture (web-based brainstorming)	B	Integrated
7	E_library	Readily available knowledge	C	Integrated
8	Sales Leads	Market Reach	A	Integrated
9	Number of employees	Human capital	B	Integrated

Table 5.16 provides a summary of the allocation of variables which were integrated and the corresponding factor.

Table 5.16: Level 3 Organisational Factors Analysis – Reallocation of Variables

Reallocated Variables	Factors	Variables
Computing resources	IT Infrastructure	IT resources

Using technologies to find leads	Systematic search	Predictive analysis to find leads
Connections	Social capital	Business network
Number of business friends	Social capital	Business network
Different Roles	Occupational identities	Role allocations in different departments
Sharing knowledge	Entrepreneurial culture (web-based brainstorming)	Using web technologies to share knowledge
E_library	Readily available knowledge	Knowledgebase
Sales Leads	Market Reach	Business Leads
Number of employees	Human capital	Number of qualified employees

5.4. Environmental Factors CCTA Development

As shown in Table 5.17, external pressure was the only factor that emerged from the analysis from all the cases. Therefore, I would only present a discussion of the two variables that I retained in the analysis.

Table 5.17: Environmental factors across all cases

Environmental factors	**Case A**	**Case B**	**Case C**	**Level**
External pressure	**X**	**X**	**X**	1

The two variables which were retained were; the invention of new technologies and use of new technologies by the company's competitors. At this stage of the analysis, I would still retain these two variables and would try to validate them in further Assertion section.

5.5. Web Technologies as Enabler Factors CCTA Development

Table 5.18 provides a list of factors that use of web technologies can enable. As shown in the table, there are eight such factors, out of them, seven emerged at level 1 analysis while remaining one emerged from level 2 analysis.

Table 5.18: Web technologies as enabler factors across all cases

Web technologies as enabler factors	**Case A**	**Case B**	**Case C**	**Level**
Entrepreneurial alertness	**X**	**X**	**X**	1
Pursuit of continuous learning	**X**	**X**	**X**	1
Collaboration among employees and stakeholders	**X**	**X**	**X**	1
Market Reach	**X**	**X**	**X**	1
Entrepreneurial culture	**X**	**X**	**X**	1
Systematic search	**X**	**X**	**X**	1
Readily available knowledge		**X**	**X**	2
Sociability	**X**	**X**	**X**	1

5.6 Individual Factors Cross-Case Assertions

This section presents eleven factors categorised as Individual factors (an overarching concept) and their role in with interacting with other factors belonging to factors of other overarching concepts and the discovery of entrepreneurial opportunities. I also included additional data that I collect as a validation step. I also provide information about the relationships that these factors have with other factors. Following sub-sections provide cross-case assertions (CCA) for each factor separately.

5.6.1. CCA for Entrepreneurial Alertness

The first factor that emerged from all cases was entrepreneurial alertness. Entrepreneurial alertness has been investigated extensively in prior research and argued to be an essential Individual factors that an entrepreneur should have. Table 5.19 provides a list of variables that emerged as the analysis and were also validated.

Table 5.19: CCA for entrepreneurial alertness

No.	Variables	Case A	Case B	Case C	Retained	Validated
1	Evaluate new information	**X**	**X**	**X**	**No**	**Yes**
2	Reflecting upon new information	**X**	**X**	**X**	**No**	**Yes**
3	Proactivity	**X**	**X**	**X**	**No**	**Yes**
4	Optimal use of resources	**X**	**X**	**X**	**No**	**Yes**
5	Combining knowledge with experience	**X**	**X**	**X**	**No**	**Yes**
6	Awareness of changes	**X**	**X**	**X**	**No**	**Yes**

7	Positive thinking	**X**	**X**	**X**	**No**	**Yes**

- ⇨ **Evaluate new information:** This variable relates to the characteristic of an entrepreneur that suggests that the entrepreneur should have the ability and willingness to evaluate new information.
- ⇨ **Reflecting upon new information:** This variable suggests that an entrepreneur should go beyond evaluating new information rather he/she should also consider reflecting upon new information which would be that to think about different scenarios that new information can be implemented in.
- ⇨ **Proactivity:** This variable suggests that as part of the entrepreneurial alertness, an entrepreneur should act proactively and not merely sit waiting for the opportunities to come to him/her.
- ⇨ **Optimal use of resources:** Optimal usage of available resources is another important aspect of entrepreneurial alertness. It emerged that entrepreneurs should be aware of the available resources within an organisation to them so that they know what can be achieved and what can't.
- ⇨ **Combining knowledge with experience:** This variable emerged in Case B and Case C – which is the larger organisation as compared to Case A. It suggests that one aspect of entrepreneurial alertness is that knowledge is paired with experience. This variable suggests both explicit knowledge and tacit knowledge are essential for entrepreneurial alertness.
- ⇨ **Awareness of changes:** As part of entrepreneurial alertness, entrepreneurs should be aware of the changes happening around them – these changes can be either within their organisation or external to their organisation (e.g., changes in the markets, customers' needs etc.).
- ⇨ **Positive thinking:** This variable is considered to be playing a crucial role in entrepreneurial alertness in a way that it keeps the entrepreneurs motivated and optimistic and prepared him/her to be not afraid of failures.

Relationships of Entrepreneurial Alertness with other Factors

The findings suggest that entrepreneurial alertness has a direct link to EOD – it positively influences EOD. The findings also suggest that organisational factors such as occupational identities and entrepreneurial culture can enhance entrepreneurial alertness. See Figures 5.1 and 5.2.

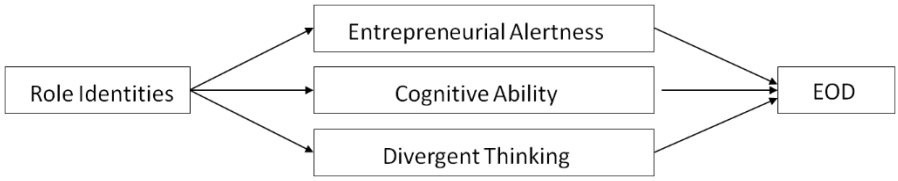

Figure 5.1: The relationship of occupational identities with Individual factors and EOD

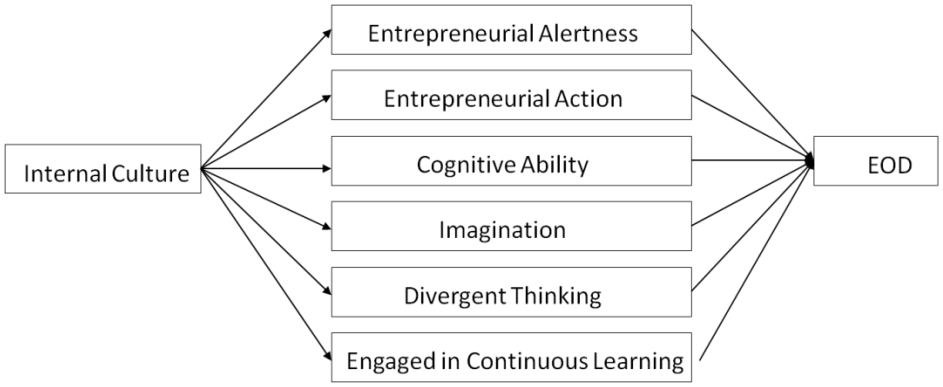

Figure 5.2: The relationship of entrepreneurial culture with Individual factors and EOD

Entrepreneurial Alertness Validation

Entrepreneurial alertness was the most discussed factor, and I achieved significant validation of this CCA and its variables. For example, one subject quoted, "A willingness of an entrepreneur to actively looking for new information and then reflecting upon it is a crucial attribute." (S2). Another stated, “Entrepreneurs should be aware of the available resources and have the ability to use the optimally.” (S6).

5.6.2. CCA for Prior Knowledge

Prior knowledge is another critical factor belonging to Individual factors that have emerged and is probably the most investigated Individual factors besides entrepreneurial alertness. This factor has emerged from all the cases. Table 5.20 shows the list of variables belonging to prior knowledge factors. All variables were also validated.

Table 5.20: CCA for prior knowledge

No.	Variables	Case A	Case B	Case C	Retained	Validated
1	Knowledge of customers problems	**X**	**X**	**X**	**No**	**Yes**
2	Knowledge of customers' needs	**X**	**X**	**X**	**No**	**Yes**
3	Knowledge of customers' anticipated needs	**X**	**X**	**X**	**No**	**Yes**
4	Knowledge of ways to satisfy customers' needs	**X**	**X**	**X**	**No**	**Yes**
5	Knowledge of ways to solve customers' problems	**X**	**X**	**X**	**No**	**Yes**
6	Knowledge of anticipated ways to satisfy the anticipated needs of customers	**X**	**X**	**X**	**No**	**Yes**
7	Knowledge of needs of younger people	**X**	**X**	**X**	**No**	**Yes**

8	Knowledge of needs of older people needs	**X**	**X**	**X**	**No**	**Yes**
9	Knowledge of needs of people of different age	**X**	**X**	**X**	**No**	**Yes**
10	Deep learning	**X**	**X**	**X**	**No**	**Yes**
11	Breadth of knowledge	**X**	**X**	**X**	**No**	**Yes**
12	Depth of knowledge	**X**	**X**	**X**	**No**	**Yes**
13	Tacit knowledge	**X**	**X**	**X**	**No**	**Yes**
14	Explicit knowledge	**X**	**X**	**X**	**No**	**Yes**
15	Formal education	**X**	**X**	**X**	**No**	**Yes**
16	Experiential education	**X**	**X**	**X**	**No**	**Yes**
17	Predicting customers' needs	**X**	**X**	**X**	**No**	**Yes**
18	Knowledge of demographics	**X**	**X**	**X**	**No**	**Yes**

Variables of Prior Knowledge and their Validation

- **Knowledge of customer's problems, Knowledge of customers' needs, Knowledge of customers' anticipated needs, predicting customers' needs:** All these variables belong to the knowledge of customers' needs. I found significant evidence about these entire variables in all cases and validated them too. For example, it was pointed out, "Organisations should focus on identifying customers' current as well as future needs." (S4). Another subject explained, "Obtaining information about customers' needs was never easier, use of web

technologies have made the job of entrepreneurs much easier." (S5). The subject who is a business development manager stated, "Use of predictive software such as web analytics can help entrepreneurs to forecast trends in customers' future needs." (S6).

- ⇨ **Knowledge of ways to satisfy customers' needs, Knowledge of ways to solve customers' problems, Knowledge of anticipated ways to satisfy anticipated needs of customers:** I found strong evidence related to all these variables across all cases and they were also validated. The findings suggest that similar to anticipating customers' future needs, entrepreneurs can also anticipate ways and means by which those future needs can be resolved. Subject who was a business innovation manager reported, "If entrepreneurs can figure out what would the future markets look like, it would become easier for them to figure out ways to solve the problems faced by individuals living in those future markets." (S3). Subject 2 said that by using state-of-the-art technologies such as web analytics, it has become convenient for managers to find out about future trends.
- ⇨ **Deep learning, Depth of Knowledge:** These variables also emerged across cases and argued to be crucial elements of prior knowledge in the validation process too. One of the subjects stated that the depth of knowledge in at least one of the area was fundamental to see the potential of new technologies and their implications for certain situations (S5, CEO).
- ⇨ **Breadth of knowledge:** This variable also emerged in all cases, and I found strong evidence for this. However, the critical point to note regarding this variable is that two subjects (e.g., S1 and S5) pointed out that breadth of knowledge would only be helpful when it is combined with the depth of knowledge otherwise the opportunities identified by entrepreneurs would be superficial and might not be feasible to act upon.
- ⇨ **Tacit knowledge, experiential education:** Both these variables are closely related and substantial evidence was found for these variables across cases. It was found that though employees can possess tacit knowledge when they are hired. The organisations can also

enhance it by engaging those employees in several hands-on types of seminars and workshops (S2, S4).

- ⇨ **Explicit knowledge, Formal education:** All three cases provided strong evidence for these variables too. During the validation process, subject 5 pointed out, "We, in our organisation, put a strong emphasis on a minimum level of formal education as that level of education would guide the further learning of our employees." Another subject replied, "Formal education is necessary and is a core requirement for getting a job in our organisation." (S6).
- ⇨ **Knowledge of demographics, Knowledge of needs of younger people, Knowledge of needs of older people needs, Knowledge of needs of people of different age:** I would talk about all these four variables together because of the close resemblances among them. These variables are related to the knowledge of changes that occur in the demographics of markets that are of the target of an organisation. I found significant evidence in two cases – Case B and C. However, upon revisiting Case A and also based on reflection, I found further evidence about this variable. One of the subjects during validation processes also highlighted, "Both young and old people have a different set of needs, and such difference should be part of the knowledge of entrepreneurs." (S1). Subject 3 also explained, “Entrepreneurs should be aware of the changes happening in demographics over time. For example, young people would turn into old ones in a couple of decades.”

Relationships of Prior Knowledge with Other Factors

Figure 5.3 show that prior knowledge has a direct relationship with EOD. It also shows that prior knowledge can be enhanced by using web technologies.

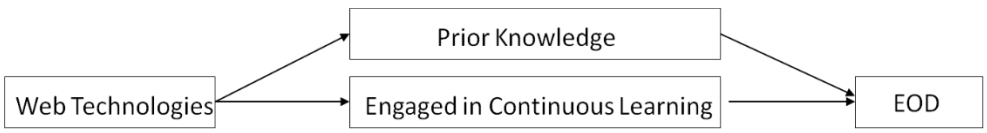

Figure 5.3: Relationship of prior knowledge with other factors

5.6.3. CCA for Leadership

Leadership is another critical factor belonging to Individual factors. Leadership also emerged across all cases. Table 5.21 shows the list of variables for leadership factor. All variables were also validated.

Table 5.21: CCA for leadership

No.	Variables	Case A	Case B	Case C	Retained	Validated
1	Ability to guide	**X**	**X**	**X**	**No**	**Yes**
2	Ability to lead	**X**	**X**	**X**	**No**	**Yes**
3	Ability to manage	**X**	**X**	**X**	**No**	**Yes**
4	Ability to inspire	**X**	**X**	**X**	**No**	**Yes**
5	Knowledgeable	**X**	**X**	**X**	**No**	**Yes**
6	Becoming a role model	**X**	**X**	**X**	**No**	**Yes**
7	Good listener	**X**	**X**	**X**	**No**	**Yes**

Variables of Leadership and their Validation

- **Ability to guide:** This variable was appeared in all cases and was also validated. All the subjects mentioned that an entrepreneur should have leadership skills and the ability to guide whenever required.
- **Ability to lead:** This variable was argued to be fundamental to leadership factors and was found across all cases. The CEO reported, "Ability to lead can be said as a basic attribute of an entrepreneur." (S5).

- ⇨ **Ability to manage:** Like above two variables, this variable was also emerged in all cases and was said to be an essential attribute of a leader who would especially involve in the entrepreneurial process to have (S1, S2, S3, S4, and S6).
- ⇨ **Ability to inspire:** This variable was also found in all the cases and was validated and supported by all the subjects. The business development manager told that entrepreneurs have to make a critical decision which may not be commendable by all the stakeholders involved. Therefore, it is necessary that an entrepreneur should have the ability to inspire others.
- ⇨ **Knowledgeable:** This variable also emerged across all the cases. I also found strong evidence for this variable. All subjects stated that possessing strong knowledge of the area is an essential attribute of leaders especially the ones who are involved in entrepreneurial activities (S1, S2, S3, S4, S5, S6).
- ⇨ **Becoming a role model:** A leader should act as a role model that was highlight by the CEO (S5). This variable was found in all cases too.
- ⇨ **Good listener:** This variable was emphasised the most, and I found strong evidence for this. All subjects pointed out that entrepreneur can only become successful when it comes to leading if they listen to their colleagues and subordinates. However, they also highlight that listening should be perceived as an act of getting know-how of other opinions; a leader should act what he/she thinks right. Leadership also has a direct relationship with EOD.
- ⇨ **Relationships of Leadership with other Factors.** Leader's cognitive ability has been found to have a direct relationship with EOD.

5.6.4. CCA for Risk Taker

Risk taker is another critical factor belonging to Individual factors. It also emerged across all cases. Table 5.22 shows the list of variables for risk taker factor. All variables were also validated.

Table 5.22: CCA for the risk taker						
No.	**Variables**	**Case A**	**Case B**	**Case C**	**Retained**	**Validated**
1	Comfort with risk	**X**	**X**	**X**	**No**	**Yes**
2	No fear of calculated risk	**X**	**X**	**X**	**No**	**Yes**
3	Compassionate thinker	**X**	**X**	**X**	**No**	**Yes**
4	Taking bold steps	**X**	**X**	**X**	**No**	**Yes**
5	Adventurousness	**X**	**X**	**X**	**No**	**Yes**

Variables of Risk Taker and their Validation

- ⇨ **Comfort with risk:** This variable was found across all cases, and substantial evidence was also found both as cross-case analysis and validation process. The ICT manager pointed out, "Entrepreneurs should feel comfortable with risks. I mean when they face risks they should not start panicking rather think risks as part of the entrepreneurial process." (S2).
- ⇨ **No fear of calculated risk:** This variable emerged in all cases. I also found strong evidence for this variable and validated it too. It was highlighted by the CEO (S5) that entrepreneurs should not just jump into risky options to prove something instead they should take only calculated risks.
- ⇨ **Compassionate thinker:** This variable was found across all cases, and substantial evidence was also found both as cross-case analysis and validation process. The CEO also pointed out that entrepreneurs should also be compassionate about what they are doing (S5).
- ⇨ **Taking bold steps:** This variable emerged in all cases. I also found strong evidence for this variable and validated it too. It was explained by the Business Innovation Manager, "Once all

the necessary measures been taken concerning calculating risks etc., the entrepreneur should act boldly." (S3).

- ⇨ **Adventurousness:** This variable was found across all cases, and substantial evidence was also found both as cross-case analysis and validation process. Interestingly, a couple of subjects highlighted this variable by saying that sometimes being adventurous can help entrepreneurs identify new opportunities (S4, S6).

Relationships of Risk Taker with other Factors: Risk taker has been found to have a direct relationship with EOD.

5.6.5. CCA for Cognitive Ability

Cognitive ability is another critical factor belonging to Individual factors that have emerged from all cases and was highly stressed upon by several participants. Table 5.23 shows the list of variables for cognitive ability factor. All variables were also validated.

Table 5.23: CCA for cognitive ability

No.	Variables	Case A	Case B	Case C	Retained	Validated
1	Ability to understand complex problems	X	X	X	No	Yes
2	High order cognitive functioning	X	X	X	No	Yes
3	Cognition	X	X	X	Yes	Yes
4	Problem-solving	X	X	X	No	Yes
5	Rational thinking	X	X	X	No	Yes

Variables of Cognitive Ability and their Validation

- **Ability to understand complex problems, Problem Solving:** These variables were found across all cases, and substantial evidence was also found both as cross-case analysis and validation process. A couple of subjects explained that ability to solve complex problems is the essential cognitive ability that entrepreneurs should have (S4, S5).
- **High order cognitive functioning:** This variable emerged in all cases. I also found strong evidence for this variable and validated it too. This variable was pointed out by half of the subjects who stated that finding new opportunities involve a high level of cognitive abilities and may not be done by all people (S1, S2, and S6).
- **Cognition:** This variable was found across all cases and was validated. However, it was retained in the validation process and by further reflecting upon this as it seems merely related to cognitive ability factor.
- **Rational thinking:** This variable was found across all cases, and substantial evidence was also found both as cross-case analysis and validation process. When it comes to cognitive ability, it also involves thinking effectively. However, it was highlighted by the digital marketing manager that though entrepreneurs should think rationally (S1).

  Relationships of Cognitive Ability with other Factors: Cognitive ability has been found to have a direct relationship with EOD. It is also affected by occupational identities and entrepreneurial culture (see Figures 5.1 and 5.2).

5.6.6. CCA for Imagination

Imagination is another critical factor belonging to Individual factors. It also emerged across all cases. Table 5.24 shows the list of variables for Imagination factor. All variables were also validated.

Table 5.24: CCA for imagination						
No.	**Variables**	**Case A**	**Case B**	**Case C**	**Retained**	**Validated**
1	Engagement in thinking	**X**	**X**	**X**	**No**	**Yes**
2	Spend quality time on pondering	**X**	**X**	**X**	**No**	**Yes**
3	Thinking of opportunities	**X**	**X**	**X**	**No**	**Yes**
4	Thinking of new ways	**X**	**X**	**X**	**No**	**Yes**
5	Thinking heuristically	**X**	**X**	**X**	**No**	**Yes**
6	Imagining a new business	**X**	**X**	**X**	**No**	**Yes**

Variables of Imagination and their Validation

- **Engagement in thinking, Spend quality time on pondering, Thinking of opportunities, Imaging about new business:** These variables were found across all cases, and substantial evidence was also found both as cross-case analysis and validation process. Almost all subjects pointed out that with the increasing invention of distracting technologies such as social media etc., it sometimes becomes harder for individuals to sit comfortably and spend quality time on thinking (S1, S2, S4 and S5). Therefore, it is essential to spend quality time thinking about new opportunities.
- **Thinking of new ways:** This variable emerged in all cases. I also found strong evidence for this variable and validated it too although it seems quite similar to thinking about new opportunities. However, the business development pointed out that thinking about opportunities is different from thinking of new ways to solve customers' problems because thinking about opportunities might not involve problems at all (S3).

⇨ **Thinking heuristically:** This variable was found across all cases, and substantial evidence was also found both as cross-case analysis and validation process. Interestingly, where an ability to think rationally has been pointed out to be a vital attribute, a couple of subjects also reported that thinking heuristically is equally crucial for being able to find new opportunities.

Relationships of Imagination with other Factors: Imagination has been found to have a direct relationship with EOD. It is also affected by entrepreneurial culture (see Figure 5.2).

5.6.7. CCA for Divergent Thinking

Divergent thinking is another crucial factor belonging to Individual factors. It was found in Cases B and C. However, after revisiting and reflecting upon the Case a material, evidence about this factor was found. Table 5.25 shows the list of variables for leadership factor. All variables were also validated.

Table 5.25: CCA for divergent thinking

No.	Variables	Case A	Case B	Case C	Retained	Validated
1	Thinking differently	**X**	**X**	**X**	**No**	**Yes**
2	Connecting different dots	**X**	**X**	**X**	**No**	**Yes**
3	Associating different pieces of information	**X**	**X**	**X**	**No**	**Yes**
4	Synthesising information	**X**	**X**	**X**	**No**	**Yes**
5	Thinking out of the box	**X**	**X**	**X**	**No**	**Yes**
6	Challenging the norms	**X**	**X**	**X**	**No**	**Yes**

Variables of Divergent Thinking and their Validation

- **Thinking differently, thinking out of the box:** These variables were found across all cases, and substantial evidence was also found both in cross-case analysis and validation process. Almost all subjects pointed out that entrepreneurs should have the ability to think differently from ordinary people, that is how they would be able to see something that most ordinary people will not be able to (S1, S2, S4, S5, and S6).
- **Connecting different dots, associating different pieces of information, synthesising information:** These variables emerged in all cases. I also found strong evidence for these variables and validated them too. Another variable that the ICT manager pointed out that entrepreneur should have the ability to connect different dots and pieces of information (S2). Another subject said, "It is important that entrepreneurs are able to combine different sets of information and synthesise that information to figure out a solution to a problem at hand." (S5).
- **Challenging the norms:** This variable emerged in all cases. I also found strong evidence for this variable and validated it too. The business innovation manager explained that if entrepreneurs wanted to come up with different solutions to a problem, they had to challenge the already established norms (S3).

  Relationships of Divergent Thinking with other Factors: Divergent thinking has been found to have a direct relationship with EOD. It is also affected by occupational identities and entrepreneurial culture (see Figures 5.1 and 5.2).

5.6.8. CCA for Entrepreneurial Perception

Entrepreneurial perception is another crucial factor belonging to Individual factors. Initially, it emerged in case C only. However, further revisiting of the cases A and B provided evidence for this factor. Table 5.26 shows the list of variables for entrepreneurial perception factor. All variables were also validated.

Table 5.26: CCA for entrepreneurial perception						
No.	**Variables**	**Case A**	**Case B**	**Case C**	**Retained**	**Validated**
1	Ability to perceive what's happening around	**X**	**X**	**X**	**No**	**Yes**
2	Reflecting on new information	**X**	**X**	**X**	**Yes**	**Yes**
3	Ability to understand strategic planning	**X**	**X**	**X**	**No**	**Yes**
4	Hands-on understanding of new technologies	**X**	**X**	**X**	**Yes**	**Yes**
5	Perceive planning	**X**	**X**	**X**	**No**	**Yes**
6	Awareness of surrounding	**X**	**X**	**X**	**No**	**Yes**

Variables of Entrepreneurial Perception and their Validation

- **Ability to perceive what's happening around, Awareness of surroundings:** These variables were found across all cases, and substantial evidence was also found both as cross-case analysis and validation process. These variables were emphasised upon by a couple of subjects who said that entrepreneurs should be aware of what's happening around them and they should observe other people, business processes and what problems other people are facing (S3, S6).
- **Reflecting on new information:** This variable emerged in all cases. I also found strong evidence for this variable and validated it too. Upon reflection and validation, I decided to integrate this variable to another variable of entrepreneurial alertness.

- ⇨ **Ability to understand strategic planning, perceive planning:** These variables were found across all cases, and substantial evidence was also found both as cross-case analysis and validation process. The CEO reported that ability to understand strategic planning is vital for an entrepreneur to be able to perceive strong opportunities (S5).
- ⇨ **Hands-on understanding of new technologies:** This variable emerged in all cases. I also found strong evidence for this variable and validated it too. Upon reflection, this variable was integrated with experiential education of prior knowledge factor.

Relationships of Entrepreneurial Perception with other Factors: Entrepreneurial perception has been found to have a direct relationship with EOD.

5.6.9. CCA for Entrepreneurial Action

Entrepreneurial action is also an essential factor that belongs to Individual factors. Initially, it emerged in case C only. However, further revisiting of the cases A and B provided evidence for this factor. Table 5.27 shows the list of variables for leadership factor. All variables were also validated.

Table 5.27: CCA for entrepreneurial action

No.	Variables	Case A	Case B	Case C	Retained	Validated
1	Find new leads	**X**	**X**	**X**	**No**	**Yes**
2	Active involvement	**X**	**X**	**X**	**No**	**Yes**
3	Engagement in creative events	**X**	**X**	**X**	**No**	**Yes**
4	Proactive involvement in EOD	**X**	**X**	**X**	**No**	**Yes**
5	Actions to find new opportunities	**X**	**X**	**X**	**No**	**Yes**

Variables of Entrepreneurial Action and their Validation

- **Find new leads, Actions to find new opportunities, Active involvement, Proactive involvement in EOD:** These variables were found across all cases, and substantial evidence was also found both as cross-case analysis and validation process. All the subjects reported that entrepreneurs should be proactive in their attempts to find new opportunities (S1, S2, S3, S4, S5 and S6).
- **Engagement in creative events:** This variable was found across all cases, and substantial evidence was also found both as cross-case analysis and validation process. A couple of the subjects highlighted the importance of taking part in the creative events that they suggested that would lead those finding new opportunities (S3 and S6).

  Relationships of Entrepreneurial Action with other Factors: Entrepreneurial action has been found to have a direct relationship with EOD. It is also affected by entrepreneurial culture (see Figure 5.2).

5.6.10. CCA for Pursuit of Continuous Learning

Pursuit of continuous learning is another critical factor belonging to Individual factors. It also emerged across all cases. Table 5.28 shows the list of variables for the pursuit of continuous learning factor. All variables were also validated.

Table 5.28: CCA for the pursuit of continuous learning

No.	Variables	Case A	Case B	Case C	Retained	Validated
1	Active learning	**X**	**X**	**X**	**No**	**Yes**
1	Willingness to learn	**X**	**X**	**X**	**No**	**Yes**
3	Always open to new ideas	**X**	**X**	**X**	**No**	**Yes**

4	Constantly looking for new knowledge	**X**	**X**	**X**	**No**	**Yes**
5	Passionate about learning	**X**	**X**	**X**	**No**	**Yes**

Variables of Pursuit of Continuous Learning and their Validation

- **Active learning:** This variable was found across all cases, and substantial evidence was also found both as cross-case analysis and validation process.
- **Willingness to learn, Always open to new ideas, Constantly looking for new knowledge:** These variables emerged in all cases. I also found strong evidence for this variable and validated it too. All the subjects reported on the significance of these variables. They pointed out that finding new opportunities required entrepreneurs to continually keep themselves engaged in looking for new knowledge and learn about new technologies and their implications (S1, S2, S3, S4, S5 and S6).
- **Passionate about learning:** This variable was found across all cases, and substantial evidence was also found both as cross-case analysis and validation process. This variable was said to be very important by the business innovation manager who explained that when learning passion matters a lot as it would affect the way new information is encoded and new associations are formulated in the brain (S3).

  Relationships of Pursuit of Continuous Learning with other Factors: These factors have been found to have a direct relationship with EOD. It is also affected by web technologies (see Figures 5.3).

5.6.11. CCA for Sociability

Sociability is another critical factor belonging to Individual factors. It also emerged across all cases. Table 5.29 shows the list of variables for the sociability factor. All variables were also validated.

Table 5.29: CCA for sociability						
No.	**Variables**	**Case A**	**Case B**	**Case C**	**Retained**	**Validated**
1	Friendly nature	**X**	**X**	**X**	**No**	**Yes**
2	Show friendliness	**X**	**X**	**X**	**No**	**Yes**
3	Cheerful	**X**	**X**	**X**	**No**	**Yes**
4	Open to criticism	**X**	**X**	**X**	**No**	**Yes**
5	Open-mindedness	**X**	**X**	**X**	**No**	**Yes**

Variables of Sociability and their Validation

- **Friendly nature, show friendliness, Cheerful:** These variables were found across all cases, and substantial evidence was also found both as cross-case analysis and validation process. It was pointed out by few subjects that in order to strengthen ties with other individuals and establish them in the first place, it is essential that entrepreneurs are cheerful and are friendly to others (S1, S3 and S4).
- **Open to criticism, Open-mindedness:** These variables emerged in all cases. I also found strong evidence for these variables and validated it too. The CEO pointed out that entrepreneurs should be open to criticism because if they do not accept criticism positively then won't be able to evaluate different aspects of the opportunities that they identify (S5). Other subjects also highlighted the significance of these variables. For example, it was said that entrepreneurs should be open-minded and feel comfortable around people because that would help them develop social capital vital for identifying new opportunities (S2 and S4).

Relationships of Sociability with other Factors: Sociability has been found to have a direct relationship with social capital which in turn leads to EOD. It is also affected by web technologies (see Figures 5.4).

Figure 5.4: Sociability relationship with other factors

5.7 Organisational Factors Cross-Case Assertions

This section presents nine factors categorised as organisational factors (an overarching concept) and their role in with interacting with other factors belonging to factors of other overarching concepts and the discovery of entrepreneurial opportunities. I also included additional data that I collected as a validation step and provided my reflections on the variables which were retained. I also provide information about the relationships that these factors have with other factors. Following sub-sections provide cross-case assertions (CCA) for each factor separately.

5.7.1. CCA for IT Infrastructure

IT infrastructure is an essential factor that belongs to an overarching concept of organisational factors. IT infrastructure emerged across all cases. Table 5.30 shows the list of variables for IT infrastructure factor. All variables were also validated.

Table 5.30: CCA for IT infrastructure

No.	Variables	Case A	Case B	Case C	Retained	Validated
1	IT resources	**X**	**X**	**X**	**No**	**Yes**
2	Networking technologies	**X**	**X**	**X**	**No**	**Yes**

3	Adapting new technologies	**X**	**X**	**X**	**No**	**Yes**
4	Computing servers	**X**	**X**	**X**	**No**	**Yes**
5	Cloud computing	**X**	**X**	**X**	**Yes**	**Yes**

Variables of IT Infrastructure and their Validation

- **IT resources, networking technologies, computing servers, Adapting new technologies:** These variables emerged in all cases. I also found strong evidence for these variables and validated them too. All the subjects pointed out the significance of this variable for an organisation to provide the necessary infrastructure for their employees involved in entrepreneurial activities to be able to find new opportunities. They reported that resources related to IT facilitate several significant actions and activates such as web-based brainstorming, entrepreneurial action, collaboration among employees and other stakeholders especially customers and partners and facilitate systematic searches made by the entrepreneurs (S1, S2, S3, S4, S5 and S6).
- **Cloud computing:** This variable was found across all cases, and substantial evidence was also found both as cross-case analysis and validation process. Because the organisations investigated in this research are all IT-based, they all were either having robust cloud computing infrastructure and parts of their processes are on the cloud. However, during the validation process, I retained this variable as no substantial evidence was found.

  Relationships of IT Infrastructure with other Factors. This factor has been found to have a direct relationship with systematic search, social capital, and readily available knowledge which in turn lead to EOD (see Figure 5.5).

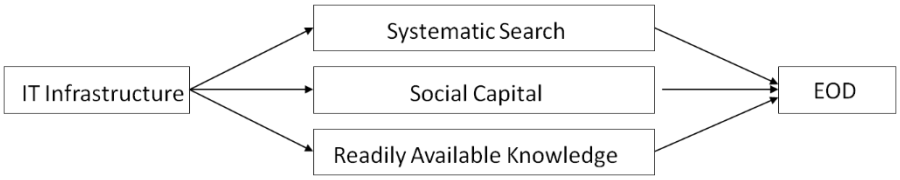

Figure 5.5: Relationship of IT Infrastructure with other factors

5.7.2. CCA for Systematic Search

Systematic search is an essential factor that belongs to an overarching concept of organisational factors. It emerged across all cases. Table 5.31 shows the list of variables for the systematic search factor. All variables were also validated.

Table 5.31: CCA for the systematic search

No.	Variables	Case A	Case B	Case C	Retained	Validated
1	Using technologies to find leads	**X**	**X**	**X**	**No**	**Yes**
2	Predictive analytics to find leads	**X**	**X**	**X**	**No**	**Yes**
3	Well thought searching	**X**	**X**	**X**	**No**	**Yes**
4	Planned searching for leads	**X**	**X**	**X**	**No**	**Yes**

Variables of Systematic Search and their Validation

- **Using technologies to find leads, Predictive analytics to find leads:** These variables emerged in all cases. I also found strong evidence for this variable and validated it too. Almost all subjects pointed out the significance of these variables. For example, a couple of the subjects reported that through systematic searches could be carried out manually, but the use of technologies could make this job far more comfortable as well as efficient (S1, S2, and S4).

⇨ **Well thought searching, planned to search for leads:** This variable emerged in all cases. I also found strong evidence for this variable and validated it too. The business development manager pointed out that organisations should encourage and mainly should have processes in place to facilitate their employees to carry out planning first before they start actual searches (S3).

Relationships of Systematic Search with other Factors: This factor has been found to have a direct relationship with systematic search EOD and affected by IT infrastructure and web technologies.

5.7.3. CCA for Social Capital

Social capital is an essential factor that belongs to the overarching concept of organisational factors. It emerged across all cases. Table 5.32 shows the list of variables for social capital factor. All variables were also validated.

Table 5.32: CCA for social capital

No.	Variables	Case A	Case B	Case C	Retained	Validated
1	Connections with people	**X**	**X**	**X**	**No**	**Yes**
2	Number of business friends	**X**	**X**	**X**	**No**	**Yes**
3	Business network	**X**	**X**	**X**	**No**	**Yes**
4	Strong Ties	**X**	**X**	**X**	**Yes**	**Yes**
5	Weak Ties	**X**	**X**	**X**	**Yes**	**Yes**
6	Selective relationships	**X**	**X**	**X**	**No**	**Yes**
7	Targeted relationships	**X**	**X**	**X**	**No**	**Yes**

Variables of Social Capital and their Validation

- **Connections with people, Number of business friends, Business network:** These variables emerged in all cases. I also found strong evidence for this variable and validated it too. All the subjects reported that organisation should have clear processes that focus on developing relationships with other organisations for potential partnerships and strategic alliances (S1, S2, S3, S4, S5 and S6).
- **Strong ties, Weak ties:** These variables were found across all cases, and substantial evidence was also found both as cross-case analysis and validation process. However, a couple of the subjects pointed out that strong ties are more important than weak ties (S2 and S6) while others said that weak ties broaden organisation's social network (S1, S3, S4, and S4). Therefore, I retained these variables.
- **Selective relationships, Targeted relationships:** This variable was found across all cases, and substantial evidence was also found both as cross-case analysis and validation process. All the subjects agreed that it was vital for organisations to develop relationships with selected clients, and organisations which were aligned with their strategic objectives (S1, S2, S3, S4, S5 and S6).

  Relationships of Social Capital with other Factors: This factor has been found to have a direct relationship with EOD and affected by IT infrastructure and sociability.

5.7.4. CCA for Market Reach

Market reach is an essential factor that belongs to an overarching concept of organisational factors. It emerged across all cases. Table 5.33 shows the list of variables for this factor. All variables were also validated.

Table 5.33: CCA for market reach						
No.	**Variables**	**Case A**	**Case B**	**Case C**	**Retained**	**Validated**
1	Sales Leads	**X**	**X**	**X**	**Yes**	**Yes**
2	Business Leads	**X**	**X**	**X**	**Yes**	**Yes**
3	Accessibility	**X**	**X**	**X**	**No**	**Yes**

Variables of Market Reach and their Validation

- **Sales leads, Business leads:** These variables were found across all cases. However, upon reflection and further analysis, I integrated these variables with finding new leads of entrepreneurial action factor of Individual factors.
- **Accessibility:** This variable was found across all cases, and substantial evidence was also found both as cross-case analysis and validation process. The business development manager pointed out that organisation should reach out to markets and make it possible for their employees to provide them with the necessary infrastructure to reach out the markets (S6).

  Relationships of Market Reach with other Factors: This factor has been found to have a direct relationship with EOD and affected by IT infrastructure and web technologies.

5.7.5. CCA for Research Collaboration

Research collaboration is also a vital factor that belongs to the overarching concept of organisational factors. It emerged across all cases. Table 5.34 shows the list of variables for research collaboration factor. All variables were also validated.

Table 5.34: CCA for research collaboration						
No.	**Variables**	**Case A**	**Case B**	**Case C**	**Retained**	**Validated**
1	Collaboration with partners	**X**	**X**	**X**	**No**	**Yes**
2	Collaboration with universities	**X**	**X**	**X**	**No**	**Yes**
3	Collaboration with research institutions	**X**	**X**	**X**	**No**	**Yes**
4	Working on collaborative projects	**X**	**X**	**X**	**No**	**Yes**
5	Collaboration with researchers	**X**	**X**	**X**	**No**	**Yes**
6	Involvement in research seminars	**X**	**X**	**X**	**No**	**Yes**

Variables of Research Collaboration and their Validation

- **Collaboration with partners, collaboration with universities, collaboration with research institutions, collaboration with researchers:** These variables were found across all cases, and substantial evidence was also found both as cross-case analysis and validation process. All the subjects highlighted the importance of research collaboration with other organisations external to an organisation (S1, S2, S3, S4, S5, and S6).
- **Working on collaborative projects:** This variable emerged in all cases. I also found strong evidence for this variable and validated it too. A couple of subjects explained that even if there are not formal collaborations with other organisations, there should be a willingness within the organisation to at least work on collaborative projects because it would help the

organisation to widen their strategic vision and benefit from the expertise found not found within the organisation (S5 and S6).

- ⇨ **Involvement in research seminars:** This variable emerged in all cases. I also found strong evidence for this variable and validated it too. The CRM manager pointed out that the easiest and most effective way that an organisation could use to establish research collaborations is through sending their employees to research seminars in other organisations as well as conduct such seminars within the organisation and invite external participants (S4).

Relationships of Research Collaboration with other Factors: This factor has been found to have a direct relationship with EOD and affected by IT infrastructure.

5.7.6. CCA for Human Capital

Human capital is an essential factor that belongs to the overarching concept of organisational factors. It emerged across all cases. Table 5.35 shows the list of variables for the human capital factor. All variables were also validated.

Table 5.35: CCA for human capital

No.	Variables	Case A	Case B	Case C	Retained	Validated
1	Number of employees	**X**	**X**	**X**	**Yes**	**Yes**
2	Number of qualified employees	**X**	**X**	**X**	**No**	**Yes**
3	Individual with diverse skills set	**X**	**X**	**X**	**No**	**Yes**
4	Personality of individuals	**X**	**X**	**X**	**No**	**Yes**
5	Individuals with diverse	**X**	**X**	**X**	**No**	**Yes**

	knowledge					

Variables of Human Capital and their Validation

- **Number of employees:** This variable was found across all cases. However, upon reflection, I retained this variable.
- **Number of qualified employees:** This variable emerged in all cases. I also found strong evidence for this variable and validated it too. All subjects reported that organisations should hire individuals very carefully especially the ones who would be involved in the entrepreneurial process and that they should be reasonably qualified (S1, S2, S3, S4, S5 and S6).
- **Individual with diverse skills set, Individuals with diverse knowledge:** These variables were found across all cases, and substantial evidence was also found both as cross-case analysis and validation process. It was highlighted that for EOD process to be efficient and productive; an organisation should hire individuals who possess a different set of skills because it would help them see more opportunities than the ones who possess the only limited set of skill and knowledge (S2 and S4).
- **Personality of individuals:** This variable emerged in all cases. I also found strong evidence for this variable and validated it too. The CRM manager stated that the personality of entrepreneurs was vital, particularly it should be aligned with that of organisational culture (S4). It was also highlighted further by the CEO who said, "Other skills can easily be learnt. However, if an individual's personality is not aligned with the organisation's culture, it would be hard for that individual to survive and be productive." (S5).

  Relationships of Human Capital with other Factors: This factor has been found to have a direct relationship with EOD.

5.7.7. CCA for Entrepreneurial culture

Entrepreneurial culture is an essential factor that belongs to the overarching concept of organisational factors. It emerged across all cases. Table 5.36 shows the list of variables for the entrepreneurial culture factor. All variables were also validated.

Table 5.36: CCA for entrepreneurial culture

No.	Variables	Case A	Case B	Case C	Retained	Validated
1	Using web technologies to share knowledge	**X**	**X**	**X**	**No**	**Yes**
2	Sharing knowledge	**X**	**X**	**X**	**No**	**Yes**
3	Physical setup	**X**	**X**	**X**	**No**	**Yes**
4	Physical resources	**X**	**X**	**X**	**No**	**Yes**
5	Positive organisational environment	**X**	**X**	**X**	**No**	**Yes**
6	Moral encouragement	**X**	**X**	**X**	**No**	**Yes**
7	Funky furniture	**X**	**X**	**X**	**No**	**Yes**

Variables of Entrepreneurial culture and their Validation

- **Using web technologies to share knowledge, sharing the knowledge:** These variables were found across all cases, and substantial evidence was also found both as cross-case analysis and validation process. It was pointed out by almost all the subjects that organisation should refined processes and resources in place that encourage and make it easy for employees to

share knowledge (S1, S2, and S6). It was also highlighted that senior employees should be encouraged to reply in a timely way to the queries by their junior colleagues (S3, S4, and S5).

- ⇨ **Physical setup, physical resources, and Funky furniture:** These variables also emerged across all cases, and substantial evidence was also found both as cross-case analysis and validation process. The CEO also pointed out that the physical appearance of an organisation played a significant role in enhancing their employees' creativity (S5).
- ⇨ **Positive organisational environment, Moral encouragement:** This variable was found across all cases, and substantial evidence was also found both as cross-case analysis and validation process. These variables were emphasised by almost all the subjects who stated that their employees did not feel any hesitation in expressing their ideas as they were encouraged and only positive criticism was passed to them (S1, S2, S3, S4 and S6).

Relationships of Entrepreneurial culture with other Factors: This factor has been found to have a direct relationship with various other factors such as entrepreneurial alertness, action, cognitive ability, imagination, divergent thinking, and the pursuit of continuous learning and EOD.

5.7.8. CCA for Occupational identities

Occupational identities are an essential factor that belongs to an overarching concept of organisational factors. It emerged across all cases. Table 5.37 shows the list of variables for roe identities factor. All variables were also validated.

Table 5.37: CCA for occupational identities

No.	Variables	Case A	Case B	Case C	Retained	Validated
1	Different Roles	**X**	**X**	**X**	**No**	**Yes**

2	Role allocations in different departments	**X**	**X**	**X**	**No**	**Yes**
3	Unique roles on a temporary basis	**X**	**X**	**X**	**No**	**Yes**
4	Expectations of the roles	**X**	**X**	**X**	**No**	**Yes**
5	Hypothetical roles	**X**	**X**	**X**	**No**	**Yes**
6	Changing Roles	**X**	**X**	**X**	**No**	**Yes**

Variables of Occupational identities and their Validation

- **Different roles, Role allocations in different departments, Hypothetical roles, changing roles:** These variables were emerged in cases B and C. However, upon reflection and revisiting case A, strong evidence was found across all cases. All the subjects also reported that allocating different roles to individuals responsible for finding new business leads, broaden their vision and enhances the breadth of knowledge that would make them more productive at finding new opportunities (S1, S2, S3, S4, S5 and S6).
- **Unique roles on a temporary basis:** This variable was found across all cases, and substantial evidence was also found both as cross-case analysis and validation process. The business development manager pointed out that organisations should assign their employees involved in the entrepreneurial process different roles on a temporary basis because that approach would enrich their knowledge base (S6).
- **Expectations of the roles:** This variable emerged in all cases. I also found strong evidence for this variable and validated it too. The ICT manager explained that it was vital that employees

were clearly explained to what was their job roles and what were the expectations that they needed to fulfil (S2) because it would make them more productive.

Relationships of Occupational identities with other Factors: This factor has been found to have a direct relationship with entrepreneurial alertness, cognitive ability and divergent thinking.

5.7.9. CCA for Readily Available Knowledge

Readily available knowledge is an essential factor that belongs to an overarching concept of organisational factors. Its infrastructure emerged across all cases. Table 5.38 shows the list of variables for this factor. All variables were also validated.

Table 5.38: CCA for readily available knowledge

No.	Variables	Case A	Case B	Case C	Retained	Validated
1	E_library	**X**	**X**	**X**	**No**	**Yes**
2	Access to internal Knowledgebase	**X**	**X**	**X**	**No**	**Yes**
3	Access to external sources of knowledge	**X**	**X**	**X**	**No**	**Yes**
4	Instant messaging to share knowledge	**X**	**X**	**X**	**No**	**Yes**
5	Availability of staff to share knowledge	**X**	**X**	**X**	**No**	**Yes**

Variables of Readily Available Knowledge and their Validation

- **E_library, Access to the internal knowledge base, access to external sources of knowledge:** These variables were initially emerged in cases B and C. However, further reflection and revisiting of case A provided evidence for these variables. All subjects pointed out to the significance of access to internal and external knowledge sources to their all employees especially who were involved in the entrepreneurial process (S1, S2, S3, S4, S5 and S6).
- **Instant messaging to share knowledge:** This variable was found across all cases, and substantial evidence was also found both as cross-case analysis and validation process. The ICT manager stated that they in their organisation had introduced internally developed instant messaging service to their employees which they could use to contact their colleagues and share their knowledge instantly (S2).
- **Availability of staff to share knowledge:** This variable emerged in all cases. I also found strong evidence for this variable and validated it too. The CEO mentioned that they encouraged their entire staff member to share their knowledge with their colleagues (S5).

  Relationships of Readily Available Knowledge with other Factors: This factor has been found to have a direct relationship with EOD and affected by IT infrastructure.

5.8 Environmental Factors Cross-Case Assertions

This section presents one factor categorised as an environmental factor (an overarching concept) and its role in with interacting with other factors belonging to factors of other overarching concepts and the discovery of entrepreneurial opportunities. I also included additional data that I collect as a validation step and also provided my reflections on the variables which were retained. I also provide information about the relationships that these factors have with other factors. Following sub-sections provide cross-case assertions (CCA) for each factor separately.

5.8.1. CCA for External Pressure

External pressure is an essential factor that belongs to an overarching concept of environmental factor. It emerged across all cases. Table 5.39 shows the list of variables for external pressure factor. All variables were also validated.

Table 5.39: CCA for external pressure

No.	Variables	Case A	Case B	Case C	Retained	Validated
1	Pressure from customers	**X**	**X**	**X**	**No**	**Yes**
2	Customers' feedback	**X**	**X**	**X**	**No**	**Yes**
3	Partners' feedback	**X**	**X**	**X**	**No**	**Yes**
4	Pressure from shareholders	**X**	**X**	**X**	**No**	**Yes**
5	Pressure from the executive board	**X**	**X**	**X**	**No**	**Yes**
6	Pressure from competitors	**X**	**X**	**X**	**No**	**Yes**
7	Use of new techs by competitors	**X**	**X**	**X**	**No**	**Yes**
8	Social climate	**X**	**X**	**X**	**No**	**Yes**
9	Government decisions	**X**	**X**	**X**	**No**	**Yes**
10	New policies	**X**	**X**	**X**	**No**	**Yes**
11	Local trends	**X**	**X**	**X**	**No**	**Yes**
12	External circumstances	**X**	**X**	**X**	**No**	**Yes**

Variables of External Pressure and their Validation

- **Pressure from customers, Customers' feedback:** These variables were found across all cases, and substantial evidence was also found both as cross-case analysis and validation process. The business development manager mentioned we perceive feedback from customers positively and it had led to improving them their several processes (S6). It was also highlighted by the business innovation manager criticism from their customers could point out to the deficiencies in the existing processes (S3).

- **Pressure from Shareholders, Partners' feedback, Pressure from the executive board, Pressure from competitors, use of new techs by competitors:** These variables emerged from all the cases, and strong evidence was also found in both cross-case analysis and validation process. The CEO explained that if an organisation had a refined process to deal with concerns and complaints from their partners, it would help an organisation to innovate to improve existing processes (S5). The business development manager also explained that observing one's competitor's progress closely could help an organisation to improve (S6). The business innovation manager further highlighted this by saying, "When your competitors start adopting new technologies, you should start considering the implications of such adoption." (S3).
- **Social climate, Local trends, External circumstances:** These variables emerged in all cases. I also found strong evidence for this variable and validated it too. All subjects reported that external circumstances such as social trends both locally and internationally were significant for an organisation to look for new opportunities (S1, S2, S3, S4, S5 and S6).
- **Government decisions, New policies:** This variable was found across all cases, and substantial evidence was also found both as cross-case analysis and validation process. Like the external circumstances and social climate, the subjects pointed out that sometimes

governments' decision and their policies made organisations respond in ways that help them innovate (S3 and S6).

Relationships of External Pressure with other Factors: This factor has been found to have a direct relationship with EOD.

5.9 Web Technologies as Enabler Cross-Case Assertions

This section presents web technologies as an enabler of certain factors that belong to other overarching concepts (e.g., Individual factors and organisational factors). I also included additional data that I collected as a validation step. I also provide information about the relationships that web technologies with other factors. Following paragraphs provide an overall cross-case assertion (CCA) for web technologies as an enabler of Entrepreneurial alertness, Pursuit of continuous learning, Collaboration among employees and stakeholders, Market reach, Entrepreneurial culture, Systematic search, Readily available knowledge, and Sociability.

Validation of Web Technologies as Enabler of Various Factors

All subjects reported that web technologies could be used to facilitate the acquisition of knowledge, pursuit of continuous learning as well as enhancing entrepreneur's alertness in identifying new opportunities (S1, S2, S3, S4, S5 and S6). Notably, the business innovation manager pointed out those web technologies could improve the quality of collaboration among various stakeholders (S3). The digital marketing manager reported that web technologies could improve an organisation's ability to reach out to new markets (S1).

Table 5.40 provides a summary of the relationships between factors.

Table 5.40: Summary of Relationships between Factors

Overarching Concept	Cross-case factor	Links	Construct 2 (to)

Individual factors	Entrepreneurial Alertness	→	EOD
	Prior Knowledge	→	EOD
	Entrepreneurial Action	→	EOD
	Cognitive Ability	→	EOD
	Risk Taker	→	EOD
	Imagination	→	EOD
	Divergent Thinking	→	EOD
	Entrepreneurial Perception	→	EOD
	Pursuit of Continuous Learning	→	EOD
	Social Ability	→	Social Capital
	Leadership	→	EOD
Organisational Factors	Systematic Search	→	EOD
	Social Capital	→	EOD
	Collaboration	→	EOD
	Market Reach	→	EOD
	Occupational identities	→	Entrepreneurial Alertness
	Occupational identities	→	Cognitive Ability

	Occupational identities	→	Divergent Thinking
	IT Infrastructure	→	Systematic Search
	IT Infrastructure	→	Social Capital
	IT Infrastructure	→	Readily Available Knowledge
	Entrepreneurial culture	→	Entrepreneurial Alertness
	Entrepreneurial culture	→	Entrepreneurial Action
	Entrepreneurial culture	→	Cognitive Ability
	Entrepreneurial culture	→	Imagination
	Entrepreneurial culture	→	Divergent Thinking
	Entrepreneurial culture	→	Engaged in Continuous Learning
	Human Capital	→	Web Technologies
Environmental Factors	External Factors	→	EOD
Web Technologies	Web Technologies	→	EOD
	Web Technologies	→	Prior Knowledge
	Web Technologies	→	Pursuit of Continuous Learning
	Web Technologies	→	Collaboration
	Web Technologies	→	Entrepreneurial Alertness

	Web Technologies	→	Systematic Search
	Web Technologies	→	Readily available Knowledge
	Web Technologies	→	Sociability
	Web Technologies	→	Market Reach

5.10 Positioning Findings Within the Literature

This section discusses the inductive findings achieved from the multiple case study investigation within the existing literature. Comparison of predicted patterns and/or effects (between existing literature and the ones that have been observed in the case study) will be involved here. Moreover, any variance or gap should be identified. By doing so, the results of these processes enabled the formulation of the contributions of this research to the existing knowledge base.

Factors, variables, and links (enriched by thick descriptions) which influence entrepreneurial opportunity discovery emerge by inductive reasoning and qualitative approach. Their aggregation leads to a model in which drivers of entrepreneurial opportunity discovery could be outlined as well as the relationship and links between them. However, some of the aspects emerged were already tackled or mentioned in the broader literature. Thus, following the methodology employed, findings from this research will be compared with the existing literature. Here, an extension of the concepts and factors is proposed from the thick descriptions emerged from this research.

5.10.1. Positioning Individual Factors

This section focuses on positioning cross-case analysis related to Individual factors within the existing entrepreneurial opportunity discovery literature. A paragraph for each factor that belongs to Individual factors defined is proposed. In line with prior research, several characteristics of

entrepreneurs that are deemed necessary for their ability to help entrepreneurs identify new entrepreneurial opportunities. These characteristics include creativity, risk-taking, entrepreneurial alertness, and diverse skill set etc. (Ardichvili et al., 2003; Baron, 2006; Garg et al., 2011).

(1) Entrepreneurial Alertness

Concerning entrepreneurial alertness influencing entrepreneurial opportunity discovery, some related considerations were found in the current literature. The literature acknowledges that alertness inspires an individual to acquire knowledge and search for opportunities which in turn lead to EOD (Webb et al., 2011). Entrepreneurial alertness is the antecedent of EOD which can lead to EOD (Miao and Liu, 2010; Ardichvili et al., 2003; Alvarez and Busenitz, 2001). Thus, the involvement of entrepreneurial alertness is vital for EOD (Baron and Ensley, 2006; Baron, 2006).

(2) Prior Knowledge

As a factor, prior knowledge has been extensively acknowledged in the extensive entrepreneurial opportunity discovery literature to-date. The existing literature provides a framework that prior knowledge may be used as a guide to discover and exploit opportunities (Shane and Venkataraman, 2000). Also, according to Shane (2000), differences in prior information affect the ability of EOD, which means some individuals are better at EOD than others due to their prior knowledge and ability to evaluate information critically (Fiet, 1996). Thus, prior knowledge positively affects EOD (Sanz-Velasco, 2006; Oyson and Whittaker, 2015).

(3) Entrepreneurial Action

Concerning entrepreneurial action as a further factor that influences entrepreneurial opportunity discovery, only a few studies shed light on this issue. Thus, some contributions emerge here to highlight the importance of entrepreneurial action.

(4) Cognitive Ability

According to the findings of this research, it seems that literature that focuses on Individual factors of entrepreneurs agrees that cognition and effect are two significant components of Individual factors that steer entrepreneurs towards the identification of new entrepreneurial opportunities (Baron, 1998; Gregoireet al., 2001). Furthermore, Baron and Ensley (2006) promote the idea that refined cognitive frameworks can help identify opportunities, which echoes to the finding that better cognitive ability leads to EOD (Alvarea and Bysenitz, 2001).

(5) Risk Taker

Prior research on EOD points out several characteristics of entrepreneurs that are deemed necessary for their ability to help entrepreneurs identify new entrepreneurial opportunities. In line with prior research, Baron (2006) reports that risk-taking individuals are more capable of seeing the bigger picture of opportunities that the ones who tend not to take the risk.

(6) Imagination

The characteristics of entrepreneurs that are essential for EOD include creativity. Similarly, creativity and intelligence are vital for EOD (Nicolaou et al., 2009). Oyson and Whittaker (2015) reports; entrepreneurial imagination leads to the discovery of entrepreneurial opportunities.

(7) Divergent Thinking

From data analysis in the single and cross-case study, I found that when individuals through divergent thinking generate creative ideas by exploring many possible solutions, it can lead to high levels of EOD.

(8) Entrepreneurial Perception

The literature only acknowledges that entrepreneurial judgment would lead to EOD (Mahnke et al., 2007), although there is little research on the entrepreneurial perception and EOD. This is one of the contributions of this research. I draw evidence from the data by cross-case analysis that entrepreneurial perception has a positive relationship with EOD.

(9) Pursuit of Continuous Learning

Concerning learning factors influencing the discovery of entrepreneurial opportunity, some related considerations were found in the current literature, while most of them focus on prior knowledge. My research finding shed light on the positive relationship between continuous learning engagement and EOD. By data analysing, I found high levels of continuous learning engagement lead to higher EOD.

5.10.2. Organisational Factors

Concerning organisational factors influencing the discovery of entrepreneurial opportunities, some related considerations were found in the current literature. Organisational factors are essential factors necessary for EOD. The findings of the literature review carried out for the current research suggest that systematic search, collaboration, social capital, market reach is at the core of discovering entrepreneurial opportunities (Garcia-Cabrera and Garcia-Soto, 2009; McKelvey et al., 2015; Westhead et al., 2009). Each factor is discussed below.

(1) Systematic Search

The importance of systematic search is acknowledged in the entrepreneurial opportunity literature (Shepherd and Levesque, 2002). When individuals or firms engage in discovering new opportunities using systematic search, the probability of finding new opportunities increases (Zahra et al., 2009). Patel and Fiet (2009) when proposing a framework of actors involved in the entrepreneurial

opportunity discovery process, highlight the importance of systematic search, suggesting a systematic search has a direct effect on EOD.

(2) Research Collaboration

The investigation of what factors are needed to develop entrepreneurial opportunity discovery is essential in this academic conversation. Perkmann et al. (2013) highlight the academic engagement with industry would lead to EOD. The importance of research collaboration with other firms has also been stressed since it would enhance the capability of a firm to identify opportunities (McKelvey et al., 2015).

(3) Social Capital

Regarding organisational factors, social capital is another critical factor that positively influences EOD (Ardichvili et al., 2003; Baron, 2006; Garcia-Cabrera and Garcia-Soto, 2009). Social capital can benefit entrepreneurs with the resources that they are lacking, which can be crucial for the process of entrepreneurial opportunity discovery (Fuentes et al., 2010). Social capital can also enrich entrepreneur's knowledge by harnessing them with information (Alvarez and Busenitz, 2001) as well as providing them with mentors, informal networks and professional forums that are positively linked with EOD (Ozgen and Baron, 2007).

(4) Market Reach

This factor emerged from the case analysis concerning entrepreneurial opportunity discovery. Market reach is believed to be precisely discussed in the data. Moreover, this is one of the contributions of this research through cross-case analysis.

5.10.3. Environmental Factors

Environmental factors are believed to be widely researched in the entrepreneurial opportunity discovery literature. In this specific academic conversation, Webb et al. (2015) argue that technological advancements, as well as external environmental factors, lead to better EOD. Tang (2010) suggests that the entrepreneurial environment moderates the relationship between EOD and personal traits.

(1). External Pressure

The concept of external pressure concerning EOD is not new. When talking about environmental factors, Zhu and Lin (2015) argued that external pressure would affect EOD. External factors can originate from competitors, customers and government, especially when new technologies are brought into organisations.

5.10.4. Web Technologies as Enabler

In most of the studies on entrepreneurial opportunity discovery, the characteristics of such web technologies were found to influence the EOD process. This extensive data and information accumulated on the web can be exploited by companies to find entrepreneurial opportunities (Karakas and Manisaligil, 2012; Jia et al., 2017; Richter et al., 2017), which offers several new avenues to explore entrepreneurial opportunities.

5.11. Proposed Conceptual Model

Figure 5.6 presents the proposed conceptual model based on the cross-case analysis presented in this chapter.

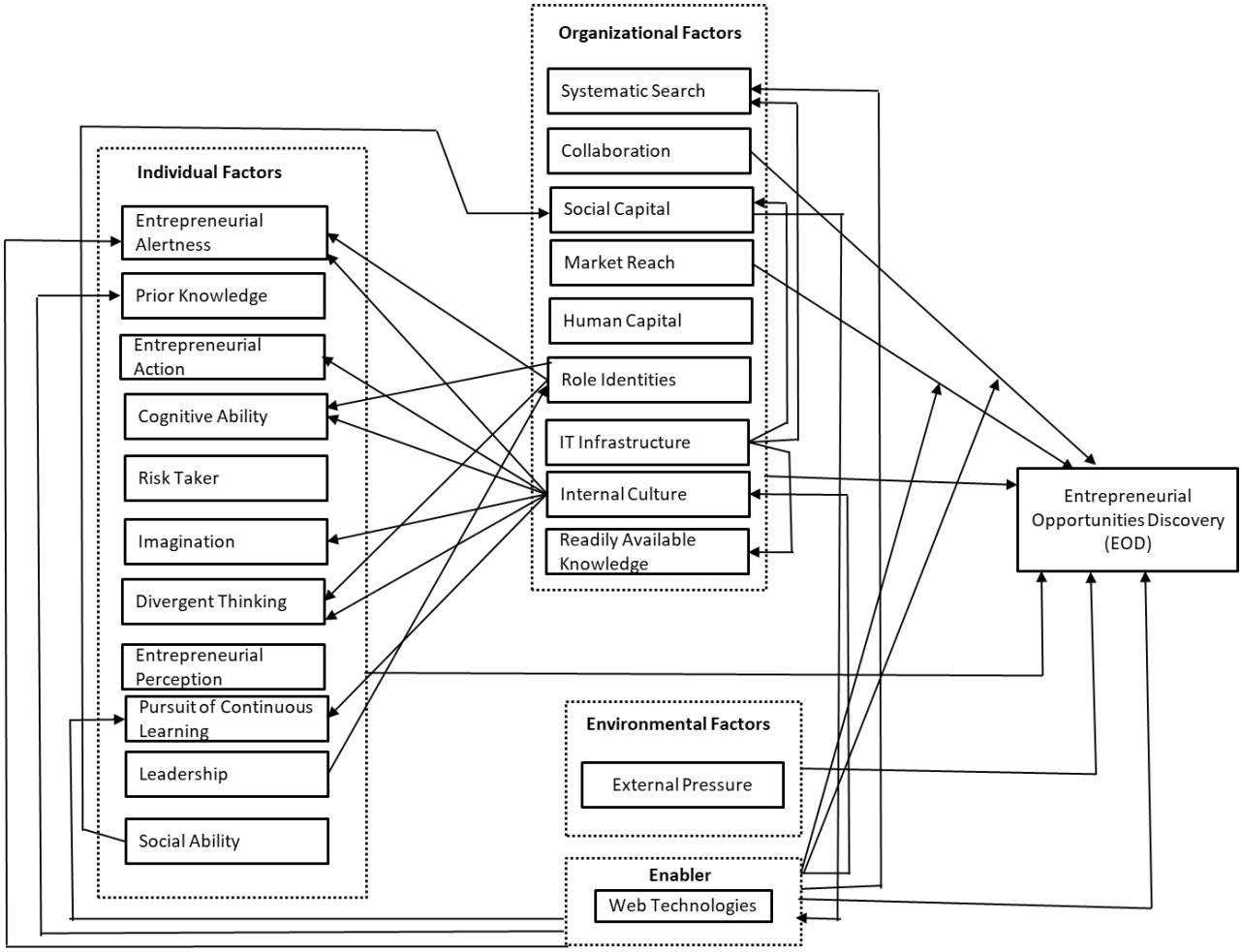

Figure 5.6: The Proposed Conceptual Model

The inter-relational dynamics are exhibited in proposed conceptual model. In light of conversation in Chapter 5, I propose, the relationship between sub-factors in individual factors, organisational factors, environmental factors and web technologies enabler factors, contribute to entrepreneurial opportunities discovery. The relationship between sub-factors can be one to one or one to many such as external pressure lead to entrepreneurial opportunities discovery. While internal culture leads to pursuit of continuous learning and divergent thinking. I propose organisational factors such as role identities, among others, affect individual factors i.e. role identities lead to divergent thinking, cognitive ability and entrepreneurial alertness. I propose web technologies are direct enabler of many factors and act as a mediator in others. Web technologies are enabler of pursuit of continuous learning and systematic search, among others, and as a result lead to entrepreneurial

opportunities discovery. While they act as a mediator on organisational factors such as market reach and collaboration.

Following section extends discussion based on this conceptual model and presents research contributions.

6. DISCUSSION AND CONCLUSION

6.1. Introduction

This thesis examines the factors that contribute to entrepreneurial opportunities discovery (EOD) in technology-based organisations as well as the role of web technologies for EOD in those organisations. There is limited research that investigates the factors contributing to EOD in technology-based organisations particularly organisations that extensively use web technologies. Therefore, I used a multi-case qualitative in-depth case study approach to investigate the phenomena. I conducted a systematic literature review to ensure most of the existing literature was reviewed. Based on the findings of the systematic literature review I then developed a tentative conceptual framework which was partially used as a lens for data collection and analysis. I collected data from three different sources mainly interviews, observations and organisational documentation. The analysis of the data resulted in a proposed conceptual model (see section 5.11).

I conclude in the light of the results presented in Chapters 4 and 5 and the context of extant literature related to the subject area. I discuss theoretical and practical contributions of this thesis by paying attention to confirmatory findings and new insights. Finally, I discuss several limitations of the current research and identify future research directions.

6.2. Discussion

I developed a tentative conceptual framework (Eisenhardt, 1989) for this study (Figure 2.2, p.44) derived from the entrepreneurial opportunity discovery research stream (Ardichvili et al., 2003; George et al. 2016; Shane, 2000; Shane and Venkataraman, 2000). Eisenhardt (1989) suggests that a "priori specification of constructs" may help the researcher to "measure constructs more accurately" (p. 536). The tentative conceptual framework revealed several factors related to Individual factors, organisational factors, environmental factors and enabling role of web technologies for EOD, as described in Chapter 2.

6.2.1. Confirmatory Findings

A review of the results provided in Table 6.1 shows that all the factors of the tentative conceptual framework identified from the extant literature were supported.

Table 6.1. Confirmatory Findings - support for factors of the tentative conceptual framework

Overarching Factor	Sub-factors	Relationship with EOD
Organisational Factors	IT Infrastructure	IT Infrastructure --> EOD
	Social Capital	Social Capital --> EOD
	Systematic Search	Systematic Search --> EOD
Individual Factors	Entrepreneurial Alertness	Entrepreneurial Alertness --> EOD
	Prior Knowledge	Prior Knowledge --> EOD
	Leadership	Leadership --> EOD
	Risk Taker	Risk Taker --> EOD
Environmental Factors	External Pressure	External Pressure--> EOD
Web Technologies as Enabler	Web Technologies--> Systematic Search	

	Web Technologies--> Entrepreneurial Alertness
	Web Technologies--> Prior Knowledge
	Web Technologies--> EOD

In the following paragraphs, I discuss the link between factors of confirmatory results and prior literature. The systematic literature review (SLR) indicates that several organisational factors are critical for EOD. These factors include IT infrastructure, social capital and systematic search (Garcia-Cabrera and Garcia-Soto, 2009; McKelvey et al., 2017; Westhead et al., 2009). For example, the importance of systematic search is acknowledged in the entrepreneurial opportunity literature (Shepherd and Levesque, 2002; Zahra et al., 2009). I found that, for technology-based organisations, use of web technologies plays an enabling role in facilitating a systematic search. Consistent with prior research (e.g., Ardichvili et al., 2003; Baron, 2006; Garcia-Cabrera and Garcia-Soto, 2009), I also found that social capital positively influences EOD. Social capital can benefit entrepreneurs with the resources that they are lacking, which can be crucial for the process of entrepreneurial opportunity discovery (Fuentes et al., 2010). Similarly, consistent with prior research (e.g., Ragowsky et al. 2012; Zhu and Lin, 2015) IT infrastructure found to be an essential factor for EOD.

In line with prior research (Ardichvili et al., 2003; Baron, 2006; Garg et al., 2011), I found several Individual factors of entrepreneurs that positively affect their ability to identify entrepreneurial opportunities. These characteristics include entrepreneurial alertness, prior knowledge, leadership, and risk taker. Prior knowledge has been extensively acknowledged in the entrepreneurial opportunity discovery literature to-date. Shane and Venkataraman (2000) suggest that prior knowledge can be used as a guide to discover and exploit opportunities. Moreover, according to Shane (2000), differences in prior information affect the ability of entrepreneurs to identify new opportunities. The results of this current research contribute to the body of knowledge by proposing that knowledge of anticipated customers' needs and means to satisfy those needs can lead to the

identification of new opportunities (see section 6.2.2.5). Similarly, consistent with prior research (e.g., Gregoireet al., 2010; Baron, 2006), I found a positive relationship between cognitive ability and risk-taking traits and EOD.

The results of the present research also indicate that environmental factor such as external pressure leads to better EOD, a finding that is consistent with prior research (e.g., Webb et al. 2011). This finding contributes to the discussion of external institutional pressures reported in prior research of institutional theory (DiMaggio and Powell, 1983). According to this perspective, we can say that technology-based organisations face mimetic and coercive pressures. Mimetic pressure refers to the external pressure that causes an organisation to make changes to adopt new technologies in order to avoid uncertainty. In the context of technology-based organisations and particularly when web technologies are involved, it becomes inevitable for such organisations to adopt popular web technology. The reason is the external pressure coming from their customers and the fear of lagging behind because their competitors have already adopted such technologies. For example, almost all organisations provide customers several points of contact such as phone, email, online chat (available 24/7) and chatbots. Similarly, external pressure also comes from coercive pressure. Coercive pressure comes from members of society because of shifting expectations influenced by changing cultural norms (Barley and Tolbert, 1997). For example, social networking platforms have led to the establishment of new cultural norms such as instant messaging, and photo and video sharing. Technology-based organisations have to fulfil their customers' expectations and bring innovation in to their processes to serve the changing needs of their customers. A recent example of coercive pressure is a monetary fine of 2.4bn Euros by the European Union (EU) over Google's search engine results (The Gauardian, 2017). Google used to give priority to the online shops affiliated with it. However, because of that coercive pressure from the EU, it had to change its algorithms. Moreover, other external pressures can also affect organisations' innovativeness. For example, prior research suggests that organisations which are accountable to external stakeholders can be more affected by external factors of different sorts, such as pressure from investors and

shareholders as compared to the organisations that are not accountable to external stakeholders (Barley and Tolbert, 1997).

6.2.2 New Theoretical Insights

The following sections provide a detailed discussion of new theoretical insights, their position in the relevant literature and how these findings extend relevant literature and/or contribute to the theory (ies) of entrepreneurship in general and theory of entrepreneurial opportunities discovery in particular. Table 6.2 provides a summary of new theoretical insights of this research.

Table 6.2: Summary of the theoretical contribution of this research

No.	New theoretical construct	Theory to which contribution is made?	Literature to which contribution is made	Specific theoretical contribution
1	Occupational identities	Theory of occupational identity (Leavitt et al., 2012)	Baron, 2007; Begley and Boyd, 1987; Cardon et al. 2009; Fauchantand Gruber, 2011	This finding suggests that assigning different occupational identities to the same individual would positively influence his/her ability to find new entrepreneurial opportunities.
2	Entrepreneurial perception	Theory of entrepreneurial perception (Long, and McMullan, 1984)	Long, and McMullan, 1984	This research extends the theory of entrepreneurial perception by identifying several important variables for entrepreneurial perception such as entrepreneurs' ability to perceive their

				surroundings, reflect on new information, understand strategic planning and entrepreneurs' hands-on understanding of technologies.This research also confirms the findings of Zhu and Lin (2015) that experience is vital for entrepreneurial perception. It extends prior work by suggesting that, for a technology-based organisation, it is essential that individuals involved in entrepreneurial activities should have a hands-on understanding of the technologies being used in the organisation.
3	Entrepreneurial culture	Entrepreneurial culture (Ireland et al., 2003)	Ireland et al., (2003); Dess and Picken, (1999)	This finding suggests that the entrepreneurial culture of an organisation is a multi-dimension factor. Specifically, it suggests that dimensions such as physical spaces within an organisation, the processes around moral encouragement and regular design

				thinking workshops, all play a vital role in facilitating entrepreneurs to find new opportunities.
4	Divergent thinking	Theory of entrepreneurial cognition (Mitchell, et al. 2007)	Mitchell, el. al. (2007)	This finding suggests a relationship between divergent thinking, entrepreneurial culture and occupational identities as such that both entrepreneurial culture and occupations designations positively influence divergent thinking.
5	Knowledge of; Anticipated customers' needs; anticipated ways to satisfy customers' needs; demographic changes	Theory of prior knowledge (Shane, 2003)	Oyson and Whittaker, (2015); Shane, (2003); Shane and Venkataraman (2000);	This finding proposes three new factors that make important components of prior knowledge, not studied previously –knowledge of anticipated customers' needs, anticipated means to satisfy customers' needs and knowledge of demographic changes.
6	Entrepreneurial Action	Theory of global competitiveness (Zahra, 1999)	Zahra, (1999)	This finding suggests that entrepreneurial action is a vital factor for organisations fully appreciate new opportunities and sustain their competitiveness.
7	Readily	Resource-based theory	Alvarez	This finding suggests that

	available knowledge	(Alvarez and Busenitz, 2001).	andBusenitz (2001).	organisations can increase the number of new opportunities that can be identified by making knowledge bases readily available.
8	Pursuit of continuous learning	Theory of active learning for entrepreneurship (Morgan, 1997)	Cohen and Leyinthal, (1990); Hurley and Hult, (1998); Morgan et al., (1998)	This finding suggests a positive relationship between the continuity of the active learning and identification of new opportunities.
9	Diversity of Individuals' skills sets	Theory of human capital and the discovery of entrepreneurial opportunities (EisenhardtandSchoonhoven, 1990)	Eisenhardtand Schoonhoven (1990)	This finding suggests that, for technology-based organisations, diversity of individual skill set of team members involved in entrepreneurial processes moderates the relationship between teams' ability to identify new opportunities and the number of opportunities they identify. The higher levels of diversity of skill set of the teams' members will lead to the higher levels of the number of opportunities that teams identify.
11	Web technologies as an enabler of		Boyles, (2011); Chang, (2012); Chau and Xu,	Web technologies were found to be influencing the discovery of

	EOD		(2012); Chen, (2005); Eijkman, (2010); Karakas and Manisaligil, (2012); Lim et al., (2011)	entrepreneurial discovery either directly or indirectly (i.e., by influencing other factors necessary for EOD such as playing a moderating role between organisational factors and EOD and antecedents of certain Individual factors).

6.2.2.1 Plural Occupational Identities

This research contributes to the theory of plural occupational identities (e.g., Leavitt et al. 2012). Theory of plural occupational identities suggests that individuals wear different hats (i.e., engage in different occupational roles) and those hats influence their thinking and ability to identify entrepreneurial opportunities (Leavitt et al. 2012; LeBoeuf, Shafir and Bayuk, 2010).

Several studies have contributed to the theory of plural occupational identities. For example, prior research has argued that plural occupational identities can positively affect entrepreneurs' action and behaviour (Stets and Burke, 2000), passion and motivation (Cardon et al., 2009), determination to achieve goals (Mosakowski and Cardon, in press) and even entrepreneurial alertness (Haynie et al., 2009; McMullen and Shepherd, 2006). However, there is little research that has investigated the role of plural occupational identities on cognition and thinking.

This research extends the theory of plural identities in two crucial ways. Firstly, the results suggest that plural occupational identities positively affect entrepreneurs' cognitive ability. Secondly, the findings also indicate that by assigning multiple occupational identities to entrepreneurs, their divergent thinking can be enhanced. Both of these factors - cognitively ability and divergent thinking- positively influence EOD.

In line with prior research on plural occupational identities (e.g., Leavitt et al. 2012; LeBoeuf et al., 2010), the results of the present research related also challenges the long-held opinion that entrepreneurs are different from others because of their individual attributes. The findings indicate that by assigning different occupational roles to the same individual, organisations can influence the thinking of the individual and it may lead her to identify more entrepreneurial opportunities than keeping her in the same occupational role.

6.2.2.2 Entrepreneurial Perception

The theory of entrepreneurial perception suggests that entrepreneurs develop subjective perceptions of the link between knowledge of available resources, ways they perceive their surroundings and services that can be provided using the knowledge of resources and their environment (McMullen and Shephard, 2006; Penrose, 1959). It further suggests that the creation of such links facilitate entrepreneurs in identifying new opportunities (Penrose, 1059; Tushman and O'Reilly, 1997) and requires entrepreneurs to have experience and develop specific psychological attributes (McMullen and Shephard, 2006; Randolph-Seng, Mitchell, Vahidnia, Mitchell, Chen, and Statzer, 2015).

Prior research has investigated the influence of experience related perception on the identification of entrepreneurial opportunities (see Zhu and Lin, 2015). However, our understanding of the factors of entrepreneurial perception from a psychological perspective is limited.

The findings of this research suggest that entrepreneurial perception is a multi-faceted factor. It further identifies several important variables for entrepreneurial perception - entrepreneurs' ability to perceive their surroundings, reflect on new information and understand strategic planning.

This research extends the theory of entrepreneurial perception by identifying several important variables for entrepreneurial perception such as entrepreneurs' ability to perceive their surroundings, reflect on new information, and understand strategic planning and entrepreneurs'

hands-on understanding of technologies. This research also confirms the findings of Zhu and Lin (2015) that experience is vital for entrepreneurial perception. It extends prior work by suggesting that, for a technology-based organisation, it is essential that individuals involved in entrepreneurial activities should have a hands-on understanding of the technologies being used in the organisation.

6.2.2.3 Entrepreneurial Culture

Entrepreneurial culture of an organisation is another vital organisational factor that positively influences the identification of entrepreneurial opportunities as found in this research. It seems that without an entrepreneurial environment, it would be hard for entrepreneurship within an organisation to flourish (Ireland et al., 2003). Prior research suggests that the entrepreneurial culture of an organisation is seen as a value system (Dess and Picken, 1999). This value system is shared by all workers of an organisation and particularly guides the structural arrangements of an organisation. Dess and Picken (1999) further elaborate that those structural arrangements focus on creating a physical environment that facilitates the process of EOD by providing entrepreneurs with necessary facilities and gadgets as well as have a positive influence on their mental health. They further pointed out that the value system also ensures that entrepreneurs are morally supported and encouraged and would not receive negative criticism. Prior research also reports that entrepreneurial culture of an organisation affects cognitive frameworks of its entrepreneurs which in turn affects their expectations of each other within the organisation (Benson, Johnson, and Kuchinle, 2002) and help them reinforce each other instead of working independently (Stevenson and Jarillo, 1990) and also facilitate their interactions with external stakeholders.

The main focus of investigating entrepreneurial culture has been either on national or regional culture or the relationship between national entrepreneurial culture and entrepreneurs' characteristics (see review by Hayton and Cacciotti, 2014). Some studies have investigated the relationship between entrepreneurial culture, regional innovativeness and economic growth

(Beugelsdijk, 2004). However, there is little research that investigates the entrepreneurial culture within an organisation and its influence on the identification of entrepreneurial opportunities. The results of the present research reveal several variables related to entrepreneurial culture within an organisation that can positively influence EOD either directly or indirectly. These variables include using web technologies to share knowledge, physical setup, physical resources, positive organisational environment, moral encouragement and use of funky furniture.

A significant theoretical contribution related to entrepreneurial culture is that it positively influences several other theoretical constructs that have been argued to be positively related to EOD. These constructs include entrepreneurial alertness, entrepreneurial action, cognitive ability, imagination, divergent thinking and engagement in continuous learning. The findings also reveal that there is a direct positive relationship between entrepreneurial culture and EOD.

6.2.2.4 Divergent thinking

According to the theory of entrepreneurial cognition, the cognitive ability of entrepreneurs is vital to help them put different pieces of information together (Mitchell et al., 2007). Linking different pieces of information together forms the basis of creativity and divergent thinking (Mufford et al. 1991; Sternberg, 2005). Divergent thinking has also been argued to be the end product of cognitive processes especially the processes involved in idea generation (Ward, 2007; Welling, 2007). Divergent thinking is referred to as individuals' ability to generate multiple ideas (Gallupe et al., 1992) and is considered a vital skill to identify opportunities (Scott et al., 2004).

Though prior research suggests that one can be trained in divergent thinking (Garfield, Taylor, Dennis and Satzinger, 2001), there is little research that investigates antecedents of divergent thinking. Prior research has either investigated divergent thinking as an independent variable (Gielnik et al., 2014), a moderator (Aggarwal and Helfat, 2009), or a mediator (Garfield et al., 2001).

Entrepreneurial orientation refers to an organisational attribute reflecting how being entrepreneurial is manifested in organisations or business units (Ismail et al., 2015; Miller, 2011). Prior research on entrepreneurial orientation suggest that cultural practices and decision-making activities lead to entrepreneurial attributes such as risk taking, divergent thinking, proactiveness, and out-of-the-box thinking (Covin and Lumpkin, 2011; Lumpkin and Dess, 1996; Miller, 1983). The results of the present research study indicate that entrepreneurial culture and plural occupational identities positively influence divergent thinking of entrepreneurs. That means organisations can improve their employees cognitive abilities to think out-of-the-box by making changes to their entrepreneurial culture as well as by involving them in different occupational roles.

6.2.2.5 Prior Knowledge: Knowledge of Anticipated Customers' Needs, Anticipated Means to Satisfy Customers' Needs and Demographic Changes

Theory of prior knowledge suggests that knowledge related variables are among the most critical variables for the identification of entrepreneurial opportunities (see George et al., 2014; Shane, 2000). Several prior knowledge related variables are positively associated with EOD such as market knowledge (Meiri and Umemoto, 2010); explicit and tacit knowledge (Marvel and Droege, 2010); experiential knowledge (Chiasson and Saunders, 2005); knowledge of social contexts (Cooper and Park, 2008); accumulated knowledge (Fiet, 1996); and innovation related knowledge (Kourilsky and Esfandiari, 1997), lead to the discovery of entrepreneurial opportunities.

However, research on the role of prior knowledge for technology-based organisations particularly the organisations that extensively use web technologies for entrepreneurial activities is limited.

The results of the present research study indicate several new factors related to prior knowledge that positively influence the discovery of entrepreneurial opportunities such as knowledge of anticipated customers' needs, anticipated means to satisfy customers' needs and demographic changes in the wider population.

Knowledge related variables revealed by the results of this research are important in general and in the context of this study in particular because rapid inventions of, and advancements in, web technologies lead to their countless applications affecting technology-based organisations mainly. Applications of these web technologies are disrupting the ways we work and live our lives. People sometimes are not aware of the fact that adopting specific technologies would lead to the creation of needs that they might not be aware of. For example, Apple introduced iPads which lead to the creation of a whole new industry. Tablets have now become a crucial part of many people's lives. Several start-ups came into being to fill the needs of tablet users such as website development companies responsible for the development of websites appropriate to the various sizes of tablets, covers for the tablets, chargers for the tablets to name a few. This whole industry came into existence because Apple anticipated the need for a tablet computer.

Another significant result of the present research is that, for technology-based organisations, it is becoming increasingly important to track the influence of technological advancements on the adoption of technologies by diverse age groups. This finding is consistent with prior research (e.g., Baron, 2006) that suggests that entrepreneurs can find new opportunities by tracking changes in the demographics as people of different age groups have different needs. Other studies have shown that identifying demographic changes happening at individual and national levels can also lead to the discovery of entrepreneurial opportunities (vanBurgetal et al., 2012).

6.2.2.6 Entrepreneurial Action

Entrepreneurial action refers to the initiatives that entrepreneurs take to introduce new services or products or innovations in the existing products or services (Santos and Eisenhardt, 2009). Entrepreneurs take such initiatives in response to internal or external stimuli (Wood and McKinley, 2010). Prior research categorise entrepreneurial action into three phases - opportunity search, evaluation and exploitation (Choi and Shepherd, 2004; Gruber et al., 2013; McMullen and Shepherd,

2006). This research only focuses on the "opportunity search" phase as the main focus of this research is on investigating the factors contributing to EOD and not opportunity evaluation or exploitation.

As part of the opportunity search phase of entrepreneurial action, prior research has examined several Individual factors necessary for entrepreneurial action to occur such as alertness (Kirzner, 1973) and prior knowledge (Gregoire et al., 2010; Shane, 2000). However, our understanding of how entrepreneurs come up with entrepreneurial ideas as part of the opportunity search phase of entrepreneurial action is limited (Hwang, 2014).

The results of the current research indicate that entrepreneurs' active involvement in creative events can enhance their ability to search for opportunities effectively. Another interesting finding is that the entrepreneurial culture of an organisation positively influences entrepreneurial action (e.g., the ability of entrepreneurs to effectively search opportunities). This is an exciting finding as it offers insights for the interplay between two overarching factors - Individual factors (i.e., entrepreneurial action) and organisational factors (i.e., entrepreneurial culture). This finding is also important because it challenges the long-held view that entrepreneurial opportunities are identified by entrepreneurs with particular subjective beliefs or qualities (McMullen and Shepherd, 2006). This finding, instead, offers a positive relationship between entrepreneurial culture and entrepreneurial action in line with research on entrepreneurial orientation (Covin and Lumpkin, 2011; Lumpkin and Dess, 1996).

6.2.2.7 Readily Available Knowledge

There is substantial research that argued the significance of knowledge for EOD (e.g., see George et al., 2016; Shane, 2000). However, to my knowledge, no study has investigated the importance of making knowledge readily available to the entrepreneur.

Prior research argues that if you take two entrepreneurs who possess the same amount of experience, qualification and knowledge, but facilitate one of them by providing relevant and needed knowledge to solve a specific problem by using technologies, it will enhance the ability of that entrepreneur to discover more opportunities as compared to the other (Frese, Krauss, Keith, Escher, and Friedrich, 2007). Minniti and Bygrave (2001) shed light on the psychological processes that lead to the superiority of readily available knowledge. They suggest that finding new opportunities is a result of creating new associations between new and old information in our minds. Our brain gives priority to the sets of information that are active and make them readily available to be used for further creation of associations leading to useful identification of solutions or opportunities.

This result is of particular significance for the context of this study - technology-based organisations. In technology-based organisations, entrepreneurs cannot be familiar with every situation in its entirety. For example, a new technological invention and the pressure of adopting such technology by the organisation can lead the entrepreneurs to think of ways that she might not have a good level of familiarity. In such cases, entrepreneurs tend to use approximation (Fiske and Taylor, 1991) - trying to apply their existing knowledge in a new situation- to adopt the technology into their existing business processes or to think of ways to exploit the usage of that technology to its optimal level. If organisations have some technological system in place that provides entrepreneurs with a permanent well-structured knowledge base that is readily available, it can significantly facilitate entrepreneurs to use their existing knowledge along with the new knowledge to solve the problems at hand.

6.2.2.8 Pursuit of continuous learning

Pursuit of continuous learning is another factor related to the overarching factor of Individual factors that were identified by the findings of this research. Prior research reports that organisations should

keep themselves and their employees engaged in active learning. This path is especially vital for all processes related to entrepreneurial activities (Cohen and Leyinthal, 1990; Hurley and Hult, 1998; Morgan et al., 1998). It further suggests that learning should involve senior employees sharing their knowledge with new employees, and providing employees with training opportunities, especially knowledge of new technologies.

6.2.2.9 Diversity of individuals' skills set

Human capital has always been considered an essential resource for organisations to progress and innovate (Gartner, 1985). However, for a technology-based organisation, it is crucial that teams involved in entrepreneurial processes comprise of individuals who possess a diverse set of skills (Gartner, 1985).

Diverse skills set of individuals equip them with different perspectives with which they can evaluate same technology differently. For example, at Massachusetts Institute of Technology (MIT), most of the technological inventions are presented to people from different backgrounds, knowledge and skills set and are asked to propose different ways that a particular technology can be exploited. There have been several cases when the high diversity among the attendees have led to the identification of a large number of ways in which a particular technology could be exploited. Eisenhardt and Schoonhoven (1990) have also argued that the higher the levels of diversity in a team's skill set, the higher would be the performance of that team in an assigned task. They further pointed out that high diversity of skills set is particularly important and useful for technology-based organisations. This was further stressed upon by Tushman and O'Reilly (1997) who elaborated that the number and quality of entrepreneurial opportunities can be enhanced if organisations comprise their entrepreneurial teams of individuals with a different set of skills and perspectives.

This finding is of particular importance for technology-based organisations that employ web technologies in their entrepreneurial process because the rapid invention of technologies and their

countless applications cannot only be absorbed by one individual. Therefore, I think organisations, by assigning different entrepreneurs to keep an eye on different sets of web technologies, would increase the chances that no new technology is missed.

6.2.2.10 Role of Web Technologies in the Discovery of Entrepreneurial Opportunities

Web technologies are increasingly being used by businesses especially technology-based companies. Web technologies have not only led to the most successful companies our planet has ever seen (e.g., Amazon, Google and Facebook), these technologies are also helping several other companies to improve their existing business processes. However, to my knowledge, there is scant research which investigates the influence of web technologies on the discovery of entrepreneurial opportunities. This research has addressed this research gap.

To my knowledge, no prior study has investigated the role of web technologies for the discovery of entrepreneurial opportunities directly. Moreover, the literature that has discussed the role of web technologies for an entrepreneurial process is dispersed and has only touched on the concept in a superficial way. Therefore, based on the findings of the systematic literature review (Chapter 2), I theorise the relationships between different web technologies and different EOD factors may influence the process of EOD either directly or indirectly.

However, the findings of this research provide a more elaborative view of the role of web technologies for EOD. The following sections provide a summary of the contributions of the research in this regard along with a discussion about what was found in prior literature.

The first theoretical contribution relates to the role of web technologies as an enabler of several vital factors that play a significant role in the EOD process. For example, one of the core factors necessary for EOD is knowledge (Shane, 2000). Web technologies appeared to be playing an efficient and active role in gathering knowledge about customers' needs and market trends in this research (Dutta et al., 2015; Eijkman, 2010; Kambil, 2008; Karakas and Manisaligil, 2012).

However, advancements in web technologies have led to the invention of several new web technologies such as web analytics, which can effectively be used to acquire knowledge about the anticipated needs of customers and markets – a phenomenon that has not been studied previously. I found that using web technologies; entrepreneurs can predict what would be the future needs of their customers. In doing so, they can think of ways those needs could be satisfied, leading to the identification of new opportunities.

Moreover, technology-based companies are increasingly using web technologies such as instant messaging to acquire such knowledge and let their employees share that knowledge among themselves instantly. Web technologies have also enabled organisations to reach out to their customers and markets in a way that were not possible before (Lim and Xavier, 2015; Lim et al., 2011). Such reach has led to the discovery of several new opportunities, by exploiting existing products and services in new contexts and cultures. Another critical factor that web technologies have enhanced is the quality of collaboration among an organisation's employees, and between an organisation and its customers and partners. Web technologies have enabled organisations to run real-time predictive analytics on customers' feedback that in turn help them understand their customers' needs better and also anticipate their future needs. It also helps organisations understand market trends quickly and conveniently. Apart from this, web technologies also influence several other factors such as entrepreneurial alertness, a pursuit of continuous learning entrepreneurial culture, systematic search, the sociability of employees and making the knowledge readily available to employees of organisations. For example, entrepreneurial alertness is one of the most important attributes of an entrepreneur that helps him/her identify new opportunities. One of the dimensions of entrepreneurial alertness is evaluating new information. Web technologies help entrepreneurs to use web analytics to evaluate web-based information to find out what's happening such as market trends and customers' problems. Similarly, the use of web technologies has made it possible for employees to instantly contact their colleagues and share their knowledge with them or

ask them for advice. Such instant knowledge sharing enabled by web technologies have facilitated organisations improve on their existing business processes.

6.3. Managerial and Policy Implications

This research study makes several managerial and policy contributions. The first managerial and policy contribution relates to selecting the type of personnel involved in the entrepreneurial process within an organisation. For example, the implication for technology-based organisation is that when hiring individuals who would be involved in an entrepreneurial process, it needs to consider evaluating the applicants if they can think out-of-the-box, have entrepreneurial imagination and are proactive. This, in line with evaluating other individual attributes such as entrepreneurial alertness and leadership skills. The organisations also need to have their employees acquire more knowledge and enhance their existing readily available knowledge base. This has implications on employees identifying anticipated needs of customers and the ways to satisfy those needs, among other entrepreneurial attributes. The findings of research study suggest that ready access to such knowledge-bases facilitate their entrepreneurs' cognitive frameworks, required to identify entrepreneurial opportunities.

The second managerial and contribution relates to improving the entrepreneurial culture of an organisation. The findings of this research suggest that organisations can increase the quality and quantity of identifying new opportunities by conducting design thinking type of seminars on a regular basis and making it necessary for their employees to participate in such actively. The findings also suggest that introduction of physical infrastructure such as funky furniture positively influences creativity and EOD. Organisations might need to re-evaluate the moral support of their employees. The implication is that they do not feel embarrassed if they make mistakes instead are encouraged to learn from mistakes and feel free to express their ideas and opinions.

The research findings suggest that knowledge of organisational resources and capabilities lead to the discovery of new opportunities. Therefore, organisations needs provide the necessary resources to their employees to engage them in the pursuit of continuous learning and make arrangements to retain such employees. Organisations also need to involve their employees in several different roles within their organisation to make them think differently and holistically. It has implication on coming up with reliable, high-quality entrepreneurial opportunities.

Third managerial and policy contribution relates to the approach of an organisation to external pressure. The findings of this research suggest that technology-based organisations perceive external pressure positively and many instances of such pressure considered as an opportunity to improve their business.

Finally, managerial and policy contribution relates to the advantages of using web technologies to not only facilitate several other important factors that influence the process of EOD but also that in some instances the use of web technologies may lead to the identification of new opportunities. For example, organisations allow their employees to use instant messaging to share knowledge among themselves as well as seek advice from their seniors on different issues. The implication of such messaging are not only numerous but they also trickle down from the leaders to the employees. Employee trust, productivity, and motivation get a boost; team-building and compliance turn stronger.

6.4. Limitations and Future Research Directions

This research has several limitations that should be considered when interpreting the findings. One such limitation - I investigated the managers' understanding of the influence of web technologies on EOD in technology-based organisations. However, there can be other organisations that use web

technologies but are not technology -based organisations. Therefore, the findings of this research can only be transferability to technology -based organisations.

The second limitation relates to the applied methodology. I adopted a qualitative multi-case study methodology which offered great in-depth insights given the fact that the phenomenon investigated here was new. However, case study methodology also put limits on the generalisability of the research findings as pointed out by Yin (2009). These findings are transferable to other contexts.

The third limitation of this research is that the data was cross-sectional, as individuals were interviewed just once and the longitudinal influence of the role of web technologies in discovering new entrepreneurial opportunities was not investigated.

Future research can investigate the role of web technologies in the discovery of entrepreneurial opportunities in other industrial settings apart from the technology-based industry.

Some studies have investigated the relationship between entrepreneurial culture, regional innovativeness and economic growth. However, there is little research that investigates the entrepreneurial culture within an organisation and its influence on EOD. Secondly, I did not investigate the belief system of sociocultural aspects of entrepreneurs and how such beliefs influence the involvement of entrepreneurs in the process of opportunities discovery. Future research can investigate those sociocultural aspects.

Future research can investigate the proposed conceptual model within technology-based organisation partly or wholly. Future research can explore how plural occupational identities can change over time and as a consequence the influence that might have on entrepreneurs' cognitive abilities, thinking and entrepreneurial alertness. Future research can also explore the influence of the hands-on understanding of web technologies of its entrepreneurs on their ability to identify new opportunities. Future research can investigate the role of various dimensions of entrepreneurial traits for the discovery of entrepreneurial opportunities. Questions as to whether these dimensions

have a direct relationship with EOD or if they act as mediators or moderators. Overall I believe this research provides a platform for further intellectual debate on the role of web technologies in the discovery of entrepreneurial opportunities.

7. REFERENCES

Abdelkafi, N. and Täuscher, K. (2016) 'Business Models for Sustainability: From a System Dynamics Perspective', *Journal of Organisation and Environment*, 29(1), pp. 74–96

Acs, Z. J., Braunerhjelm, P., Audretsch, D. B., and Carlsson, B. (2009). The knowledge spill over theory of entrepreneurship. *Small Business Economics*, 32(1), pp.15–30.

Agarwal, R. and Helfat, C.E. (2009) Strategic Renewal of Organisations. *Organisation Science*, 20 (2). pp. 281–293.

Aldrich, H. E., and Cliff, J. E. (2003). The pervasive effects of family on entrepreneurship: toward a family embeddedness perspective. *Journal of Business Venturing*, 18(5), pp.573–596.

Allport, G.W., 1962. The general and the unique in psychological science. *Journal of personality*, 30(3), pp.405-422.

Alvarez, S. A., and Barney, J. B. (2010). Entrepreneurship and epistemology: the philosophical underpinnings of the study of entrepreneurial opportunities. *Academy of Management Annals*, 4(1), pp. 557–583.

Alvarez, S. A., and Busenitz, L. W. (2001). The entrepreneurship of resource-based theory.

Alvesson, M., 2003. Beyond neopositivists, romantics, and localists: A reflexive approach to interviews in organisational research. *Academy of management review*, 28(1), pp.13-33.

Americas Conference on Information Systems, August 4th-7th, Detroit, Michigan, pp. 1-11.

Andrade, A.D., 2009. Interpretive research aiming at theory building: Adopting and adapting the case study design. *The Qualitative Report*, 14(1), pp. 42.

Ardichvili, A., Cardozo, R., and Ray, S., (2003), 'A Theory of Entrepreneurial Opportunity Identification and Development,' *Journal of Business Venturing*, 18, pp. 105-123

Arenius, P., and Clercq, D. D. (2005). A network-based approach on opportunity recognition. *Small Business Economics*, 24(3), pp. 249–265.

Audretsch, D. B., and Keilbach, M. (2007). The theory of knowledge spill over entrepreneurship. *Journal of Management Studies,* 44(7), pp. 1242–1254.

Audretsch, D. B.,Aldridge,T. T., andSanders,M.(2011). Social capital building and new business formation: a case study in Silicon Valley. *International Small Business Journal,* 29(2), pp. 152–169.

Ayres, L., Kavanaugh, K. and Knafl, K.A., 2003. Within-case and across-case approaches to qualitative data analysis. *Qualitative health research*,13(6), pp.871-883.

Baccarini, D., Salm, G. and Love, P.E., 2004. Management of risks in information technology projects. *Industrial Management and Data Systems*,104(4), pp.286-295.

Baker, T., Gedajlovic, E., and Lubatkin, M. (2005). A framework for comparing entrepreneurship processes across nations. *Journal of International Business Studies*, 36(5), pp. 492–504.

Barley, S.R., Tolbert, P.S., 1997. Institutionalization and structuration: studying the links between action and institution. *Organ. Stud*. 18 (1), pp. 93–117.

Baron, R. A. (2006). Opportunity recognition as pattern recognition: how entrepreneurs connect the dots" to identify new business opportunities. *Academy of Management Perspectives*, 20(1), pp. 104–119.

Baron, R. A. (1998). Cognitive mechanisms in entrepreneurship: why and when entrepreneurs think differently than other people. *Journal of Business Venturing,* 13(4), pp. 275–294.

Baron, R. A. (2000). Counterfactual thinking and venture formation: the potential effects of thinking about "what might have been". *Journal of Business Venturing*, 15(1), pp. 79–91.

Baron, R. A. (2004). The cognitive perspective: a valuable tool for answering entrepreneurship's basic "why" questions. *Journal of Business Venturing*, 19(2), pp. 221–239.

Baron, R. A. (2008). The role of affect in the entrepreneurial process. *Academy of Management Review*, 33(2), pp. 328–340.

Baron, R. A., and Ensley, M. D. (2006). Opportunity recognition as the detection of meaningful patterns: evidence from comparisons of novice and experienced entrepreneurs. *Management Science*, 52(9), pp. 1331– 1344.

Baron, R. A., and Ensley, M. D. (2006). Opportunity recognition as the detection of meaningful patterns: evidence from comparisons of novice and experienced entrepreneurs. *Management Science*, 52(9), pp. 1331– 1344.

Baron, R. A., and Tang, J. (2011). The role of entrepreneurs in firm-level innovation: joint effects of positive affect, creativity, and environmental dynamism. *Journal of Business Venturing*, 26(1), pp. 49–60.

Basit, T., 2003. Manual or electronic? The role of coding in qualitative data analysis. *Educational research*, 45(2), pp.143-154.

Baskarada, S., 2014. Qualitative case study guidelines. Baškarada, S. (2014). Qualitative case studies guidelines. *The Qualitative Report*, 19(40), pp.1-25.

Becker, H.S., 1990. Generalising from case studies. Qualitative inquiry in education: The continuing debate, pp.233-242.

Begley, T. M., and Boyd, D. P., (1987). A comparison of entrepreneurs and managers of small business firms, *Journal of Management*, 13(1), pp. 99-108

Benson, A., Johnson, S. and Kuchinle, K.P. (2002), The use of technology in the digital workplace: a framework for human resource development, *Advances in Developing Human Resources*, 4(4), pp. 392-404.

Berg, B.L., 2001. *Qualitative research methods for the social sciences*. Boston, MA: Pearson.

Berners-Lee T, Hendler J, Lassila O (2001) The semantic web. Sci Am Mag 284(5), pp. 34–43.

Beugelsdijk SJ (2007) Entrepreneurial culture, regional innovativeness and economic growth*. JEvol Econ* 17(2).

Bhagavatula, S., Elfring, T., van Tilburg, A., and van de Bunt, G. G. (2010). How social and human capital influence opportunity recognition and resource mobilization in India's handloom industry. *Journal of Business Venturing*, 25(3), pp. 245–260.

Bidgoli, H., (2012). E-collaboration: new productivity tool for the twenty0first century and beyond. *Business Strategy Series*, 13(4), pp. 147 – 153.

Boaz, A. and Ashby, D. (2003) 'Fit for purpose? Assessing research quality for evidence based policy and practice', London: Queen Mary, University of London 10- Briner, R.B., Denyer, D. and Rousseau, D.M. (2009) 'Evidence-Based Management: Concept clean up time?', The Academy of Management Perspectives, Vol. 23, No. 4, 19-32

Boyles, T., (2011). Small business and web 2.0: Hope or hype? Entrepreneurial Executive, 16, pp. 81 – 96.

Brekhus, W.H., Galliher, J.F. and Gubrium, J.F., 2005. The need for thin description. *Qualitative Inquiry,* 11(6), pp.861-879.

Brockner, J., Higgins, E. T., and Low, M. B. (2004). Regulatory focus theory and the entrepreneurial process. *Journal of Business Venturing,* 19, pp. 203–220.

Brown, J. D., 2000. *What is Construct Validity*?. JALT Testing and Evaluation SIG Newsletter, 4 (2) Oct 2000, pp. 8 – 12.

Burmeister, E., and Aitken, L. M. (2012). Sample size: How many is enough? Australian Critical Care, 25, 271-274.

Busenitz, L.W., West, G.P., Shepherd, D., Nelson, T., Chandler, G.N., and Zacharakis, A. (2003). Entrepreneurship research in emergence: Past trends and future directions*. Journal of Management,* 29, pp. 285–308.

Butler, J. E., Doktor, R., and Lins, F. A. (2010). Linking international entrepreneurship to uncertainty, opportunity discovery, and cognition. *Journal of International Entrepreneurship*, 8(2), pp. 121–134.

Campbell, D.T., 1975. " Degrees of freedom" and the case study. *Comparative political studies*, 8(2), pp. 178.

Cardon, M. S., Wincent, J., Singh, J., and Drnovsek, M. (2009). The nature and experience of entrepreneurial passion. *Academy of Management Review*, 34(3), pp. 511-532.

Casson, M., and Wadeson, N. (2007). The discovery of opportunities: extending the economic theory of the entrepreneur. *Small Business Economics*, 28(4), pp. 285–300.

Chandra, Y., Styles, C., and Wilkinson, I. (2009). The recognition of first time international entrepreneurial opportunities: evidence from firms in knowledge-based industries. *International Marketing Review*, 26(1), pp. 30–61.

Chang, C. C., (2012). Exploring IT entrepreneurs' dynamic capabilities using Q-technique, *Industrial Management and Data Systems,* (112: 8), pp. 1201 – 1216.

Chang, C. M. (2005), 'Value addition to technology organisations: The six-dimensional opportunities,' *International Journal of Innovation and Technology Management*, 2(4), pp. 451-470

Chau, M., and Xu, J., (2012). Business intelligence in blogs: Understanding consumer interactions and communities, *MIS Quarterly*, (36:4), pp. 1180 – 1216.

Chen, M., (2005). An analysis of the driving forces for web services adoption, *ISeB*, (3), pp. 265 – 279.

Chiasson, M., and Saunders, C. (2005). Reconciling diverse approaches to opportunity research using the structuration theory. *Journal of Business Venturing*, 20(6), pp. 747–767.

Choi, Y. R., and Shepherd, D. A. (2004). Entrepreneurs' decisions to exploit opportunities. *Journal of Management*, 30(3), pp. 377–395.

Choi, Y. R., Lévesque, M., and Shepherd, D. A. (2008). When should entrepreneurs expedite or delay opportunity exploitation? *Journal of Business Venturing*, 23(3), pp. 333–355.

Choo, C.W. The knowing organisation: How organisations use information to construct meaning, create knowledge and make decisions, International Journal of Information Management, Volume 16, Issue 5, 1996, Pages 329-340.

Cliff, J. E., Jennings, P. D., and Greenwood, R. (2006). New to the game and questioning the rules: the experiences and beliefs of founders who start imitative versus innovative firms. *Journal of Business Venturing*, 21(5), pp. 633–663.

Coffey, A. and Atkinson, P., 1996. *Making sense of qualitative data: complementary research strategies*. Sage Publications, Inc.

Cohen, W.M., and Levinthal, D.A. (1990). Absorptive capacity: A new perspective on learning and innovation. *Administrative Science Quarterly*, 35, pp. 128-152.

Cook, N., 2017. Enterprise 2.0: How social software will change the future of work. Routledge.

Cooper, S. Y., and Park, J. S. (2008). The impact of “incubator” organisations on opportunity recognition and technology innovation in new, entrepreneurial high-technology ventures. *International Small Business Journal*, 26(1), pp. 27–56.

Cooperrider, D. and Whitney, D.D., 2005. *Appreciative inquiry: A positive revolution in change*. Berrett-Koehler Publishers.

Covin, J. G., Lumpkin, G. T. (2011) Entrepreneurial orientation theory and research: Reflections on a needed construct. Entrepreneurship Theory and Practice 35(5): 855–872.

Coyne, I.T., 1997. Sampling in qualitative research. Purposeful and theoretical sampling; merging or clear boundaries? *Journal of advanced nursing*, 26(3), pp.623-630.

Creswell, J.W., 2007. *Qualitative inquiry and research design: Choosing among five approaches*. (2nd ed., pp. 53-84). Thousand Oaks, CA: Sage Publications, Inc.

Creswell, J.W., 2010. *Mapping the developing landscape of mixed methods research*. SAGE handbook of mixed methods in social and behavioural research, 2, pp.45-68.

Creswell, J.W., 2015. *Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research, Enhanced Pearson e-text with Loose-Leaf Version--Access Card Package*. Pearson Education, Inc.

Crick, D. and Spence, M.(2005).The internationalisation of high performing UK high-tech SMEs: a study of planned and unplanned strategies. *International Business Review*, 14(2), pp. 167–185.

Cromer, C., (2010). Understanding web 2.0’s influences on public e-services: a protection motivation perspective, I*nnovation*, 12(2), pp. 192 – 205.

Cronin, Patricia, Frances Ryan, and Michael Coughlan. "Undertaking a literature review: a step-by-step approach." British Journal of Nursing 17.1 (2008): 38-43.

Darke, P., Shanks, G. and Broadbent, M., 1998. Successfully completing case study research: combining rigour, relevance and pragmatism. *Information systems journal*, 8(4), pp.273-289.

David J. Teece (2018), Business models and dynamic capabilities, *Long Range Planning*, *Volume 51, Issue 1, 2018, Pages 40-49*.

Delamar, F. and Davidson, P. (2000) "Where do they come from? Prevalence and characteristics of nascent entrepreneurs", *Entrepreneurship and Regional Development*, 12, pp. 1-23

Denyer, D. and Tranfield, D. (2009). 'Producing a Systematic Review'. In The SAGE Handbook of Organisational Research Methods. D.A. Buchanan and A. Bryman (eds). London: SAGE.

Denzin, N. K. (2009). The research act: A theoretical introduction to sociological methods. New York, NY: Aldine Transaction.

Denzin, N.K., 1989. *Interpretive biography* (Vol. 17). Sage.

Dess, G. G., and Picken, J. C., (1999). Beyond productivity: How leading companies achieve superior performance by leveraging their human capital. *Personnel Psychology*, 53(2), pp. 481 – 484.

Devers, K.J. and Frankel, R.M., 2000. Study design in qualitative research--2: Sampling and data collection strategies. *Education for health*, 13(2), pp. 263.

Dey, I., 1993. Creating categories. *Qualitative data analysis*, pp.94-112.

Dey, I., 1999. *Grounding grounded theory: Guidelines for qualitative inquiry*. Academic Press.

DiMaggio, P.J., and Powell, W.W. 1983. "The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality in Organisational Fields," *American Sociological Review,* 48(2), pp. 147-160.

Drucker, P. (2001) Management Challenges for the 21st Century, New York: Harper Business Press

Dutta, D. K., Gwebu, K. L., and Wang, J., (2015). Personal innovativeness in technology, related knowledge and experience, and entrepreneurial intentions in emerging technology industries: a process of causation or effectuation? *International Entrepreneurial Management Journal*, 11, pp. 529 – 555.

Eijkman, H., (2010). Academics and Wikipedia Reframing Web 2.01 as a disruptor of traditional academic power-knowledge arrangements, *Computer-wide Information Systems*, 27(3), pp. 173 – 185.

Eisenhardt, K.M. and Schoonhoven, C.B. (1990) Organisational growth: Linking founding team, strategy, environment and growth among U. S. semiconductor ventures, 1978–1988. *Administrative Science Quarterly*, 35(3), 5pp. 04-529.

Eisenhardt, K.M. and Graebner, M.E., 2007. Theory building from cases: Opportunities and challenges. *Academy of management journal*, 50(1), pp. 25.

Eisenhardt, K.M., 1989. Building theories from case study research. *Academy of management review*, 14(4), pp.532-550.

Endres, A. M., and Woods, C. R. (2007). The case for more "subjectivist" research on how entrepreneurs create opportunities. *International Journal of Entrepreneurial Behaviour and Research*, 13(4), pp. 222–234.

evidences from a mineral based economy. *International Journal of Entrepreneurship and Small Business,* 12(1), pp. 109–127.

Farr-Wharton, R., and Brunetto, Y. (2007). Women entrepreneurs, opportunity recognition and government sponsored business networks: a social capital perspective. *Women in Management Review*, 22(3), pp. 187– 207.

Fauchart, E., and Gruber, M. 2011. Darwinians, communitarians, and missionaries: The role of founder identity in entrepreneurship. *Academy of Management Journal*, 54, pp. 935-957.

Fernando J., Garrigos-Simon, Teresa Barberá, R., (2012), 'Social networks and Web 3.0: their impact on the management and marketing of organisations', *Management Decision*, 50(10), pp. 1880 – 1890

Fiet, J. O. (1996). The informational basis of entrepreneurial discovery. *Small Business Economics*, 8(6), pp. 419– 430.

Fiet, J. O. (2007). A prescriptive analysis of search and discovery. *Journal of Management Studies*, 44(4), pp. 592–611.

Fiske, S. T., and Taylor, S. E., (1991). *Social Cognition*, 2nd. (edn) ST Fiske, SE Taylor - New Yorl: McGraw-Hill,

Flyvbjerg, B., 2006. Five misunderstandings about case-study research. *Qualitative inquiry*, 12(2), pp.219-245.

Fontana, A. and Frey, J.H., 2000. The interview: From structured questions to negotiated text. *Handbook of qualitative research*, 2(6), pp.645-672.

Foreman, P.B., 1948. The theory of case studies. *Social Forces*, pp.408-419.

Frese, M., Krauss, S.I., Keith, N., Escher, S., Grabarkiewicz, R., Luneng, S.T., Heers, C., Unger, J., and Friedrich, C. (2007). Business owners' action planning and its relationship to business success in three African countries. *Journal of Applied Psychology*, 92, pp. 1481–1498.

Friedman, R.S., Foerster, J., 2005. The influence of approach and avoidance cues on attentional flexibility. *Motivation and Emotion* 29, pp. 69–81.

Fuentes, M. D. M. F., Arroyo, M. R., Bojica, A. M., and Pérez, V. F. (2010). Prior knowledge and social networks in the exploitation of entrepreneurial opportunities. *International Entrepreneurship and Management Journal*, 6(4), pp. 481–501.

Gaglio C, Winter S. *Entrepreneurial alertness and opportunity identification: Where are we now? In*: Carsrud AL, Brännback M, editors. Understanding the Entrepreneurial Mind: Opening the Black Box. Springer; 2009. pp. 305–325

Gaglio, C. M., and Katz, J. A. (2001). The psychological basis of opportunity identification: entrepreneurial alertness. *Small Business Economics*, 16(2), pp. 95–111.

Gallupe, R. B., Dennis, A. R., Cooper, W. H., Valacich, J. S., Bastianutti, L. M., and Nunamaker, J. F. 1992. Electronic brainstorming and group size. *Academy of Management Journal*, 35(2), pp. 350-369.

García-Cabrera, A. M., and García-Soto, M. G. (2009). A dynamic model of technology-based opportunity recognition. *Journal of Entrepreneurship*, 18(2), pp. 167–190.

Garfield, M. J. Taylor, N. J., Dennis, A. R., and Satzinger, J. W., (2001). Modifying paradigms – individual differences, creativity techniques and exposure to ideas in group idea generation, *Information Systems Research*, 12(3), pp. 322 – 333.

Garg, A. K., Matshediso, I. B., and Garg, D. (2011). An individual's motivation to become entrepreneur:

Garrigos-Simon, F. J., (2012). Social networks and Web 3.0: their impact on the management and marketing of organisations, *Management Decisions*, 50(10), pp. 1880 – 1890.

Geiger, D., Seedorf, S., Schulze, T., Nickerson, R. and Schader, M. (2009), "Managing the crowd: towards a taxonomy of crowdsourcing processes", *Proceedings of the Seventeenth*

Gielnik, M. M., Kramer, A. C., Kappel, B., and Frese, M., (2014). Antecedents of Business Opportunity Identification and Innovation: Investigating the Interplay of Information Processing and Information Acquisition, *Applied Psychology*, 63(2), pp. 344 – 381.

Gläser, J. and Laudel, G., 2004. *The Sociological description of non-social conditions of research. REPP Discussion Paper 04/2. Canberra*: The Australian National University.

Goetz, J.P. and LeCompte, M.D., 1984. *Ethnography and qualitative design in educational research* (Vol. 19). Orlando, FL: Academic Press.

Goffman, E., 1959. *The presentation of self in everyday life*. London: Penguin.

Gordon, C. (2002) Contributions of Cultural Anthropology and Social Capital Theory to Understandings of Knowledge Management, Doctoral Thesis, Ontario Institute for Studies in Education of the University of Toronto

Gordon, S. R. (2007). Interpersonal trust, vigilance and social networks roles in the process of entrepreneurial opportunity recognition. *International Journal of Entrepreneurship and Small Business*, 4(5), pp. 564–585.

Gordon, S. R. (2007). Interpersonal trust, vigilance and social networks roles in the process of entrepreneurial opportunity recognition. *International Journal of Entrepreneurship and Small Business*, 4(5), pp. 564–585.

Greenhalgh, T. and Peacok, R. (2005), Effectiveness and efficiency of search methods in systematic reviews of complex evidence: audit of primary sources. British Medical Journal. November 5; 331(7524): 1064–1065.

Grégoire, D. A, and Shepherd, D. A., (2012). Technology-market combinations and the identification of entrepreneurial opportunities: An investigation of the opportunity-individual nexus, *Academy of Management Journal*, 55(4), pp. 753-785

Grégoire, D. A., Barr, P. S., and Shepherd, D. A. (2010). Cognitive processes of opportunity recognition: the role of structural alignment. *Organisation Science*, 21(2), pp. 413–431.

Grégoire, D. A., Cornelissen, J., Dimov, D., and van Burg, E. (2015). The mind in the middle: Taking stock of affect and cognition research in entrepreneurship. *International Journal of Management Reviews, 17*(2), 125-142.

Gruber, M., MacMillan, I. C., and Thompson, J. D. (2013). Escaping the prior knowledge corridor: What shapes the number and variety of market opportunities identified before market entry of technology start-ups? *Organisation Science,* 24(1), pp. 280-300.

Guba, E. G., Lincoln, Y. S. (1982). Epistemological and methodological bases of naturalistic inquiry. Educational Communication and Technology Journal 30 (4), 233–252.

Guest, G., Bunce, A., and Johnson, L. (2006). How many interviews are enough? An experiment with data saturation and variability. Field Methods, 18(1), 59-82.

Hansen, D. J., Monllor, J. and Shrader, R. C. (2016) 'Identifying the elements of entrepreneurial opportunity constructs: Recognizing what scholars are really examining', *The International Journal of Entrepreneurship and Innovation*, 17(4), pp. 240–255

Haynie, J.M., Shepherd, D.A. and McMullen, J.S. (2009). An opportunity for me? The role of resources in opportunity evaluation decisions. *Journal of Management Studies,* 46(3), pp. 337–361.

Hayton, J. and Cacciotti, G., 2014, *'Culture and entrepreneurship: Empirical evidence for direct and indirect effects',* in A. Fayolle (ed.), A Handbook of research on entrepreneurship: What we know and what we need to know, pp. 1417-183, Edward Elgar, Cheltenham.

Hermanns, H., 2004. 5.3 *Interviewing as an Activity. A Companion* to, p.209.

Hesse-Biber, S.N. and Leavy, P., 2010. *The practice of qualitative research*. Sage.

Higgins, J.P.T. and Green, S. (2006) 'Cochrane Handbook for Systematic Reviews of Interventions', The Cochrane Library 4.2.6

Hite, J. M. (2005). Evolutionary processes and paths of relationally embedded network ties in emerging entrepreneurial firms. *Entrepreneurship: Theory and Practice*, 29(1), pp. 113–144

Holstein, J.A. and Gubrium, J.F., 1995. *The active interview* (Vol. 37). Sage

Huff, A.S., 2008. *Designing research for publication*. Sage.

Hurley, R. F., and Hult,G. T.M. (1998). Innovation, market orientation, and organisational learning: an integration and empirical examination. *Journal of Marketing*, 62, pp. 42–54.

Hwang, C. Y. (2014). *Toward a process theory of entrepreneurship: Revisiting opportunity identification and entrepreneurial actions*. PhD thesis.

Ireland, R. D., Hitt, M. A., and Sirmon, D. G., (2003). A model of strategic entrepreneurship: The construct and its dimensions, *Journal of Management*, 29(6), pp. 963 – 989.

Ismail, K., Anuar, M. A., Omar, W. W., Aziz, A. A., Seohod, K., Akhtar, C. S. (2015) Entrepreneurial intention, entrepreneurial orientation of faculty and students towards commercialization. Procedia-Social and Behavioural Sciences 181(11): 349–355.

Jia, Q., Guo, Y. and Barnes, S.J., 2017. Enterprise 2.0 post-adoption: Extending the information system continuance model based on the technology-Organisation-environment framework. Computers in Human Behaviour, 67, pp.95-105.

Journal of Management, 27(6), pp. 755–775.

Kambil, A (2008) 'What is your Web 5.0 strategy?', *Journal of Business Strategy*, 29(6), pp. 56 – 58

Kaplan, B. and Maxwell, J.A., 2005. *Qualitative research methods for evaluating computer information systems.* In Evaluating the organisational impact of healthcare information systems (pp. 30-55). Springer New York.

Karakas, F. and Manisaligil, A., (2012). Reorienting self-directed learning for the creative digital era, *European Journal of Training and Development*, 36(7), pp. 712 – 731.

Kellermanns, F. W., and Eddleston, K. A. (2006). Corporate entrepreneurship in family firms: a family perspective. *Entrepreneurship: Theory and Practice*, 30(6), pp. 809–830.

Khan, S. and VanWynsberghe, R., 2008, January. Cultivating the under-mined: Cross-case analysis as knowledge mobilization. In Forum Qualitative Sozialforschung/Forum: *Qualitative Social Research* (Vol. 9, No. 1).

Khilstrom, R., and Laffont, J. 1979. "A general equilibrium entrepreneurial theory of firm formation based on risk aversion," *Journal of Political Economy* 87(4), pp. 719-748.

Kirzner, I. M. (1973). *Competition and Entrepreneurship*. Chicago: University of Chicago Press.

Kirzner, I. M. (1997). Entrepreneurial discovery and the competitive market process: An Austrian approach. *Journal of Economic Literature*, 35(1), pp. 60-85

Kitchenham, B. A., Budgen, D., Turner, M., and Khalil, M. (2004). Lessons from applying the systematic literature review process within the software engineering domain. The Journal of Systems and Software, 80(4), 571-583.

Kourilsky, M. L., and Esfandiari, M. (1997). Entrepreneurship education and lower socioeconomic black youth: an empirical investigation. *Urban Review*, 29(3), pp. 205–215.

Kumar, B, and Babu, M 2011, 'An Implementation of Semantic Web System for Information retrieval using J2EE Technologies', *International Journal on Computer Science and Engineering*, 3(6), pp. 2498-2505

Kuo-Ming Chao (2016), E-services in e-business engineering, *Electronic Commerce Research and Applications*, Volume 16,2016, Pages 77-81.

Kuzel, A.J., 1999. *Sampling in qualitative inquiry*. " In BF Crabtrree and WL Miller (Eds.) Doing Qualitative Research (second edition). Thousand Oaks, CA: Sage Publications (pp. 33-45).

Kvale, S., 2008. *Doing interviews*. Sage.

Lahm, R. J., (2006). State of the entrepreneurial blogosphere, *The Entrepreneurial Executive*, 11, pp. 27 – 37.

Lauckner, H., Paterson, M. and Krupa, T., 2012. Using constructivist case study methodology to understand community development processes: Proposed methodological questions to guide the research process. *The Qualitative Report*, 17(13), pp. 1.

Leavitt, K., Reynolds, S. J., Barnes, C. M., Schlipzand, P., and Hannah, S. T. 2013. Different hats, different obligations: Plural occupational identities and situated moral judgments. *Academy of Management Journal*, 55, pp. 1316-1333.

LeBoeuf, R. A., Shafir, E., and Bayuk, J. B. 2010. The conflicting choices of alternating selves. *Organisational Behaviour and Human Decision Processes*, 111, pp. 48-61.

Lettl, C., Hienerth, C., and Gemuenden, H. G. (2008). Exploring how lead users develop radical innovation: opportunity recognition and exploitation in the field of medical equipment technology. *IEEE Transactions on Engineering Management*, 55(2), pp. 219–233.

Levina, N., and Ross, J. W., (2003), 'From the vendor's perspective exploring the value proposition in information technology outsourcing,' *MIS Quarterly*, 27(3), pp. 331-364.

Levy, M. (2009). WEB 2.0 implications on knowledge management, *Journal of Knowledge Management*, 13(1), pp. 120 – 134.

Liang, T., and Turban, E., (2011), Introduction to the Special Issue Social Commerce: A Research Framework for Social Commerce, *International Journal of Electronic Commerce*, 16(2), pp. 5-14.

Lim, S., Saldana, A. Z., and Saldana, P. E. Z., (2011), Do market-oriented firms adopt Web 2.0 technologies? An empirical study in hospitality firms, *International Entrepreneurial Management Journal,* 7, pp. 465 – 477.

Lim, W.L. and Xavier, S.R. 2015. Opportunity recognition framework: exploring the technology entrepreneurs. *American Journal of economics*, 5(2), pp. 05-111.

Lindsay, N. J., Lindsay, W. A., Jordaan, A., and Hindle, K. (2006). Opportunity recognition attitudes of nascent indigenous entrepreneurs. *International Journal of Entrepreneurship and Small Business,* 3(1), pp. 56–75.

Lockyer, S., 2004. *Coding qualitative data. The sage encyclopaedia of social science research methods,* 1(1), pp.137-138.

Long, W. and W. E. McMullan, 1984, 'Mapping the New Venture Opportunity Identification Process', in J. A. Hornaday, F. A. Tardley, J. A. Timmons and K. H. Vesper (eds.), *Frontiers of Entrepreneurship Research,* Wellesley, MA: Babson College, pp. 567-591.

Lumpkin, G. T., Dess, G. G. (1996) Clarifying the entrepreneurial orientation construct and linking it to performance. Academy of Management Review 21(1): 135–172.

Lunnan, A., Nybakk, E., and Vennesland, B. (2006). Entrepreneurial attitudes and probability for start-ups – an investigation of Norwegian non-industrial private forest owners. *Forest Policy and Economics,* 8(7), pp. 683–690.

Lynskey, M. J. (2004). Knowledge, finance and human capital: the role of social institutional variables on entrepreneurship in Japan. *Industry and Innovation*, 11(4), pp. 373–405.

Macpherson, A., Jones, O., and Zhang, M. (2004). Evolution or revolution? Dynamic capabilities in a knowledge-dependent firm. *R and D Management*, 34(2), pp. 161–178.

Maccani, G. (2016) *Exploring the factors that influence adoption of open government data for commercial service innovation in cities.* PhD thesis, Maynooth University Ireland. Retrieved from http://mural.maynoothuniversity.ie/8779/

Mahmood, K., and Richardson, J. V., (2011), Adoption of Web 2.0 in US academic libraries: a survey of ARL library websites, *Electronic Library and Information Systems*, 45(4), pp. 365 – 375.

Mahnke, V., Venzin, M., and Zahra, S. A. (2007). Governing entrepreneurial opportunity recognition in MNEs: aligning interests and cognition under uncertainty. *Journal of Management Studies*, 44(7), pp. 1278–1298.

Mainela, T., and Puhakka, V. (2009). Organising new business in a turbulent context: opportunity discovery and effectuation for IJV development in transition markets. *Journal of International Entrepreneurship*, 7(2), pp. 111–134.

management. *Strategic Management Journal* [Special issue], 11, pp. 17-27

Markman, G. D., and Baron, R. A. (2003). Person-entrepreneurship fit: why some people are more successful as entrepreneurs than others. *Human Resource Management Review,* 13(2), pp. 281–301.

Marvel, M. R., and Droege, S. (2010). Prior tacit knowledge and first-year sales: learning from technology entrepreneurs. *Journal of Small Business and Enterprise Development*, 17(1), pp. 32–44.

Mayring, P., 2000. Qualitative content analysis. Forum Qualitative Sozialforschung / Forum: *Qualitative Social Research* [On-line Journal], 1(2), Art. 20. Available at: http://www.qualitative-research.net/fqs-texte/2-00/2-00mayring-e.htm

McAfee Inc (2010) Web 2.0: *a Complex Balancing Act—first global study on Web2 usage, risks and best practices*

McKelvie, A., Johnson, A. R., and Mathisen, M. T., (2017). Time to Market: Analysis of Context Elements Determining First Sales for University Spin-offs, *Academy of Management Proceedings,* 1, pp. 13097

McMullen, J. S., and Shepherd, D. A. (2006). Entrepreneurial action and the role of uncertainty in the theory of the entrepreneur. *Academy of Management Review*, 31, pp. 132-152.

Mejri, K., and Umemoto, K. (2010). Small-and medium-sized enterprise internationalization: towards the knowledge-based model. *Journal of International Entrepreneurship*, 8(2), pp. 156–167.

Miao, Q., and Liu, L. (2010). A psychological model of entrepreneurial decision making. *Social Behaviour and Personality: An International Journal*, 38(3), pp. 357–363.

Miles, M.B. and Huberman, A.M., 1994. *Qualitative data analysis: An expanded sourcebook*. Sage.

Miller, D. (1983) The correlates of entrepreneurship in three types of firms. Management Science 29(7): 770–791.

Miller, D. (2011) Miller (1983) revisited: A reflection on EO research and some suggestions for the future. Entrepreneurship Theory and Practice 35(5): 873–894.

Minniti, M., and Bygrave, W. (2001). A dynamic model of entrepreneurial learning. *Entrepreneurship Theory and Practice,* 25(3), pp. 5–16.

Mitchell, R. K., Busenitz, L., Lant, T., McDougall, P. P., Morse, E. A., and Smith, J. B. (2002). Toward a theory of entrepreneurial cognition: Rethinking the people side of entrepreneurship research. *Entrepreneurship Theory and Practice*, 27(2), pp. 93-104

Mitchell, R. K., Busentiz, L. W., Gagilo, C. M., McMullen, J. S., and Morse, E. A. (2007). The central question in entrepreneurial cognition research, *Entrepreneurship Theory and Practice*, 31(1), pp. 1-27

Mitra, B., Diaz, F. and Craswell, N., 2017, April. Learning to match using local and distributed representations of text for web search. In *Proceedings of the 26th International Conference on World Wide Web* (pp. 1291-1299). International World Wide Web Conferences Steering Committee.

Molenaar, P.C., 2004. A manifesto on psychology as idiographic science: Bringing the person back into scientific psychology, this time forever. *Measurement,* 2(4), pp.201-218.

Morse, J. M. (2015) 'Critical Analysis of Strategies for Determining Rigor in Qualitative Inquiry', *Qualitative Health Research*, 25(9), pp. 1212–1222.

Morse, J. M., Barrett, M., Mayan, M., Olson, K., and Spiers, J. (2002). Verification Strategies for Establishing Reliability and Validity in Qualitative Research. *International Journal of Qualitative Methods*, 13–22.

Mumford, M.D., Mobley, M.I., Uhlman, C.E., Reiter-Palmon, R., and Doares, L.M. (1991). Process analytic models of creative capacities. *Creativity Research Journal*, 4, pp. 91–122.

Murnieks,C. Y., Mosakowski, E., and Cardon, M. S., (2014). Pathways of passion: identity centrality, passion, and behaviour among entrepreneurs, *Journal of Management*, 40(6), pp. 1583 - 1606

Myers, M., 1999. Investigating information systems with ethnographic research. *Communications of the AIS,* 2(4es), p.1.

Myers, M.D. and Newman, M., 2007. The qualitative interview in IS research: Examining the craft. *Information and organisation*, 17(1), pp.2-26.

Myers, M.D., 1997. Qualitative research in information systems. *Management Information Systems Quarterly*, 21(2), pp.241-242.

Naser Valaei and Sajad Rezaei (2017) Does Web 2.0 utilisation lead to knowledge quality, improvisational creativity, compositional creativity, and innovation in small and medium-sized enterprises? *A sense-making perspective, Technology Analysis and Strategic Management*, 29:4, pp. 381-394

Nayar, R, Narendran, R., and Nayar, S. (2013). *Semantic Web as an innovation enabler. In Driving the Conomy through innovation and entrepreneurship, Emerging agenda for technology management,* Springer, New Delhi Heidelberg New York Dordrecht London, pp. 475 – 486.

Neuman, W.L., 2005. *Social research methods: Quantitative and qualitative approaches* (Vol. 13, pp.26-28). Boston, MA: Allyn and bacon.

Nicholson, B. and Sahay, S., 2004. Embedded knowledge and offshore software development. *Information and organisation*, 14(4), pp.329-365.

Nicolai J. Foss and Peter G. Klein (2017) 'Entrepreneurial Discovery or Creation? In Search of the Middle Ground. *Academy of Management Review* 42:4, pp. 733-736

Nicolaou, N., and Shane, S. (2010). Entrepreneurship and occupational choice: genetic and environmental influences. *Journal of Economic Behaviour and Organisation*, 76(1), pp. 3–14.

Nicolaou, N., Shane, S., Cherkas, L., Hunkin, J., and Spector, T. D. (2009). Is the tendency to engage in entrepreneurship genetic? *Management Science*, 54(1), pp. 167-179.

O'Reilly, M., and Parker, N. (2012, May). Unsatisfactory saturation: A critical exploration of the notion of saturated sample sizes in qualitative research. Qualitative Research Journal, 1-8.

Oyson, M. J., and Whittaker, H., (2015). Entrepreneurial cognition and behaviour in the discovery and creation of international opportunities, *Journal of International Entrepreneurship*, (13), pp. 303 – 336.

Ozgen, E. (2009). The collaborative frontiers of social networks and opportunity recognition in convergent technologies. *Academy of Entrepreneurship Journal*, 15(1–2), pp. 111–128.

Ozgen, E. (2011). Porter's diamond model and opportunity recognition: a cognitive perspective. *Academy of Entrepreneurship Journal*, 17(2), pp. 61–76.

Ozgen, E., and Baron, R. A. (2007). Social sources of information in opportunity recognition: effects of mentors, industry networks, and professional forums. *Journal of Business Venturing*, 22(2), pp. 174–192.

Ozgen, E., and Baron, R. A. (2007). Social sources of information in opportunity recognition: effects of mentors, industry networks, and professional forums. *Journal of Business Venturing*, 22(2), pp. 174–192.

Palys, T., 2008. *Purposive sampling*. The Sage encyclopaedia of qualitative research methods, 2, pp.697-698.

Park, J. S. (2005). Opportunity recognition and product innovation in entrepreneurial hi-tech start-ups: a new perspective and supporting case study. *Technovation*, 25(7), pp. 739–752.

Patel, P. C., and Fiet, J. O. (2009). Systematic search and its relationship to firm founding. *Entrepreneurship: Theory and Practice*, 33(2), pp. 501–526.

Patton, E. and Appelbaum, S.H., 2003. The case for case studies in management research. *Management Research News*, 26(5), pp.60-71.

Patton, M.Q., 1990. *Qualitative evaluation and research methods*. SAGE Publications, inc.

Patton, M.Q., 2005. *Qualitative research*. John Wiley and Sons, Ltd.

Patzelt, H., and Shepherd, D. A. (2011). Recognizing opportunities for sustainable development. *Entrepreneurship: Theory and Practice*, 35(4), pp. 631–652.

Peattie, L., 2001. Theorizing planning: Some comments on Flyvbjerg's Rationality and Power. *International Planning Studies,* 6(3), pp.257-262.

Pech, R. J., and Cameron, A. (2006). An entrepreneurial decision process model describing opportunity recognition. *European Journal of Innovation Management*, 9(1), pp. 61–78.

Penrose, E.T. 1959. *The Theory of the Growth of the Firm* John Wiley and Sons, New York.

Perkmann, M., Tartari, V., McKelvey, M. et al., (2013). Academic engagement and commercialisation: a review of the literature on –university-industry relations*, Research Policy,* 42, pp. 423 – 442.

Petticrew, M., and Roberts, H. (2006). *Systematic reviews in the social sciences*: A practical guide. Blackwell Pub.

Pettigrew, A.M. ed., 1988. *The management of strategic change*. B. Blackwell.

Polkinghorne, D.E., 1995. Narrative configuration in qualitative analysis. *International journal of qualitative studies in education*, 8(1), pp.5-23.

Polkinghorne, D.E., 2005. Language and meaning: Data collection in qualitative research. *Journal of counselling psychology,* 52(2), pp. 137.

Quaddus, M. and Xu, J., 2005. Adoption and diffusion of knowledge management systems: field studies of factors and variables. *Knowledge-Based Systems*, 18(2), pp.107-115.

Ragowsky, A., Licker, P.S., and Gefen, D. 2012. Organisational IT Maturity (OITM): A Measure of Organisational Readiness and Effectiveness to Obtain Value from Its Information Technology, *Information Systems Management,* 29(2), pp. 148-160.

Ramaswamy, V., (2010). Competing through co-creation: innovation at two companies, *Strategy and Leadership*, 38(2), pp. 22 – 29

Ramón Zataraín Cabada, María Lucía Barrón Estrada, Francisco González Hernández, Raúl Oramas Bustillos, Carlos Alberto Reyes-García (2018), An affective and Web 3.0-based learning environment for a programming language, Telematics and Informatics, Volume 35, Issue 3, Pages 611-628.

Ramos-Rodríguez, A., Medina-Garrido, J., Lorenzo-Gómez, J., and Ruiz-Navarro, J. (2010).What you know or who you know? The role of intellectual and social capital in opportunity recognition. *International Small Business Journal,* 28(6), pp. 566–582.

Randolph-Seng, B., Mitchell, R. K., Vahidnia, H., Mitchell, J. R., Chen, S., and Statzer, J., (2015). The micro foundations of entrepreneurial cognition research: toward an integrative approach, *Foundations and Trends® in Entrepreneurship*, 11(4), pp. 207-335.

Razmerita, L., Kirchner, K., and Sudzina, F., (2009). Personal knowledge management The role of Web 2.0 tools for managing knowledge at individual and organisational levels, *Online Information Review*, 33(6), pp. 1021 – 1039.

Riaan Rudman, Rikus Bruwer, (2016) "Defining Web 3.0: opportunities and challenges", *The Electronic Library, Vol. 34 Issue: 1, pp.132-154*.

Richter, C., Kraus, S., Brem, A., Durst, S. and Giselbrecht, C., 2017. Digital entrepreneurship: Innovative business models for the sharing economy. Creativity and Innovation Management, 26(3), pp.300-310.

Rui Shu, Shenggang Ren, Yi Zheng (2018), Building networks into discovery: The link between entrepreneur network capability and entrepreneurial opportunity discovery, *Journal of Business Research, Volume 85,2018, Pages 197-208.*

Russell Newman, Victor Chang, Robert John Walters, Gary Brian Wills (2016), Web 2.0—The past and the future, *International Journal of Information Management, Volume 36, Issue 4, Pages 591-598.*

Saint-Onge, H. (2002) Linking Knowledge to Strategy, presentation at the Strategic Planning for KM Conference, Toronto, May 28-29

Sambasivan, M., Abdul, M., and Yusop, Y. (2009). Impact of personal qualities and management skills of entrepreneurs on venture performance in Malaysia: opportunity recognition skills as a mediating factor. *Technovation*, 29(11), pp. 798–805.

Sandelowski, M., 1995. Sample size in qualitative research. *Research in nursing and health*, 18(2), pp.179-183.

Santoro, M., Sanz-Velasco, S. A. (2006). Opportunity development as a learning process for entrepreneurs. *International Journal of Entrepreneurial Behaviour and Research*, 12(5), pp. 251–271.

Santos, F. M., and Eisenhardt, K. M. (2009) Constructing markets and shaping boundaries: Entrepreneurial power in nascent fields. *Academy of Management Journal*, 52(4), pp. 643–671.

Sardeshmukh, S. R., and Corbett, A. C. (2011). The duality of internal and external development of successors: opportunity recognition in family firms. *Family Business Review*, 24(2), pp. 111–125.

Schultze, U. and Avital, M., 2011. Designing interviews to generate rich data for information systems research. *Information and Organisation*, 21(1), pp.1-16.

Schumpeter, J. A. (1934). *The theory of economic development: An inquiry into profits, capital, credit, interest, and the business cycle* (2000 ed.). London: Transaction.

Schwandt, T.A., 2001. Dictionary of qualitative inquiry. Sage Publications.

Scott, G., Leritz, L. E., and Mumford, M. D. (2004). The effectiveness of creativity training: A quantitative review. *Creativity Research Journal*, 16, pp. 361–388.

Scully, Michael (2016) "The History of the iPad," *Proceedings of the New York State Communication Association:* Vol, Article 3.

Shane, S. (2000). Prior knowledge and the discovery of entrepreneurial opportunities. *Organisation Science*, 11(4), pp. 448–469.

Shane, S. (2000). Prior knowledge and the discovery of entrepreneurial opportunities. *Organisation Science*, 11(4), pp. 448–469.

Shane, S. (2003). *A General Theory of Entrepreneurship: The Individual-opportunity Nexus.* UK: Edward Elgar Publishing Limited

Shane, S. A., and Venkataraman, S. (2000). The promise of entrepreneurship as a field of research. *Academy of Management Review*, 25, pp. 217-226.

Shane, S., Nicolaou, N., Cherkas, L., and Spector, T. D. (2010). Do openness to experience and recognizing opportunities have the same genetic source? *Human Resource Management*, 49(2), pp. 291–303

Shaughnessy H (2010) *How semantic clustering helps analyse consumer attitudes. http://blogs. hbr.org/research/2010/07/every-day-in-the-english.html*

Shaw, E., and Carter, S. (2007). Social entrepreneurship: theoretical antecedents and empirical analysis of entrepreneurial processes and outcomes. J*ournal of Small Business and Enterprise Development*, 14(3), pp. 418–434.

Shepherd, D. A., and Lévesque, M. (2002). A search strategy for assessing a business opportunity. *IEEE Transactions on Engineering Management*, 49(2), pp. 140–154.

Shim, J.P., Shin, Y.B. and Nottingham, L., 2002. Retailer web site influence on customer shopping: exploratory study on key factors of customer satisfaction. *Journal of the Association for Information systems*, 3(1), pp. 3.

Smaling, A., 2003. Inductive, analogical, and communicative generalisation. *International Journal of Qualitative Methods*, 2(1), pp.52-67.

Smith,B.R., Matthews,C.H., and Schenkel, M. T. (2009).Differences in entrepreneurial opportunities: the role of tacitness and codification in opportunity identification. *Journal of Small Business Management*, 47(1), pp. 38–57.

Srnicek, N. (2017), The challenges of platform capitalism: Understanding the logic of a new business model. *Juncture, 23: 254-257*.

Stake, R.E., 2013. *Multiple case study analysis*. Guilford Press.

Stenmark, D. (2001) The Relationship between Information and Knowledge, in Proceedings of IRIS 24, Ulvik, Norway, August 11-14.

Sternberg, R.J. (2005). Creativity or creativities? *International Journal of Human Computer Studies*, 63, pp. 370–382.

Stets, J. E., and Burke, P. J. 2000. Identity theory and social identity theory. *Social Psychology Quarterly*, 63, pp. 224 - 237.

Stevenson, H. H., and Jarillo, J. C. 1990. A paradigm of entrepreneurship: Entrepreneurial

Stevenson, H. H., Roberts, M. J., Grousbeck, H. I. (1985), '*New Business Ventures and the Entrepreneurs,*' Irwin, Homewood II,

Suša Vugec, D., Tomičić-Pupek, K. and Vukšić, V.B., 2018. Social business process management in practice: Overcoming the limitations of the traditional business process management. International Journal of Engineering Business Management, 10, p.1847979017750927.

Tang, J. (2010). How entrepreneurs discover opportunities in China: an institutional view. *AsiaPacific Journal of Management*, 27(3), pp. 461–479.

Tenebaum, J. M., (2006), AI meets web 2.0. *AI Magazine*, 27(4), pp. 47 – 68.

Tesch, R., 1990. *Qualitative research: Analysis types and software*. Routledge.

The Guardian, (2017). *https://www.theguardian.com/business/2017/jun/27/google-braces-for-record-breaking-1bn-fine-from-eu, last accessed: 22 January 2019.*

Tominc, P., and Rebernik, M. (2007). Growth aspirations and cultural support for entrepreneurship: a comparison of post-socialist countries. *Small Business Economics*, 28(2–3), pp. 239–255.

Tsou, H. T., (2012). Collaboration competency and partner match for e-service product innovation through knowledge integration mechanisms, *Journal of Service Management*, 23(5), pp. 640 – 663.

Tumasjan, A. and Braun, R. (2011). In the eye of the beholder: How regulatory focus and self-efficacy interact in influencing opportunity recognition. *Journal of Business Venturing*, doi: 10.1016/j.jbusvent.2011.08.001.

Tushman ML, O'Reilly CA (1996) Ambidextrous organisations: managing evolutionary and revolutionary change. *Calif Manage Rev,* 38, pp. 8–30

Ucbasaran, D., Westhead, P., and Wright, M. (2008). Opportunity identification and pursuit: does an entrepreneur's human capital matter? *Small Business Economics*, 30(2), pp. 153– 173.

Ucbasaran, D., Westhead, P., and Wright, M. (2009). The extent and nature of opportunity identification by experienced entrepreneurs. *Journal of Business Venturing*, 24(2), pp. 99–115.

Ucbasaran, D., Wright, M., and Westhead, P. (2003). A longitudinal study of habitual entrepreneurs: starters and acquirers. *Entrepreneurship and Regional Development*,15(3), pp. 207–228.

Vaghely, I. P., and Julien, P. (2010). Are opportunities recognized or constructed? An information perspective on entrepreneurial opportunity identification. *Journal of Business Venturing*, 25(1), pp. 73–86.

Van Burg, E., Podoynitsyna, K., Beck, L., Lommelen,T., (2012). Directive deficiencies: how resource constraints direct opportunity identification in SMEs. *J. Prod. Innov.Manag*.29(6), pp. 1000–1011.

Van Gelderen, M. (2007). Country of origin as a source of business opportunities. International *Journal of Entrepreneurship and Small Business*, 4(4), pp. 419–430.

Van Mannen, J., (1979), 'The fact of fiction in organisational ethnography,' *Administrative Science Quarterly*, 24, pp. 539-550.

Vandekerckhove, W., and Dentchev, N. A. (2005). A network perspective on stakeholder management: facilitating entrepreneurs in the discovery of opportunities. *Journal of Business Ethics*, 60(3), pp. 221–232.

Venkataraman, S. (1997).'*The Distinctive Domain of Entrepreneurship Research: An Editor'sPerspective,* In Advances in Entrepreneurship Emergence and Growth

Vidgen, R., Francis, D., Powell, P., and Woerndl, M., (2004). Web service business transformation: collaborative commerce opportunities in SMEs, *Journal of Enterprise Information Management,* 7(5), pp. 372 – 382.

Walsham, G., 1993. *Interpreting information systems in organisations* (Vol. 19). Chichester: Wiley.

Walsham, G., 1995. Interpretive case studies in IS research: nature and method. *European Journal of information systems*, 4(2), pp.74-81.

Wang, Y. L., and Ellinger, A. D. (2009). Examining the relationships between information acquisition, entrepreneurial opportunity recognition, and innovation performance through the development and validation of a new measure to assess information acquisition in the high technology sector in Taiwan. *International Journal of Entrepreneurship and Innovation Management*, 9(3), pp. 313–342.

Ward, T.B. (2007). Creative cognition as a window on creativity. *Methods*, 42, pp. 28–37.

Webb, J. W., Ireland, R. D., Hitt, M. A., Kistruck, G. M., and Tihanyi, L. (2011). Where is the opportunity without the customer? An integration of marketing activities, the entrepreneurship process, and institutional theory. *Journal of the Academy of Marketing Science*, 39(4), pp. 537–554.

Welling, H. (2007). Four mental operations in creative cognition: The importance of abstraction. *Creativity Research Journal*, 19, pp. 163–177.

Westhead, P., Ucbasaran, D., and Wright, M. (2009). Information search and opportunity identification: the importance of prior business ownership experience. *International Small Business Journal*, 27(6), pp. 659–680.

Wong, P. K., Lee, L., and Foo, M. D. (2008). Occupational choice: the influence of product vs. process innovation. *Small Business Economics*, 30(3), pp. 267–281.

Wood, M. S. and McKinley, W. (2010). The production of entrepreneurial opportunity: a constructivist perspective. *Strategic Entrepreneurship Journal*, 4(1), pp. 66-84.

Yin, R.K., 2013. *Case study research: Design and methods*. Sage publications.

Zahra, A. S., Matherne, B. P., and Carleton, J. M., (2003). Technological resource leveraging and the internationalisation of new ventures, *Journal of International Entrepreneurship*, 1(2), pp. 163 – 186.

Zahra, S. A., and George, G. (2002). The net-enabled business innovation cycle and the evolution of dynamic capabilities. *Information Systems Research*, 13(2), pp. 147–150.

Zahra, S. A., Gedajlovic, E., Neubaum, D. O., and Shulman, J. M. (2009). A typology of social entrepreneurs: motives, search processes and ethical challenges. *Journal of Business Venturing*, 24(5), pp. 519–532.

Zahra, S. A., Yavuz, R. I., and Ucbasaran, D. (2006). How much do you trust me? The dark side of relational trust in new business creation in established companies. *Entrepreneurship: Theory and Practice*, 30(4), pp. 541–559.

Zhang, Y.W. and Wildemuth, B.M., 2010. BM 2009,'*Qualitative analysis of content'. Applications of Social Research Methods to Questions in Information and Library*, pp.1-12.

Zhu, Z., and Lin, S. F., (2015). Entrepreneurial Perceptions and E-business Opportunity Discovery: Evidence from China, *Thirty Sixth International Conference on Information Systems*, Fort Worth 2015

Zhuang, B., Liu, L., Li, Y., Shen, C. and Reid, I.D., 2017, July. Attend in groups: a weakly-supervised deep learning framework for learning from web data. In *CVPR, 1*(2), pp. 7).

8. APPENDICES

Appendix 1: Review Group

Person/Expert	Why this person was chosen?	How was this person involved in the review?
Senior Scholar	Academic Expert in the field of Business and Management. Principle Review Supervisor, Head of School of Business at Maynooth University.	Provided academic guidance and support in all aspects of systematic literature review, especially entrepreneurship area in this review.
Senior Scholar	Academic Expert in the field of information technology management. Lecturer in information systems, innovation and IT management at Maynooth University.	Provided academic guidance and support in all aspects of systematic literature review, especially on web technologies area in this review.
Recent PhD Graduate	Researcher. Lecturer of Human Resources at Maynooth University.	As a recent PhD graduate, he gave view points on how to go about conducting literature review, manage time, effectively using search databases and helped in locating academic journals.
Practitioner	Project Manager in large IT firm. Managing the '*Webx connect System*' [a tool to exploit web 2.0 technologies for entrepreneurial opportunities]	Gave view points on web 2.0/3.0 platform for businesses, unified communication technologies and social software as a service for business. Gave practitioner's view on web technologies for businesses.
Senior Practitioner	CTO in large IT firm. Involved in process of developing *'Data Analytics Software'* for web mining which will do pattern recognition from user generated content in social software environment.	Gave view points on web 2.0/3.0 platform for businesses. Provided documents related to web 2.0 technologies exploitation in business.
Practitioner	Entrepreneurial Manager / ICT Services Manager in IT firm. Working on project involving web technologies implementation for collaboration practices within and outside organisation	Gave view points on the investment in web 2.0/3.0 platform for businesses and challenges of establishing social and collaboration platform for small companies
Researcher, Academic	Researcher of ICT in business	Gave view points on topic in general. Helped locate relevant papers.
Practitioners	Two Start-up Entrepreneurs. Co-Founders of Fintech company. Extensively use web technologies for business.	Gave view points on the risks and challenges involved in implementing social software architecture for entrepreneurial opportunities discovery.

Senior Information Scientist	Subject Specific librarian [business and IT] at Maynooth University.	Helped in creating bibliographic database, correcting search string (s), searches in databases and locating papers in business and management.
Information Scientist	Subject specific librarian [business and IT] at Maynooth University.	Helped in creating bibliographic database, correcting search string (s), searches in databases and locating papers.

Appendix 2: Pilot Searches

Keyword 1:	Keyword2:	Keywords 3:
Evolving Web technologies	Entrepreneurial Opportunities	E-Business

Pilot Searches (Review 1 and 2, Search string and Search Results)

Search string 1: ("web 2.0 technologies" OR web technologies OR "second generation web" OR new technologies OR "IT" OR "ICT" OR information technology OR online interaction OR online communities OR communication technologies OR business technologies OR social media* OR social software OR user generated content* OR Interactive technologies OR "ubiquitous technologies" OR ubiquitous computing OR virtual community OR virtual life OR virtual reality OR "social computing" OR knowledge system OR internet technologies OR social interaction OR web interaction* OR internet interaction OR augmented reality OR context aware* OR mobile sensing* OR social network* OR commerce technologies OR social commerce*) AND

Search string 2: ("entrepreneurship" OR entrepreneur* OR entrepreneurship* OR "entrepreneurial" OR new opportunities* OR business opportunity OR IT business opportunities OR "business opportunities" OR enterprise opportunities OR well timed business* OR business advantage* OR favourable idea OR initiative OR business platform* OR access OR break through OR new business OR new product OR new service OR new idea OR new market OR business restructuring OR business formulation OR opportunity establishment OR business innovation OR business building OR profit OR invention OR invent OR opportunity verification OR "opportunity exploitation" OR entrepreneurism OR entrepreneurism OR "entrepreneurial opportunities" OR "entrepreneurial opportunities" OR entrepreneurial activity* OR entrepreneurial activity* OR "entrepreneurial" OR technology entrepreneurship OR technology entrepreneur) AND

Search string 3: ("e-business" OR "e business" OR "e-business" OR online business OR IT business OR ICT business OR internet business OR web business OR e ventures OR e-ventures OR e-ventures OR ecommerce OR e-commerce OR e commerce OR digital business OR digital commerce OR electronic business OR "corporate entrepreneurship" OR "innovative business" OR virtual business OR technology business OR electronic commerce OR dotcom business OR dot-com business OR IT firm OR IT organisation OR virtual business)

Appendix 2 (Cont...) - Pilot Searches (Review 1 and 2, Search string and Search Results)

Search Database: EBSCO host Search Screen: Advanced Search Source type: Academic Journals Years: All Search modes: Boolean/Phrase Language: English

	Results	Relevant
Strings 1 only	128555Papers	Refine
Strings 2 only	201400Papers	Refine
Strings 3 only	24,344Papers	Refine
Strings 1 and 2	22,179Papers	Refine
Strings 1 and 3	5,648 Papers	Refine
Strings 2 and 3	6,768Papers	Refine

Appendix 3: Results of New Searches

Interface: EBSCO Databases: EBSCO Search Screen: Advanced Search Select Field: Open Years: All Search modes: Boolean/Phrase Publication: Academic Journals Limiters : Language: English; Alert: Set	**Interface: Emerald Management** Search Screen: Advanced Search Select Field: Open Years: All Search modes: Boolean/Phrase Publication: Academic Journals Limiters : Language: English; Alert: Set	
Search Databases	**Search Results**	
Business Source Complete Academic Source Complete Social Science Full Index Econlit Full index PyscArticles	74	
Emerald Management X	336	**Total = 410 Papers**

Appendix 4: List of Papers Identified from Academic Network Approach

1. Manlio Del Giudice 2011 and Detmar Straub 2011 “IT and Entrepreneurism: An On- Again, Off-Again Love Affair or a Marriage?” *MIS Quarterly* Vol. 35 No. 4— Supplement/December 2011
2. Fernando J. Garrigos-Simon, Rafael LapiedraAlcamí, Teresa Barberá Ribera, (2012) "Social networks and Web 3.0: their impact on the management and marketing of organisations", Management Decision, Vol. 50 Iss: 10, pp.1880 – 1890. [Came in search string]
3. Liang, T, and Turban, E 2011, 'Introduction to the Special Issue Social Commerce: A Research Framework for Social Commerce', *International Journal of Electronic Commerce*, 16, 2, pp. 5-14. [Came in search string]
4. Ajit Kambil, (2008) "What is your Web 5.0 strategy?", *Journal of Business Strategy*, Vol. 29 Iss: 6, pp.56 – 58 [Came in search string]

Appendix 5: List of Papers Identified by Snowballing Search Strategy

1. Murugesan, S. Understanding Web 2.0. IEEE IT Professional 9, 4 (2007), 34–41
2. Gani A., and Sharma, B. 2003. "The Effects of Information Technology Achievement and Diffusion on Foreign Direct Investment," *Perspectives on Global Development and Technology* (2: 2), pp. 161-178.
3. Koplowitz, R. and Young, G. Web 2.0 Social Computing Dresses Up for Business. Forrester Research, Cambridge, MA, 2007
4. Culnan, M.J.; McHugh, P.J.; and Zubillaga, J.I. How large U.S. companies can use Twitter and other social media to gain business value. mIS Quarterly Executive, 9, 4 (2010), 243–259
5. Zott, C. et al. the business model: recent developments and future research. Journal of Management 37, 4 (2011), 1019–1042.
6. Jones, C., Hecker, R., and Holland, P. (2003). Small firm internet adoption: Opportunities forgone, a journey not begun. Journal of Small Business and Enterprise Development, 10(3), 10.
7. Schmengler, K., and Kraus, S. (2010). Entrepreneurial marketing over the internet: an explorative qualitative empirical analysis. International Journal of Entrepreneurial Venturing, 2(1), 15.
8. Li C, Bernoff J. (2008) Groundswell: winning in a world transformed by social technologies. Boston, MA: Harvard Business School Press.
9. See, S. L. 2004. "Corporate Entrepreneurship: Exploiting Technologies for Innovation Discovery and Breakthrough," in *Proceedings of the Engineering Management Conference IEMC 2004* (Volume 2), October 18-21, pp. 699-702.
10. Leitão, J., and Ferreira, J. 2009. "Entrepreneurship and ICT: A Comparative Analysis between Germany and Portugal," International Journal of Entrepreneurship and Small Business, 7(3), pp. 324-346.
11. Debabroto Chatterjee, Rajdeep Grewal and V. Sambamurthy MIS Quarterly , Vol 26, No. 2 (Jun., 2002), pp. 65-89 [Fulfilled Selection Criteria]
12. Hendler, J. (2009), "Web 3.0 emerging", Computer, Vol. 42 No. 1, pp. 111-3. [Fulfilled Selection Criteria]

Appendix 6: Protocol Driven Search

Protocol driven Searches	410
Business Source Compete, Academic Search complete, Econ Lit, and Social Science Full text, PyscAricles	74
Emerald Management X	336
	Filtration of Protocol driven= 50
Snowballing Searches	13
Reference tracking	12
Further papers of key Authors	1
	Relevant Papers = 3
Academic Network Approach	4
	Relevant Papers = 1 [3 other appeared in search results]
Total Papers Identified	54 (see appendix 4)

Appendix 7: Selection and Classification of Remaining papers

Paper by	Fits Selection Criteria Y/N	Include Y/N. Assessment Criteria	Reason for Inclusion
Fernando et al. 2012	Y	Y – Criteria 1	Discusses the entrepreneurial organisations using web technologies in their business to gain competitive advantage, idea generation, restructuring, transformation and discovering entrepreneurial opportunities
Tsou (2012)	Y	Y- Criteria 3	Measures organisational performance in terms of their restructuring or formation of businesses lead by the identification of successful opportunity through the use of evolving web technologies
Karakas and Manisaligil (2012)	Y	Y – Criteria 2	Addresses the effect of web technologies on entrepreneurial organisations. The studies which deals with role of technologies in entrepreneurial endeavours.
Gayle et al. 2012	Y	Y – Criteria 3	Addresses the effect of web technologies on entrepreneurial organisations.
Pierson and Heyman (2011)	Y	Y- Criteria 3	Addresses the effect of web technologies on entrepreneurial organisations.
Hlavinka (2011)	Y	Y –Criteria 2	Discusses the entrepreneurial organisations using web technologies in their business to gain competitive advantage, idea generation, restructuring, transformation and discovering entrepreneurial opportunities
Remy et al. (2010)	Y	Y –Criteria 3	Addresses the influence Web 2.0 evolution has on business transformation
Ramaswamy (2010)	Y	Y – Criteria 2	Addresses the effect of web technologies on entrepreneurial organisations. The studies which deals with role of technologies in entrepreneurial endeavours
Rudman (2010)	Y	Y – Criteria 2	Measures organisational performance in terms of their restructuring or formation of businesses
Eijkman (2010)	Y	Y – Criteria – 2	Measures organisational performance in terms of their restructuring or formation of businesses
Liana et al. (2009)	Y	Y – Criteria – 3	Measures organisational performance in terms of their restructuring or formation of businesses
Vehovar and Lesjak (2007)	Y	Y – Criteria 3	Measures organisational performance in terms of their restructuring or formation of businesses
Kambil (2008)	Y	Y – Criteria 1	Addresses the impact of evolving web technologies may have on the discovery of entrepreneurial opportunities
Drago et al (2011)	Y	Y – Criteria 2	Addresses the effect of web technologies on entrepreneurial organisations.
Sako (2012)	Y	Y – Criteria 2	Addresses the effect of web technologies on entrepreneurial organisations.
Cromer (2010)	Y	Y – Criteria 3	Addresses the influence Web 2.0 evolution has on business transformation
Hemanth (2011)	Y	Y – Criteria 2	Addresses the effect of web technologies on entrepreneurial organisations.
Lahm (2011)	Y	Y – Criteria 2	Addresses the influence Web 2.0 evolution has on business transformation

Julia et al. (2011)	Y	Y – Criteria 3	Addresses the effect of web technologies on entrepreneurial organisations.
Ernst-Joachim et al (2010)	Y	Y – Criteria 2	Addresses the effect of web technologies on entrepreneurial organisations.
Chen (2005)	Y	Y – Criteria 2	Addresses the influence Web 2.0 evolution has on business transformation
Chang (2005)	Y	Y – Criteria 3	Addresses the effect of web technologies on entrepreneurial organisations.
Feeny (2001)	Y	Y – Criteria 2	Addresses the impact of evolving web technologies may have on the discovery of entrepreneurial opportunities
Mangelsdorf and Martha (2007)	Y	Y – Criteria 2	Addresses the impact of evolving web technologies may have on the discovery of entrepreneurial opportunities
Boyles (2011)	Y	Y – Criteria 2	Address the impact of evolving web technologies may have on the discovery of entrepreneurial opportunities
Hendler (2009)	Y	Y – Criteria	Addresses the effect of web technologies on entrepreneurial organisations.
Debabroto et al. 2002	Y	Y – Criteria 1	Measures organisational performance in terms of their restructuring or formation of businesses

Paper	**Fits Selection Criteria Y/N**	**Include Y/N Assessment Criteria**	**Reason for Inclusion**
Liang, T, and Turban, E 2011, 'Introduction to the Special Issue Social Commerce: A Research Framework for Social Commerce', *International Journal Of Electronic Commerce*, 16, 2, pp. 5-14.	Y	Y–Criteria 3	Discusses the effect of web technologies on entrepreneurial organisations. Address the influence Web 2.0 evolution has on business transformation.
Manlio Del Giudice 2011 and Detmar Straub 2011 "IT and Entrepreneurism: An On-Again, Off-Again Love Affair or a Marriage?" MIS Quarterly Vol. 35 No. 4—Supplement/December 2011	Y	Y- Criteria 1	Discusses the entrepreneurial organisations using web technologies in their business to gain competitive advantage, idea generation, restructuring, transformation and discovering entrepreneurial opportunities.
Shane, S., 'Prior Knowledge and the Discovery of Entrepreneurial Opportunities,' *Journal of Organisation Science*, (11:4), 2000, pp. 448 – 469.	Y	Y -Criteria 2	Measures the role of prior knowledge on the discovery of entrepreneurial opportunities.

Park, John S. "Opportunity recognition and product innovation in entrepreneurial hi-tech start-ups: a new perspective and supporting case study." *Technovation*25.7 (2005): 739-752.	Y	Y- Criteria 1	Addresses the impact of technology exploitation on the discovery of entrepreneurial opportunities

Appendix 8: Consent Form

I……agree to participate in [*name*]'s research study.

The purpose and nature of the study has been explained to me in writing.

I am participating voluntarily.

I give permission for my interview with [*name*] to be tape-recorded. I have the option to be identified but neither mine nor my organisational details will be identified in analysis or any publication of this research.

I understand that I can withdraw from the study, without repercussions, at any time, whether before it starts or while I am participating.

I understand that I can withdraw permission to use the data within two weeks of the interview, in which case the material will be deleted.

I understand that anonymity will be ensured in the write-up by disguising my identity.

I understand that pseudonyms will be used; the extracts from my interview may be quoted in the thesis and any subsequent publications if I give permission below:

(Please tick one box):

- I agree to quotation/publication of extracts from my interview
- I do not agree to quotation/publication of extracts from my interview

Signed…… Date…….

Appendix 9: Prior studies concerning the role of web technologies in EOD

Technology Construct **Description of the Construct**	**Relationship with other factors**	**Relationship with EOD** **Findings**	**Authors**
E-Collaboration Technologies	N/A[2]	E-Collaboration --> EOD	Bidgoli, (2012) Naser Valaei and Sajad Rezaei (2017)
Web Technologies as a whole[1]	Web--> Knowledge/ New Information	Web--> Knowledge --> EOD	Chao (2016) Boyles, (2011)

Web Technologies as a whole	Web --> Social Capital	Web--> Social Capital --> EOD	Chang, (2012) Newman et al. (2016)
Web-Blogs	Web-Blogs --> Knowledge	Web-Blogs --> Knowledge--> EOD	Chau and Xu, (2012)
Web Technologies as a whole	N/A	Web --> EOD	Chen, (2005)
Web Technologies as a whole	Web --> Means to Serve Customers	Web --> Means to Serve Customers --> EOD	Cromer, (2010)
Web Technologies as a whole	Web --> Knowledge	Web --> Knowledge --> EOD	Dutta et al., (2015)
Web Technologies as a whole	Web --> Knowledge	Web--> Knowledge--> EOD	Eijkman, (2010)
Social Networks	Social Networks --> Decision Management	Social Networks --> Decision Management-->EOD	Garrigos-Simon et al., (2012)
Web Technologies as a whole	Web--> Knowledge	Web--> Knowledge--> EOD	Kambil, (2008)
Web Technologies as a whole	Web --> Learning and Knowledge	Web--> Learning and Knowledge--> EOD	Karakas and Manisaligil, (2012)
Web-Blogs	Blogs--> Knowledge	Blogs--> Knowledge-->EOD	Lahm (2006)
Web Technologies as a whole	Web--> Knowledge	Web--> Knowledge--> EOD	Levy, (2009)
Web Technologies as a whole	Web--> Market Knowledge	Web--> Market Knowledge--> EOD	Lim et al., (2011)
Web Technologies as a whole	Web--> Social Network Knowledge	Web--> Knowledge, Social Network--> EOD	Mahmood and Richardson, (2011)
Web Technologies as a whole	Web--> Knowledge	Web--> Knowledge--> EOD	Razmerita et al., (2009)
Web Technologies as a whole	Web--> Knowledge	Web--> Knowledge--> EOD	Tenenbaum, (2006)
Web Technologies as a whole	Web--> Knowledge	Web--> Knowledge--> EOD	Tsou, (2012)
Web Technologies as a whole	N/A	Web--> EOD	Vidgen et al., (2004)

[1] "Web Technologies as a whole" means when the implication of several Web-based technologies is being investigated.

[2] "N/A" means that the study did not talk about the Web's relationship with pertinent factors that influence EOD

Appendix 10: Case A Key statements

Sub-Factors	Variables	# KS	Key Statement
External pressure: from competitors	Use of new techs by competitors	1	External pressure in technology-based organisations
External pressure: from competitors	Use of new techs by competitors	2	Measures to innovate rapidly
External pressure: from competitors	Use of new techs by competitors	3	Adopt new technology or think of better alternatives
External pressure; from customers	Customers' feedback	4	Pressure leads to innovation
External pressure; from customers	Customers' feedback	5	Pressure leads to improving customer services
External pressure; from customers	Customers' feedback	6	Opens up new opportunities
External pressure and maturity of organisation	Maturity of business processes	7	Firm's maturity through technology adoption
External pressure and maturity of organisation	Maturity of business processes	8	Less pressure from external stakeholders
External pressure and maturity of organisation	Maturity of business processes	9	Internal processes improvement holds key
External environment; social climate	Social circumstances	10	Business ventures are grounded in context
External environment; social climate	Social circumstances	11	Advantage of current social climate to shape their creation
External environment; local trends	Trends	12	Businesses need to be sensitive to current local customers trends
External environment; local trends	Trends	13	Success of business targeting different communities
External environment; emerging technologies	Emerging technologies	14	Higher risk in emerging markets

and markets			
External environment; emerging technologies and markets	Emerging technologies	15	Need to legitimise the market to the consumer
IT infrastructure	IT resources	16	Use of variety of tools to gather and share knowledge with customers
IT infrastructure	IT resources	17	Users involved in the development process
IT infrastructure	Computing resources	18	Companies benefit from an web technologies bases IT infrastructure
IT infrastructure	Computing resources	19	Small companies need not huge resources for infrastructure
Entrepreneurial internal environment; physical resources	Physical setup	20	Employees designing their working environments
Entrepreneurial internal environment; physical resources	Physical setup	21	Small meeting rooms to enable more intensive meetings
Entrepreneurial internal environment; physical resources	Physical setup	22	Sharing ideas in IT enabled environment
Entrepreneurial environment; physical resources	Physical setup	23	Use of funky furniture
Entrepreneurial environment; physical resources	Physical setup	24	Informal atmosphere within organisation can facilitate creativity
Occupational identities	Role allocation	25	Managers sometime face a conflict of their occupational identities
Occupational identities	Role allocation	26	Hinder managers making accurate and efficient decisions
Occupational identities	Role allocation	27	Conducting meetings with individualized occupational identities
Occupational identities	Role allocation	28	One person has to act within the boundaries of one role only
Collaboration among stakeholders	CIT for collaboration	29	High level and quality of communication and collaboration with all the stakeholders
Collaboration among	CIT for collaboration	30	Use evolving web along with predictive analytics to know what the customers' exact needs

stakeholders			
Collaboration among stakeholders	CIT for collaboration	31	Exploit emerging web ’s capabilities to find new business leads
Collaboration among stakeholders	CIT for collaboration	32	Media interaction with customers
Collaboration among stakeholders	CIT for collaboration	33	Business based on providing alternatives to promotional items
Collaboration among stakeholders	CIT for collaboration	34	Providing best user experience
Knowledge about customers	Customers' emotions and behaviour	35	Social media platforms provide an excellent corridor to acquire knowledge
Knowledge about customers	Customers' emotions and behaviour	36	Online customers’ emotional and behavioural experiences about daily life events
Knowledge about customers	Customers' emotions and behaviour	37	Tools that analyses emotional responses from the online forums
Knowledge about customers	Customers' emotions and behaviour	38	Communicate knowledge to clients
Knowledge about customers	Customers' emotions and behaviour	39	Products recommendations for customers using analytics
Market reach	Reaching market	40	Social media as an enterprise app store
Market reach	Reaching market	41	Social media creating an opportunity for marketing practitioners
Market reach	Reaching market	42	Low cost associated with web technologies
Market reach	Reaching market	43	New technologies to enter in big data analytics related markets
New entrepreneurial opportunities	EOD	44	Exploit emerging web ’s capabilities to find new business leads
New entrepreneurial opportunities	EOD	45	Evolution of web is opening up new entrepreneurial opportunities
New entrepreneurial opportunities	EOD	46	New ways of staying in touch and getting clients know through social media
Entrepreneurial alertness	Ability to evaluate new info	47	Evaluate the available information different from the normal approaches
Entrepreneurial alertness	Proactivity	48	Entrepreneurial alertness can only work when there is suitable environment around an entrepreneur
Entrepreneurial alertness	Proactivity	49	An entrepreneur has also to be proactively searching for opportunities

Entrepreneurial alertness	Optimal use of resources	50	Enough resources and support available to the entrepreneur
Entrepreneurial alertness	Combining knowledge with experience	51	Knowledge is a crucial factor in noticing new opportunities
Entrepreneurial alertness	Combining knowledge with experience	52	Experience is a crucial factor in noticing new opportunities
Cognitive abilities	Higher order cognition	53	Encouragement to make conscious efforts to discover new opportunities
Cognitive abilities	Higher order cognition	54	Cognitive abilities to solve problems and come up with innovative solutions
Imagination	Thinking about opportunities	55	Brain storming sessions for innovation
Imagination	Thinking about opportunities	56	Knowledge is very important in discovering new business leads
Imagination	Thinking about opportunities	56	Entrepreneurial imagination is vital
Imagination	Thinking about opportunities	57	Conducting systematic search or sharing with one's peers
Imagination	Thinking about opportunities	58	A creative entrepreneur can imagine more opportunities than a less creative entrepreneur
Leadership	Ability to lead	59	Leadership is an important attribute of an entrepreneur
Leadership	Ability to lead	60	Leadership should be taught to students at college level
Leadership	Ability to lead	61	Students be given the role of project manager
Risk taker	Comfort with risk	62	Comfort with risk is most important
Risk taker	Comfort with risk	63	Identifying the consumer need before competitors
Breadth of knowledge	Knowledge of new techs	64	Knowledge of new technologies important
Breadth of knowledge	Knowledge of new techs	65	Knowledge enable firms to enter into new markets
Breadth of knowledge	Knowledge of new techs	66	Extension of knowledge brought along allow for new markets to be attained
Depth of knowledge	Deep learning	67	Encouragement of continuous learning
Depth of knowledge	Deep learning	68	Entrepreneurial spark gained from other experiences
Depth of knowledge	Deep learning	69	Staff encouraged to self-learn new systems
Depth of knowledge	Deep learning	70	Reinforces new learning and evaluation skills
Explicit knowledge	Formal education	71	Formal education necessary
Explicit	Formal	72	Technical knowledge useful resource

knowledge	education		
Explicit knowledge	Formal education	73	Talent acquisition pre planned
Explicit knowledge	Formal education	74	Placements before graduation
Tacit knowledge	Experiential education	75	Strength of entrepreneurship lives in the will to create
Tacit knowledge	Experiential education	76	Human capital to acquire knowledge in diverse domains
Tacit knowledge	Experiential education	77	Determine future activity of the company
Knowledge of anticipated customers/ market needs	Predicting customers' needs	78	High level communication with the stakeholders
Knowledge of anticipated customers/ market needs	Predicting customers' needs	79	Quality collaboration with the stakeholders
Knowledge of anticipated customers/ market needs	Predicting customers' needs	80	Evolving web to know what the customers' exact needs are
Knowledge of anticipated customers/ market needs	Predicting customers' needs	81	Predictive analysis for future customers' needs
Knowledge of anticipated customers/ market needs	Predicting customers' needs	82	Every single problem for a customer can become a service sold.
Knowledge of anticipated customers/ market needs	Predicting customers' needs	83	High degree of accessibility to customers
Knowledge of anticipated means to satisfy needs	Finding ways to solve customers' needs	84	Lists of problems encountered by people in the daily life
Knowledge of anticipated means to satisfy needs	Finding ways to solve customers' needs	85	Data analytics to satisfy customers' needs
Knowledge of anticipated means to satisfy needs	Finding ways to solve customers' needs	86	Start-ups come up with ideas in response to a market condition
Knowledge of anticipated means to satisfy needs	Finding ways to solve customers' needs	87	Start-ups come up with ideas in response to a perceived market need
Research collaboration	Collaborative research projects	88	Collaboration of research helps in product creation and diversity
Social Capital	B2b and b2c	89	Social capital leads to company growth.

	networks		
	B2b and b2c networks	90	Development networks opens up new information
	B2b and b2c networks	91	B2b e-seminars opens up new information
	Strong ties/ Quality of relationship	92	Quality of network is far more important
Social Capital	Strong ties/ Quality of relationship	93	Network size does not matter much
Social Capital	Strong ties/ Quality of relationship	94	Quality social interactions good for well being
Social Capital	Strong ties/ Quality of relationship	95	Web as a tool for social connectivity
Social Capital	Strong ties/ Quality of relationship	96	Content is the critical piece in social media puzzle
Systematic search	Searching for new leads	97	Team collaboration for new ideas
Systematic search	Searching for new leads	98	Searching for new ideas through sales leads
Systematic search	Searching for new leads	99	Team collaboration for new ideas
Systematic search	Searching for new leads	100	Brainstorming for new ideas
Systematic search	Searching for new leads	101	Web based brain storming
Systematic search	Searching for new leads	102	Easy evaluation of new opportunities

Appendix 11: Case B Key statements

Sub-Factors	**Variables**	**# KS**	**Key Statement (KS)**
External pressure	Comments from partners	103	Partnerships important for technology-based companies
External pressure	Comments from partners	104	Partner's feedback enhances firm's capability
External pressure	Comments from partners	105	Out of box thinking lead to new opportunities
External pressure	External circumstances	106	Suggestions from partners to improve operational processes
External pressure	External circumstances	107	Suggestions from customers to improve operational processes
External environment	Governments decision	108	External circumstances open opportunities for new markets
External	Governments	109	Extensions in existing markets arise

environment	decision		
External environment	Governments decision	110	Entrepreneur alertness on opportunities
External environment	Adapting IT	111	Uncertainty due to Brexit
External environment	Adapting IT	112	Brexit a challenge for technology-based firms
External environment	Adapting IT	113	Opportunities for the technology-based firms
IT infrastructure	Adapting new technologies	114	Adapting IT infrastructure to scale the firm
IT infrastructure	Adapting new technologies	115	Adapting IT infrastructure allow firm to learn about inefficiencies and problems
IT infrastructure	Adapting new technologies	116	Learning about inefficiencies and problems leads to opportunities discovery
IT infrastructure	Networking technologies	117	Being able to connect with consumers is an important part of technology business
IT infrastructure	Networking technologies	118	Being able to connect with other decisions makers is an important part of technology business
IT infrastructure	Networking technologies	119	Being able to connect with internal staff is an important part of technology business
IT infrastructure	Networking technologies	120	Being able to share resources with decision makers is an important part of technology business
IT infrastructure	Networking technologies	121	Being able to share resources with internal staff is an important part of technology business
IT infrastructure	Networking technologies	122	IT infrastructure key for connecting with stakeholders
IT infrastructure	Networking technologies	123	IT infrastructure key for sharing resources with stakeholders
Entrepreneurial internal environment; physical features	Physical setup	124	Encouraging staff that no idea is a bad idea
Entrepreneurial internal environment; physical features	Physical setup	125	Share ideas in meetings and whiteboards
Entrepreneurial internal environment; physical features	Physical setup	126	Share ideas on electronic boards
Entrepreneurial internal environment; physical features	Physical setup	127	Organisational need for people to be different
Entrepreneurial internal environment; moral support	Positive organisational environment	128	Encouraging is the key for entrepreneurial managers to perform optimally
Entrepreneurial internal environment;	Positive organisational environment	129	Positive environment is the key for entrepreneurial managers to perform optimally

moral support			
Occupational identities	Unique roles on temporary basis	130	Assigning unique roles to different individuals is considered very important in our organisation
Occupational identities	Unique roles on temporary basis	131	Assigning unique roles helps staff involve in entrepreneurial activities
Occupational identities	Unique roles on temporary basis	132	Assigning unique roles help in achieving focus
Occupational identities	Expectations of the roles	133	Making expectations from individual staff members clear is very important
Occupational identities	Expectations of the roles	134	Making expectations clear save staff from expressing conflicting behaviours
Occupational identities	Involvement in different roles	135	Managers involved in different job roles seem more appreciative of the new challenges
Occupational identities	Involvement in different roles	136	Managers involved in different job roles also have broader knowledge and vision
Occupational identities	Involvement in different roles	137	Unique roles make managers more efficient at identifying new opportunities
Collaboration among stakeholders	CIT for collaboration	138	The blogs and instant message are a great way to interact with people having the same interest
Collaboration among stakeholders	CIT for collaboration	139	Blogs bring people together, ideal for leisure and business
Collaboration among stakeholders	CIT for collaboration	140	Social medias can provide an unintimidating means to connect with others
Collaboration among stakeholders	CIT for collaboration	141	Networkscan provide means to share with others
Collaboration among stakeholders	CIT for collaboration	142	Tailored made solutions key for good customer experiences
Collaboration among stakeholders	CIT for collaboration	143	Productive service and experience are key
Collaboration among stakeholders	CIT for collaboration	144	Analyses of good customer experience make a better service or product which in turn leads to a more successful business
Collaboration among stakeholders	CIT for collaboration	145	Providing alternatives to promotional items at events
Collaboration among stakeholders	CIT for collaboration	146	Knowledge of what exactly annoys users so as to create the best experience when using our products
Collaboration among stakeholders	CIT for collaboration	147	The internet allows interconnectedness
Collaboration among stakeholders	CIT for collaboration	148	The internet allows management on a scale previously made impossible by communication issues

Knowledge about customers	Understanding customers	149	Big analytics is quite important to the innovativeness of organisation
Knowledge about customers	Understanding customer	150	Big analytics helps understanding customers
Knowledge about customers	Understanding customers	151	Web technologies have made job of data analysts much easier
Knowledge about customers	Understanding customers	152	Conveniently see patterns in customers' habits with almost no effort
Market reach	Reaching out to people	153	Technological advancements made world small
Market reach	Reaching out to people	154	Internet and social media have enabled us to reach out to people located in villages across the globe
Market reach	Reaching out to people	155	Digitisation has made it possible to reach out the customers located in remote areas.
Market reach	Reaching out to people	156	Globalization has made it possible to reach out the customers located in remote areas
New entrepreneurial opportunities	EOD	157	Work related information key for innovation
New entrepreneurial opportunities	EOD	158	Collaboration at work key for EOD
New entrepreneurial opportunities	EOD	159	People can more effectively innovate within interactive space
New entrepreneurial opportunities	EOD	160	Rise of social media and the web means more ways to connect
New entrepreneurial opportunities	EOD	161	Web enable collection of real time information
New entrepreneurial opportunities	EOD	162	A blog can help someone looking for information on a specific topic
New entrepreneurial opportunities	EOD	163	Blogs have global outreach
Entrepreneurial alertness	Awareness of changes	164	Entrepreneurial alertness to see the changes happening around
Entrepreneurial alertness	Awareness of changes	165	Changes around can be in technologies, markets, customers' needs, government policies
Entrepreneurial alertness	Awareness of changes	166	Track down changes means opportunities would follow automatically
Entrepreneuri	Positive	167	Positive entrepreneurial attitude crucial for an entrepreneur

al attitude	thinking		to perform well
Entrepreneuri al attitude	Positive thinking	168	Positive thinking fuel entrepreneurial passion
Cognitive abilities	Cognition	169	Cognitive abilities need to be developed for being able to see opportunities
Cognitive abilities	Cognition	170	Cognitive abilities need to be developed for being able to exploit opportunities
Cognitive abilities	High order cognition	171	Entrepreneurial cognition is important attribute of an entrepreneur
Cognitive abilities	High order cognition	172	Entrepreneurial cognition to follow with a proper entrepreneurial action
Cognitive abilities	High order cognition	173	Entrepreneurial action and cognition are inter linked
Imagination	Thinking heuristically	174	Entrepreneurs with compassion are more likely to imagine new entrepreneurial opportunities
Imagination	Thinking heuristically	175	Entrepreneurs with compassion are more likely to imagine new entrepreneurial opportunities
Imagination	Imagining a new business	176	Many businesses came into existence only in the imagination of entrepreneurs first
Imagination	Imagining a new business	177	Many businesses came into existence only in the imagination of entrepreneurs
Imagination	Imagining a new business	178	First step imagining a new business or opportunity
Leadership	Ability to manage	179	Leadership becomes far more important when you are in a corporate setting
Leadership	Ability to manage	180	Management structure is key in big corporates
Leadership	Ability to manage	181	Bad management can lead to large sections of the company failing
Breadth of knowledge	Deep learning	182	Project manager require deep learning in technological innovation in financial services
Breadth of knowledge	Deep learning	183	Not understand technology aspectsis an issue in project management
Breadth of knowledge	Deep learning	184	Deep learning key in opportunities identification process
Depth of knowledge	Knowledge of new techs	185	Stock of knowledge is openly available throughout in good organisations
Depth of knowledge	Knowledge of new techs	186	Stock of knowledge Improve integration within the team
Depth of knowledge	Deep learning	187	Having a deep knowledge of a field makes it easier to spot opportunities
Depth of knowledge	Deep learning	188	Having observational kills makes it easier to spot opportunities
Depth of knowledge	Deep learning	189	Individuals in organisation improve their evaluation process through experience
Depth of knowledge	Deep learning	190	Individuals in organisation improve their evaluation process through continuous learning
Explicit knowledge	Formal education	191	Applying new frames of reference to an existing problem can reveal interesting opportunities
Explicit knowledge	Formal education	192	Applying new frames of reference to an existing market can reveal interesting opportunities
Tacit knowledge	Experiential education	193	Tacit knowledge is important for effectively identifying new opportunities
Tacit knowledge	Experiential education	194	Explicit knowledge is important for effectively identifying new opportunities

Knowledge of anticipated customers/ market needs	Customers' needs	195	The customer or prospect is the very origin of the solutions
Knowledge of anticipated customers/ market needs	Customers' needs	196	Product must be desired by the market
Knowledge of anticipated customers/ market needs	Customers' needs	197	We use quality feedback questionnaires to involve our services and make sure the gap between expectations and reality is as small as possible
Knowledge of anticipated customers/ market needs	Customers' needs	198	Quality feedback questionnaires to make sure gap between expectations and reality is as small as possible
Knowledge of anticipated customers/ market needs	Customers' needs	199	Quality feedback questionnaires to evaluate customers' needs
Knowledge of anticipated means to satisfy needs	Ways to solve customers' needs	200	Dedicated resources for events and meetings w
Knowledge of anticipated means to satisfy needs	Ways to solve customers' needs	201	Future potential problems of customers as well as their potential solutions
Knowledge of anticipated means to satisfy needs	Ways to solve customers' needs	202	Technologies used to develop predictive analysis tools
Knowledge of anticipated means to satisfy needs	Ways to solve customers' needs	203	Predictions are key
Knowledge of demographic changes	Demographics	204	Web-technologies based companies look for opportunities among youngsters
Knowledge of demographic changes	Demographics	205	Youngsters' main users of web technologies
Knowledge of demographic changes	Demographics	206	Companies ignore the factors in demographics
Knowledge of demographic changes	Young customers	207	New opportunities lie in constraints
Knowledge of demographic changes	Demographics	208	The opportunities arising from the changes in the demographic

Knowledge of demographic changes	Demographics	209	Customers require companies allocate resources
Knowledge of demographic changes	Demographics	210	Processes in place to develop new solutions
Research collaboration	Involvement in research seminars worldwide	211	Strives to gain prime position in technological advances
Research collaboration	Involvement in research seminars worldwide	212	Scientific research key
Research collaboration	Involvement in research seminars worldwide	213	Partnership with companies, institutions and seminars around the world
Social capital	Business connections	214	Business Connections important in social capital
Social capital	Business connections	215	Quality business network important
Systematic search	Searching for new leads	216	Discovering opportunities by actively searching for them
	Searching for new leads	217	A known information domain helps individuals discover opportunities
	Searching for new leads	218	Systematic search helps to see flaws more clearly and easily

Appendix 12: Case C Key Statements

Sub-Factors	**Variables**	**# KS**	**Key Statement (KS)**
Entrepreneurial action	Actions to actively find opportunities	219	Technologies can give birth to several opportunities
Entrepreneurial action	Actions to actively find opportunities	220	Entrepreneurs have to act in order to find opportunities
Entrepreneurial action	Actions to actively find	221	Entrepreneur's timely actions key to

	opportunities		find opportunities
Entrepreneurial action	Actions to actively find opportunities	222	Active opportunity identification key
Entrepreneurial action	Proactive involvement in EOD	223	Managers involved in entrepreneurial processes must be proactive
Entrepreneurial action	Proactive involvement in EOD	224	Managers involved in talking to customers understanding their needs
Entrepreneurial action	Proactive involvement in EOD	225	Understanding various options to satisfy customers' needs
Entrepreneurial action	Proactive involvement in EOD	226	Awareness of firm's capabilities, resources and the value that it want to offer to customers
Entrepreneurial action	Proactive involvement in EOD	227	All efforts carried out in parallel facilitate managers in discovering new entrepreneurial opportunities
Entrepreneurial action	Active involvement in EOD	228	Entrepreneurial opportunity cannot be completely appreciated without an appropriate action taken by the entrepreneur
Entrepreneurial action	Active involvement in EOD	229	Organisation may involve evaluating organisation's services, resources and customers' needs
Entrepreneurial action	Find new leads	230	Active engagement with potential customers leads to new opportunities
Entrepreneurial action	Find new leads	231	Collaborations with partners lead to new opportunities
Entrepreneurial action	Engagement in creative events	232	One important factor that can lead to the identification of entrepreneurial opportunities is to attend different events and seminars
Entrepreneurial action	Engagement in creative events	233	Meeting new people and productive discussion with them
Entrepreneurial action	Engagement in creative events	234	Insights on what's happening in the industry and the world
External pressure	Customers comments	235	Regular interaction with customers and acquiring their feedback
External pressure	Customers comments	236	Extra effort in improving business processes
External environment	Governments actions	237	Adherence to government's new policies can be challenging
External environment	Governments actions	238	Government new policies lead to opportunities
IT infrastructure	Computing servers	239	Quality and quantity of servers as business scales
IT infrastructure	Computing servers	240	Improve speed and efficiency for users
IT infrastructure	Cloud computing	241	Advances in cloud computing enables small companies to acquire sophisticated IT infrastructure
IT infrastructure	Cloud computing	242	Large organisations still need in-house sophisticated IT infrastructure
IT infrastructure	Cloud computing	243	Operationalise new business ideas
IT infrastructure	Cloud computing	244	IT infrastructure to maintain competitive advantage
Internal entrepreneurial environment	Physical setup	245	Co-working spaces welcome aspiring entrepreneurs

Internal entrepreneurial environment	Physical setup	246	Helpful environment key enabler
Occupational identities	Hypothetical roles	247	Before brainstorming sessions different set of scenarios
Occupational identities	Hypothetical roles	248	Employees play a role of certain individual like an investor, customer, partner or user
Occupational identities	Hypothetical roles	249	Roles create more ideas
Occupational identities	Changing roles	250	Internal survey reveal managers with varying roles are entrepreneurial
Occupational identities	Changing roles	251	Managers with creative ideas than those who were more experienced
Occupational identities	Changing roles	252	Changing roles way better than same role
Occupational identities	Changing roles	253	Changing roles improve experiential learning
Collaboration among stakeholders	CIT for collaboration	254	Take time to hear everyone's opinions
Collaboration among stakeholders	CIT for collaboration	255	Creative input entertained
Collaboration among stakeholders	CIT for collaboration	256	Open forums such as a Slack channel for ideas and white board sessions
Collaboration among stakeholders	CIT for collaboration	257	Internal wiki helps to develop standards
Collaboration among stakeholders	CIT for collaboration	258	Using database to solve a problem
Collaboration among stakeholders	CIT for collaboration	259	Solve a problem or gain knowledge on a product or service
Collaboration among stakeholders	CIT for collaboration	260	Internal wikis and blogs give a communal access point
Collaboration among stakeholders	CIT for collaboration	261	Internal wikis alternative to hierarchy driven information
Knowledge about customers	Understanding customers	262	Obtaining knowledge about customers crucial
Knowledge about customers	Understanding customers	263	Knowledge acquisition through web technologies
Knowledge about customers	Understanding customers	264	Web analytics enables firms to predict patterns
Knowledge about customers	Understanding customers	265	Customers' interaction and feedback to better understand their needs
Market reach	Reaching out to markets and people	266	Web technologies to reach out to customers
Market reach	Reaching out to markets and people	267	Web technologies to reach out to partners
Market reach	Reaching out to markets and people	268	Increasing use of Web technologies in communication internally and externally
Market reach	Reaching out to markets and people	269	Use of Web enables latest knowledge about the needs and wants of customers
Market reach	Reaching out to markets and people	270	Use of Web enables latest knowledge about the partners
New entrepreneurial opportunities	EOD	271	Research and scrape data from the web in order to identify current trends

New entrepreneurial opportunities	EOD	272	Predict where the industry is going
New entrepreneurial opportunities	EOD	273	Predictive analysis leads to opportunity recognition
New entrepreneurial opportunities	EOD	274	Constantly questioning things and looking for problems
New entrepreneurial opportunities	EOD	275	Coming up with new ideas to innovate for the future of company
New entrepreneurial opportunities	EOD	276	User generated content is the modern way of communicating
New entrepreneurial opportunities	EOD	277	Allowing everyone to express themselves yields good information
Diversity of individuals' skills set	Diverse skills set	278	Staff involved in entrepreneurial activities possess formal education
Diversity of individuals' skills set	Diverse skills set	279	Staff possess diverse set of skills and knowledge
Diversity of individuals' skills set	Personality of individuals	280	Human capita looked in terms of breadth and depth of knowledge
Diversity of individuals' skills set	Personality of individuals	281	Relevant and diverse knowledge to what our organisation does
Diversity of individuals' skills set	Personality of individuals	282	Different people with different skill set and every individual with expert level knowledge in at least one area
Diversity of individuals' skills set	Personality of individuals	283	Human capital does not limit itself to formal education and prior experience
Diversity of individuals' skills set	Personality of individuals	284	Individual's personality corresponds to the values of organisation
Human capital	Qualified employees	285	Diverse experience key in technology businesses
Human capital	Qualified employees	286	Ability to learn new technologies in a fast-paced environment
Human capital	Qualified employees	287	Technical knowledge key in technology businesses
Human capital	Qualified employees	288	Share resources with internal staff is an important part of human capital
Human capital	Qualified employees	289	Assigning unique roles helps employees gain new knowledge
Diversity of individuals' skills set	Design thinking seminars	290	Seminars and workshops for most recent knowledge
Diversity of individuals' skills set	Design thinking seminars	291	Knowledgeable people and share their ideas
Diversity of individuals' skills set	Design thinking seminars	292	Design thinking events lead to the identification of new business ideas
Diversity of individuals' skills set	Diverse skills set	293	Formal education equip people with diverse skills
Diversity of individuals' skills set	Diverse skills set	294	Diverse skills set important for organisations
Diversity of individuals' skills set	Diverse skills set	295	Diverse skills set key for Innovation
Diversity of individuals' skills set	Diverse knowledge	296	Diversifying the knowledge and skills of every employee
Diversity of individuals' skills set	Diverse knowledge	297	Open up the boundaries of employee's vision
Diversity of individuals' skills set	Diverse knowledge	298	Diverse knowledge enables new opportunities

Divergent thinking	Connecting different dots	299	Encouragement to keep updating knowledge on new technologies
Divergent thinking	Connecting different dots	300	Assessing potential of technologies being used for solutions
Divergent thinking	Connecting different dots	301	Connect diverse pieces of information when it comes to generate entrepreneurial ideas
Divergent thinking	Thinking out of the box	302	Thinking out the of box is a vital characteristic of an entrepreneur
Divergent thinking	Thinking out of the box	303	Divergent thinking key to think beyond established norms
Divergent thinking	Associating different pieces of information	304	Connect different dots of information in order to generate new entrepreneurial opportunities
Divergent thinking	Associating different pieces of information	305	Most of the time entrepreneurial opportunities are out there to exploit
Divergent thinking	Associating different pieces of information	306	Looking at opportunities differently from others
Divergent thinking	Associating different pieces of information	307	Entrepreneur's ability to spot unique opportunities
Divergent thinking	Associating different pieces of information	308	Systematic search along with higher order cognitive abilities of entrepreneurs
Divergent thinking	Associating different pieces of information	309	Entrepreneur's ability of making use of old information in the light of new information
Divergent thinking	Associating different pieces of information	310	Perceiving meanings in information highly important to come up with innovative ideas
Divergent thinking	Synthesizing information	311	Open up the boundaries of employees vision
Divergent thinking	Synthesizing information	312	Synthesising informationkey to identify new opportunities
Divergent thinking	Synthesizing information	313	Synthesising information using data analytic techniques
Entrepreneurial alertness	Reflecting on new information to find new leads	314	Balance between needs and their solutions is constantly changing
Entrepreneurial alertness	Reflecting on new information to find new leads	315	Opportunities right there if someone can detect them
Entrepreneurial alertness	Reflecting on new information to find new leads	316	Technology-based industry has rapid advancements in technologies
Entrepreneurial alertness	Reflecting on new information to find new leads	317	Acquisition of new information makes an entrepreneur alert
Entrepreneurial alertness	Reflecting on new information to find new leads	318	Reflecting upon patters of new information makes entrepreneur alert
Entrepreneurial alertness	Ability to evaluate new info	319	Highly motivated individual always ready to identify new opportunities
Entrepreneurial attitude	Positive attitude	320	Positive attitude towards becoming self-employed
Entrepreneurial attitude	Positive attitude	321	Optimistic outlook on opportunities

Entrepreneurial attitude	Positive attitude	322	Ability to withstand pressure
Cognitive abilities	Problem solving	323	Problem solving is one of the most important attributes of an entrepreneur
Cognitive abilities	Problem solving	324	Ability to decompose complex information key
Imagination	Thinking about opportunities	325	Entrepreneurial imagination prompts an entrepreneur to explore
Imagination	Thinking about opportunities	326	Different ways a service can be implemented in different context
Imagination	Thinking about opportunities	327	Feels passion about something unique
Imagination	Thinking about opportunities	328	Applying new frames of reference to an existing problem can reveal interesting opportunities
Imagination	Thinking about opportunities	329	Applying new frames of reference to an existing market can reveal interesting opportunities
Imagination	Thinking about opportunities	330	Explicit and tacit knowledge combined leads to see what others cannot see
Leadership	Ability to lead	331	Leadership and drive of the entrepreneur are two critical attributes
Leadership	Ability to lead	332	Ability to lead from front
Leadership	Ability to lead	333	Drive to succeed in a risky situation
Entrepreneurial perception	Ability to perceive what's happening around	334	Staff involved in entrepreneurial activities are briefed about different scenarios
Entrepreneurial perception	Ability to perceive what's happening around	335	Scenarios about collaborations with partners at the start of their employment
Entrepreneurial perception	Ability to perceive what's happening around	336	Briefings and training enhance staff's ability to understand the nature of collaborations
Entrepreneurial perception	Ability to perceive what's happening around	337	Ability to perceive common interest with partners
Entrepreneurial perception	Ability to understand strategic planning	338	Entrepreneur managers encouraged to involve in the strategic planning processes
Entrepreneurial perception	Ability to understand strategic planning	339	Ability to understand strategic planning of our organisation
Entrepreneurial perception	Ability to understand strategic planning	340	Ability to perceive organisation's future
Entrepreneurial perception	Hands-on understanding of usages of new techs	341	Comprehensive training of the staff involved in entrepreneurial activities
Entrepreneurial perception	Hands-on understanding of usages of new techs	342	Involvement in how the various technologies are being used in day-to-day operations
Entrepreneurial perception	Hands-on understanding of usages of new techs	343	Involvement provides the staff with necessary experience
Entrepreneurial perception	Hands-on understanding of usages of new techs	344	Hands-on understanding of the capabilities of different technologies

Entrepreneurial perception	Hands-on understanding of usages of new techs	345	Training in new techs increase the chances of coming up with some new ideas
Breadth of knowledge	Knowledge of new techs	346	Having existing knowledge makes an entrepreneur more aware of possible pitfalls
Breadth of knowledge	Knowledge of new techs	347	Breadth of knowledge in new technologies
Depth of knowledge	Deep learning	348	Use of shared folders
Depth of knowledge	Deep learning	349	Project management software for collaboration
Depth of knowledge	Deep learning	350	Use of wikis and knowledge databases for learning
Explicit knowledge	Formal education	351	Prior formal qualification key
Explicit knowledge	Formal education	352	Hold several in-house seminars and workshops
Explicit knowledge	Formal education	353	Staff members equipped with contemporary knowledge
Explicit knowledge	Formal education	354	Technical knowledge key resource
Tacit knowledge	Experiential education	355	Necessary to update skills and knowledge regularly
Tacit knowledge	Experiential education	356	Update knowledge in all sectors
Tacit knowledge	Experiential education	357	Follow trends in technology and new innovations in the market
Knowledge of anticipated customers / market needs	Predicting customers' needs	358	Anticipating customers' problems
Knowledge of anticipated customers / market needs	Predicting customers' needs	359	Research for services to be provided in future
Knowledge of anticipated customers / market needs	Predicting customers' needs	360	Survey for the customer to give their feedback on service
Knowledge of anticipated customers / market needs	Predicting customers' needs	361	Anticipating customers' wants
Knowledge of means to satisfy anticipated needs	Finding ways to solve customers' needs	362	Putting ourselves in future
Knowledge of means to satisfy anticipated needs	Finding ways to solve customers' needs	363	Drawing a picture of what future markets would look like
Knowledge of means to satisfy anticipated needs	Finding ways to solve customers' needs	364	Market components affect the way people live their lives and do their work
Knowledge of means to satisfy anticipated needs	Finding ways to solve customers' needs	365	Vital to keep ourselves ahead of competitors
Knowledge of means to satisfy anticipated needs	Finding ways to solve customers' needs	366	Anticipated customers' needs leads to new opportunities
Knowledge of means to satisfy anticipated needs	Finding ways to solve customers' needs	367	Customers' involvement in product development
Knowledge of means to satisfy anticipated	Finding ways to solve customers' needs	368	Knowledge of changing markets key

needs			
Knowledge of demographic changes	Older people needs	370	Several events in organisation to discuss the needs of older people
Knowledge of demographic changes	Older people needs	371	Encourage our staff to have the empathy for the old generation
Knowledge of demographic changes	Older people needs	372	Motivate staff to solve problems
Knowledge of demographic changes	Older people needs	373	New methods to solve problems
Knowledge of demographic changes	Demographics	374	With knowledge of demographics identify new opportunities
Knowledge of demographic changes	Demographics	375	Changes in technologies can be seen in the light of changes in other factors such as demographic
Knowledge of demographic changes	Demographics	376	Entrepreneur manager to foresee changes in demographics
Knowledge of demographic changes	Demographics	377	Web technologies provide ideal ways to track the needs of diverse age groups which when analysed properly
Knowledge of demographic changes	Demographics	378	Web technologies provide ideal ways to track the demands/wants of diverse age groups
Knowledge of demographic changes	Demographics	379	Analysis may lead to the discovery of new opportunities
Knowledge of demographic changes	Demographics	380	Shared knowledge of demographic changes
Research collaboration	Collaborative research project	381	Research collaboration key to develop new opportunities
Research collaboration	Collaborative research project	382	Research collaboration key to develop creative workforce
Research collaboration	Collaborative research project	383	Collaboration generates the `swap` of high dependency knowledge
Research collaboration	Collaboration with partners	384	Regular meetings to share ideas
Research collaboration	Collaboration with partners	385	Developments about product line with sister companies
Research collaboration	Collaboration with partners	386	Collaboration of research helps in product diversity
Research collaboration	Collaboration with partners	387	Evaluation of research collaboration
Social capital	Selective relationships	388	Encourage employees to attend various seminars and workshops
Social capital	Selective relationships	389	Knowledge on each other's capabilities
Social capital	Selective relationships	390	Discuss the problems teams are working on
Social capital	Targeted relationships	391	Many folds increase in use of social networking platforms
Social capital	Targeted relationships	392	Customers expect engagement
Social capital	Targeted relationships	393	Web technologies to deeply engage with customers'
Social capital	Targeted relationships	394	Increasing use of social networking platforms by non-technology businesses

Social capital	Connection with people	395	Every transaction with customers perceived an opportunity
Social capital	Connection with people	396	Web technologies to strengthen relationship with customers'
Social capital	Connection with people	397	Social capital leads to company growth
Social capital	Connection with people	398	Development networks opens new information
Systematic search	Searching for new leads	399	Unearthing more opportunities with systematic search
Systematic search	Searching for new leads	400	Team collaboration in systematic search for new ideas
Systematic search	Searching for new leads	401	Web based brain storming for ideas

Appendix 13: Cases Documents

Ref#	Source	Summary of content Case A	Length	Year
D1	CEO	Company and services description; focus on how operations are improved using web technologies.	71 pages	2015
D2	CEO	Web Services description. Strategies to improve services.	4 pages	2015
D3	CEO	Feedback from customers on product win competition experience; overview of the case's needs to sustainably enter the market and deliver the service; description of the web services offered.	8 pages	2014
D4	Web	Company's website including news and events update.	N/A	N/A
D5	Web	Overview of the web services offered with specific focus on international markets.	345 words	2014
D6	Web	Focus on web services data and how it is being re-used by Case A.	535 words	2015
D7	Web	Reflections and insights on how web services can improve the business. Benefits and opportunities are underlined.	823 words	2015

D8	Web	Web technologies description; relationship with the partners; focus on challenges faced by the case.	1400 words	2014
D9	Web	Video Interview. Web services benefits and how customer engagement initiatives can be implemented	31 minutes	2015
D10	Web	Company's Portals (focus on social media used).	Web Page	N/A

Ref#	Source	Summary of content – Case B	Length	Year
D1	CEO	Overview of the company and its future.	18 pages	2015
D2	CEO	Web technologies description (technical and usefulness); needs and value proposition towards the company	27 pages	2015
D3	CEO	Future trends in the technology context; Plan for embedding new web technologies into the service.	5 pages	2014
D4	CEO	Overview of the web technologies and internet ecosystem.	4 pages	2015
D5	Web	Big data opportunities; Tweets.	6 pages	2015
D6	Web	Big data and business opportunities; Early thinking on the not-yet established new services. .	892 words	2015
D7	Web	Web services characteristics and general information about the current CEO.	202 words	2015
D8	Web	Video interview	16 minutes	2015
		Web services characteristics and general		

D9	Web	information about the current CEO. Company's perspective (opinion, Data gathering strategy and goals)	482 words	2014
D10	Web	Company's website	N/A	N/A
D11	Web	Company's Portals (focus on web applications used).	Web Page	N/A

Ref#	**Source**	**Summary of content - Case C**	**Length**	**Year**
D1	CEO	Service description, revenue models, market opportunities, and overview of the company's team.	14 pages	2016
D2	CEO	Company's product launch document. Service description, idea generation experience.	4 pages	2016
D3	CEO	Focus on technical characteristics and features of the service.	13 pages	N/A
D4	Web	Company's website.	N/A	N/A
D5	Web	Video interview on CTO's experience as an entrepreneur in the tech industry.	Video (40 min)	2016
D6	Web	Company promoting products. Promotional material	Web page	N/A
D7	Web	Start-Up Ireland consortium's webpage that describe history of innovations of the case.	Web page	N/A
D8	Web	Service description, revenue models, technical Characteristics and expansion opportunities.	1377 words	2015
D9	Web	Focus on individuals' skills and backgrounds of people working within the case.	590 words	2016
D10	Web	Structured and interactive outline of technical features leveraged by the company in delivering	Web page	2016

		its web bas service.		
D11	Web	Data analytics; Opportunities and challenges.	Web Page	N/A