



**LUND UNIVERSITY**

**Disruptive Innovation**

**A study on the approach to opportunity recognition by  
ventures with disruptive characteristics**

**By**

**Jenny Lee & Remie Bastiaansen**

Supervisors: Claudio Fassio & Craig Mitchell

Examiner: Sotaro Shibayama

## **Abstract**

The aim of the paper was to contribute new insights on how ventures with disruptive characteristics approach opportunity recognition. The construct of disruptive innovation is a relatively new body of theory and there is a lack of clarity on the process of disruption, especially when it comes to making ex ante predictions. It is critical to understand how the process of opportunity recognition influences the process of disruption. Studying the approach to opportunity recognition by ventures with disruptive characteristics, offers an unique insight into the process of disruption as we found a consistent pattern amongst the majority of the ventures regarding their approach towards active search and their mind-set.

**Keywords:** disruptive innovation, disruptive ventures, opportunity recognition

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# 1. Introduction

With the growth of novel technologies (Internet of Things, Blockchain, Artificial Intelligence, 3D printing etc.), we are shifting towards a Fourth Industrial Revolution (FIR), characterised by increasing digitalization. These technologies have disruptive characteristics (Rahman et al, 2017) and have the potential to disrupt industries by transforming entire systems of production, management and governance, leading to improved quality of life (Schwab, 2016). It is predicated that disruption will become more prevalent as technology becomes smarter, more intuitive, and more economical.

We have already seen evidence of this effect, how technology have displaced leading brands, a prime example being of Kodak, originally one of the most powerful companies globally but today has less than \$1 billion market capitalisation (Anthony, 2016). Many believed that Kodak's downfall was not embracing digital technology sooner, but according to one of Kodak's engineers, Steve Sasson, it was management's lack of foresight that caused its demise. Although Kodak had invested time and money in developing the very first digital camera, management was unable to recognise the potential it had to disrupt the market. It is evident that in order for incumbents to survive, taking a sustaining approach is not sufficient, nor is solely focusing on developing new tech, how a company spots an opportunity and understands when to pivot is crucial to its growth. As Anthony (2016) argues that Kodak's failure was *'due to their inability to truly embrace the new business models the disruptive change opens up'*

As we head towards a FIR, technology is changing the way we do business, ventures are becoming more conscious of the need to re-examine their approach; do they continue to sustain, potentially leading to that 'Kodak moment' or disrupt to circumvent business failure?

This paper aims to fill in gaps in the literature by examining the factors that shape how ventures with disruptive characteristics recognise opportunities. Moreover, due to the lack of research on disruption before it occurs, we are interested in ventures that are currently on a disruptive pathway. The main question that the research seeks to answer throughout the course of the paper is: *How do ventures with disruptive characteristics approach opportunity recognition?*

## 1.1 Aims & Objectives

The aim of this research is to investigate how ventures identify opportunities that have the potential to be disruptive. By providing an overview of literature and theories on disruptive

innovation and opportunity recognition, the paper will present key findings on whether there is a set methodology to identifying disruptive opportunities.

The objective of the research is to analyse the phenomenon ‘disruptive innovation’ through the insights of specific ventures that personify the term. In order to validate the research, it is critical to firstly analyse the different theories on disruptive innovation to establish a concrete definition, to facilitate the selection process for the right disruptive characterized ventures.

Observation of existing literature on opportunity recognition will provide a theoretical framework to identify patterns in opportunity recognition and if they correlate with a disruptive approach.

## **1.2 Research Purpose**

Disruptive innovation (DI) has gained much publicity in recent years and as technology continues to advance there is a need for both start-ups and incumbents to be aware of disruption. Technology is closely linked to disruptive innovation as often it provides new opportunities to transform processes, products, services and new markets etc., however according to Christensen and Raynor (2003) and Kirzner (1973), technology isn’t the main driving force. DI is often described as a process and from this perspective an innovation usually refers to the identification and utilization of business opportunities to create new products, services, or markets (Kuckertz et al., 2017). Identifying, pursuing and exploiting an opportunity should lead to an innovation, whether truly radical or less so (Kuckertz et al., 2017). The concept of DI has been researched in literature by many authors, but the theory has primarily been applied based on post hoc empirical evidence. There has been much debate on whether the theory of DI can be used to predict a disruption before it occurs, but there is limited research in this field. Better understanding the type of organizational abilities that would result in disruptive innovations, eventually will help to make ex ante predictions about companies who develop such innovations (Govindarajan & Kopalle, 2006). What is evident from the post hoc studies is that there is a strong correlation between DI and opportunity recognition (OR). What these studies make clear is that entrepreneurs whose innovations turn out to be disruptive are actively engaged in discovering and creating opportunities. This makes it appropriate to look into literature on the entrepreneurial pursuit of opportunities to see if its themes can illuminate the pursuit of DI.

In light of this, the aim of this paper is to contribute new insights on disruptive characterized ventures approach to OR, applying the theory of DI on ventures who have not (yet) disrupted the market but have the potential to do so. The paper will provide critical insights on how they

discover opportunities, providing a basis for guidance to potentially help other firms to navigate this field.

### **1.3 Research Limitations**

It is important to note that the paper is primarily seeking to understand how ventures with disruptive characteristics identify opportunities that could potentially lead to disruption. There is a wealth of information on how established firms can mitigate disruption, but not much is known on how a new company can initiate a disruptive process.

The authors see the research in two critical phases but the paper will primarily focus on phase 1. Phase 1 addresses the understanding of the nature of disruptive innovations and how ventures that exhibit DI characteristics approach OR and phase 2 will take the form of a comparative study between disruptive ventures and non-disruptive ventures. The construct of DI is a relatively new body of theory and there is a lack of clarity on the characteristics that enable disruption, especially when it comes to making ex ante predictions. In light of this, for the purpose of this paper, the authors will focus on phase 1 of the research, as they felt it was critical to firstly understand ventures approach based on the parameters and dynamics of what DI is and how OR is applied in the context of DI and how these ventures cultivate potential disruptive opportunities. Potential limitations with the paper is the lack of focus on sustaining companies and their approach to OR. In order to fully comprehend how disruptive opportunities occur, it is also critical to understand whether non-DI firms approach to OR differs greatly to DI firms. The authors recognise this limitation but strongly feel that prior to a comparative study, we first must understand what to measure in a disruptive characterized ventures approach to opportunity recognition.

### **1.4 Thesis Outline**

Section 2 outlines the theoretical framework of this paper, presenting principle theories that are critical in understanding current perspectives on the topic of disruptive innovation and opportunity recognition. By undertaking a comparative literature review to establish a conclusive definition of the term disruptive innovation and to enable the authors to identify which OR theory to apply within the methodology. Section 3, outlines the research methodology, describing the methods applied, the selection process and interview procedure, leading to an analysis of the data and its validity. Section 4 and 5 will discuss, evaluate and conclude the findings.



## 2. Literature Review

### 2.1 Disruptive Innovation Theory

In today's complex and dynamic world, having a disruptive innovation capability is mandatory, both for growing a business and protecting existing markets (Kaplan, 2012). Disruption has become a buzzword in the world of entrepreneurship, a term that is often widely misunderstood and inaccurately utilised. Incumbents such as Uber and Tesla are often labelled as disruptive but do not embody this term according to professor Clayton M. Christensen who first coined the term disruptive innovation. Based on Christensen's theory, to be genuinely disruptive, a firm should either create new markets that incumbents have missed, or enter at the low-market foothold which has been neglected by incumbents who focus primarily on sustained growth and profitability through the creation of new products and services for their core customers (Christensen et al, 2015).

The theory on disruptive innovation originates from Christensen's book "The innovator's dilemma" in 1997. The book elaborates on how technological innovation takes place, and how market leaders and incumbents, in their industry, fail to stay on the forefronts of innovation resulting in them being disrupted. In order to resolve the innovator's dilemma, where incumbent firms can avoid being disrupted and become the disrupter themselves, Christensen and Raynor (2003) published another book entitled: *The Innovator's Solution*. In this book, the term disruptive technology is replaced by 'disruptive innovation', because they widened the application of the theory to include not only technological products, but also services and business models innovation (Yu and Hang, 2010).

The theory is widely popular and few academic management theories have had as much influence in the business world as Christensen's theory of disruptive innovation (King & Baatartogtokh, 2015). However, despite Christensen's theory widespread use and appeal, its essential validity and generalizability have seldom been tested in the academic literature (King & Baatartogtokh, 2015) and many researchers have stated that the definition of a disruptive innovation is still underspecified (Danneels, 2004; Reagan, 2014; Nagy et al., 2016; Lepore, 2014). Thus, questions have been raised for a more complete analysis of disruption to more comprehensively and precisely understand its characteristics (Govindarajan & Kopalle, 2006; Sandström et al., 2014; Nagy et al., 2016). Some researchers were supporters of Christensen, in general, but proposed their own slightly different views (Yu and Hang, 2010). At least seven articles have attempted to identify or define disruptive innovations (Adner, 2002; Christensen,

2006; Christensen & Raynor, 2003; Danneels, 2004; Hang et al., 2011; Schmidt & Druehl, 2008; Nagy et al., 2016). The conflicting nature of the literature on disruptive innovation in the last decade may pose a state of ambiguity for future research and therefore a clear and agreed upon definition is needed.

## **2.2 Christensen's Work**

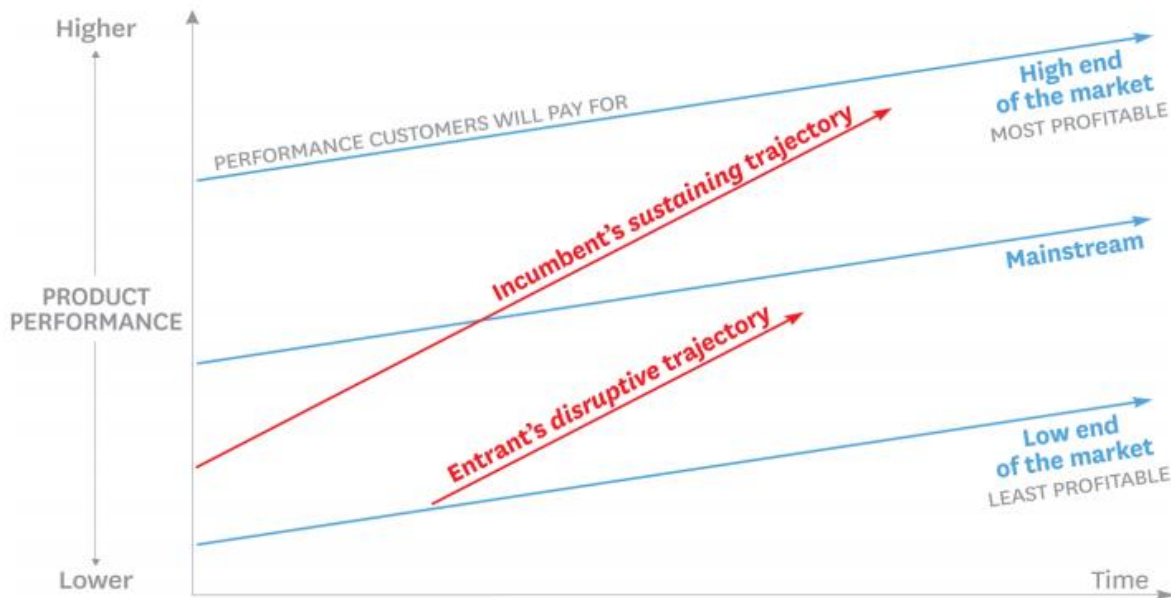
Christensen's definition of disruptive innovation is that it is "a process by which a product or service takes root, initially in simple applications at the bottom of a market and then relentlessly moves up market, eventually displacing established competitors" (Christensen, 1997). Disruption occurs when mainstream customers start adopting the new offering in volume (Christensen, 2015).

According to Christensen (2015) a disruption, by definition, takes place in 2 types of markets that incumbents overlook; low-end footholds and new market footholds. In the case of low-end footholds incumbents typically try to provide their most profitable and demanding customers and always try to improve their products and services, resulting in paying less attention to less-demanding customers (Christensen 2015). The products or services are overshooting the performance of the less-demanding customers, opening the door for disruptors to enter. An example of a low-end foothold disruption is the case of minicomputers displacing traditional mainframes as minicomputers were originally presented as an inexpensive alternative to mainframes.

In the case of new-market footholds, disruptors create a market where none existed before (Christensen, 2015). These disruptors find a way to create new markets and new customers typically by lowering price or designing for a different set of consumers or different needs of existing non-customers (Santandreu, 2017). A potential disruptive innovation is the Apple Watch and health wearable technologies, such as Jawbone or Fitbit, as they might create a completely new market (Santandreu, 2017).

Disruptive innovations are different from so-called sustaining innovations (Christensen, 2015). A sustaining innovation includes making products better from the perspective of incumbents existing customers and serves the mainstream to the high-end customer segment (Christensen, 2015). They occur in major markets that have historically been valued by incumbents (Christensen et al., 2016). When incumbents face threats from sustaining innovations they typically respond with competitive products or services, whereas disruptive innovations are overlooked (Christensen, 2015). Sustaining innovations are often valued over disruptive

innovations by incumbents as they prioritize their existing customers (Christensen et al., 2016). An example of a sustaining innovation is mobile networks going from 3G to 4G or a new version of the iPhone. According to this measure the earlier mentioned Uber and Tesla can thus be qualified as sustaining innovations.



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Another aspect of disruption mentioned by Christensen (2015) is that disruption is a process and not a specific product or service. Most innovations, whether they are disruptive or not, start of as small-scale experiments and the business model is often the primary focus, not the product or service (Christensen, 2015). The main reason for this is that complete substitution, if it comes at all, can take decades as profiting from the old business model for a little longer by incumbents often seems better than writing it off straight away (Christensen, 2015).

Furthermore, disruptors often build business models that are very different from those of incumbents (Christensen, 2015). An example is Airbnb, which employs a business model that facilitates interaction between multiple users; Airbnb enables host interaction with guests (Christensen et al., 2016). Airbnb offers services that are “good enough”, yet dramatically increases convenience and lowers costs (Christensen et al., 2016).

At last Christensen points out that some disruptive innovations succeed and some don't; Business success is not build in the definition of disruption (Christensen, 2015). An example are internet-based retailers who followed disruptive trajectories in the late 1990s and only a small number succeeded (Christensen, 2015).

### 2.3 Other Perspectives and Challenges on DI

Govindarajan and Kopalle (2006) contributed to the definition of disruption by adding that disruptors emerge out of a niche and not necessarily a low-end of the market. This addition includes high-end disruption, which is regarded as one of the most important additions to the theory (Mcdougall, 2014; Yu and Hang, 2010; Sood & Tellis, 2011). This is part a response to critiques that the label “disruptive innovation” can only be applied post-hoc (Christensen, 2006). Critics (e.g. Lepore, 2014; Sood & Tellis, 2011; Danneels, 2004) have argued that Christensen’s definitions of “disruptive” and “sustaining” innovation are repetitive or circular because, they are true by definition: “this innovation was disruptive, therefore it is a disruptive innovation” (Reagan, 2014).

The definition by Govindarajan & Kopalle offers a more comprehensive view on the multifaceted complexity of disruptive innovation, however it’s not absolute as there are more factors that play a role when it comes to disruption and there are also exceptions to the rule. In a case study done by, Andrew King and Baljir Baatartogtokh (2015), the authors conclude that not all incumbent companies overshoot customers’ needs. An example given by the authors is that hand animation was replaced by computer animation not because it outstripped what customers wanted, but because it was too expensive (King & Baatartogtokh, 2015).

A more recent paper by Nagy et al. (2016) takes a different perspective towards defining disruptive innovation, and finds its foundation in innovation adoption literature. The proposed definition is as follows: “*an innovation that changes the performance metrics, or consumer expectations, of a market by providing radically new functionality, discontinuous technical standards, or new forms of ownership.*” (Nagy et al., 2016). This definition has overlap with Christensen’s definition and claims that a (potential) disruptive innovation can be identified by one (or a combination) of the following three characteristics: (1) radical functionality, (2) discontinuous technical standards and, (3) innovation’s ownership.

Radical functionality refers to an innovation that provides an user the ability to commence a new behaviour or to accomplish a new task that was previously impossible to perform (Nagy et al., 2016). Radical functionality (or new functionality innovation) creates new markets as described by Christensen as new-market disruption (Nagy et al., 2016).

Discontinuous technical standards refers to innovations that utilize new materials or new processes in the creation of existing technologies (Nagy et al., 2016). These type of innovations

typically disrupt markets by using cheaper materials or more efficient production processes for existing technologies as described by Christensen as low-end innovation (Nagy et al., 2016).

Innovation's ownership refers to introducing alternative forms of ownership in established industries (Nagy et al., 2016). They disrupt the status quo of these industries by changing characteristics like price, or services surrounding the innovation (Nagy et al., 2016). An example of this type of disruption is open source software, like WordPress. WordPress allows users to create websites without introducing a radically different functionality or discontinuous technical standards. The disruptive factor is that no single person or group of persons owns the software, rather it is collectively owned by volunteers who create, manage, support and distribute these technologies (Nagy et al., 2016). This diffusion of ownership raises questions about the price and services, which in turn affect marketplace expectations (Nagy et al., 2016).

With the proposed definition Nagy et al (2016) claim that the post-hoc dilemma will be solved as academics and practitioners with these three innovation characteristics now can investigate specific innovation qualities and compare new technology characteristics with old technology characteristics.

#### **2.4 Definition of DI used in this paper**

It is evident that there are parities across the scholars definitions and much of their definitions agrees and are built upon Christensen's theory. We identified three recurring pillars that are reflected in the proposed definitions, which form the basis of our understanding of DI:

1. *Market segment*: market segment refers to the targeted segment at time of entry of the disruptive product or service.
2. *Process*: the process describes the crucial factors that are changed in an industry by the disruptive innovation over time, to stimulate adoption by the mainstream.
3. *Business Model*: this refers to how a different/new business model changes the dynamic and interaction between stakeholders in an industry.

Listed in Table 1 in [Appendix 7.1](#), we have summarised and grouped the different scholars definitions of disruptive innovation into the 3 identified pillars.

As this paper aims to investigate ventures that have the potential to disrupt a market, we will use the definition provided by Nagy et al. (2016). This definition includes all three recurring pillars that are described by scholars in the field of DI, but more importantly it is grounded in an innovation's characteristics (radical functionality, discontinuous technical standards, and an

innovation's ownership). This foundation is relevant as the topic of discussion is the innovation itself, and the disruptive element of that innovation. A definition that does not address innovation characteristics would appear to discuss something other than the innovation itself (Nagy et al., 2016). With defined characteristics that allow for disruption to happen we can identify these characteristics in ventures before disruption takes place and compare them with each other and sustaining innovative firms. Hence, the definition used in this paper is as following: *“A disruptive innovation is an innovation that changes the performance metrics, or consumer expectations, of a market by providing radically new functionality, discontinuous technical standards, or new forms of ownership.”* (Nagy et al., 2016).

## **2.5 Opportunity Recognition Theory**

Part one of the theoretical framework outlines the definition of disruptive innovation by leading scholars in the field, focusing on Nagy et al., (2016) who grounds the definition of DI in measurable characteristics. Leading to the discovery of our own framework to utilise in how we apply disruptive characteristics in the selection process of our samples.

The second part of the framework examines opportunity recognition theories, which will play an integral part in addressing our research question. By understanding the various factors that influence how ventures with disruptive characteristics identify/discover opportunities, we need to firstly understand what the current OR approaches are within an entrepreneurship context in recent literature. An analysis of current literature on OR from leading scholars will be analysed below, concluding with a selected theory that best applies to DI, based on the authors judgement.

## **2.6 The Domain of Opportunity Recognition**

Opportunity recognition can be described as the way in which entrepreneurs identify opportunities to establish new business ventures. Essentially an entrepreneur can identify a new or better way of doing something – this could be a product or a service, a way to meet customer needs that are not currently met or even create new markets that currently don't exist. How they do this is through the process of OR.

For both long-term and start up success, OR represents one of the most important early aspects of entrepreneurship. It is often seen as the first step in the process of entrepreneurship and an ongoing process for incumbents. Firms that stay alert and are actively searching for opportunities, stay ahead of their competitors, resulting in the delivery of innovative solutions.

There has been much debate surrounding opportunity recognition, how opportunities are formed and exploited. Alvarez et al. (2010) argue that there are three schools of thought; realist (building on the work of Austrian economists Hayek 1945, Kirzner 1973 and Von Mises 1949), constructionist (rooted in the work of Berger and Luckmann 1966) and evolutionary realist perspectives (Azevedo 1997, 2002, McKelvey 1999 and Campbell 1974). The following sections will discuss the three schools of thought to identify the core approaches to opportunity recognition.

## **2.7 Realist Approach**

How entrepreneurs detect opportunities is widely considered as a critical phase in the entrepreneurial process. Many scholars have examined this process and identified that there are many variables that influence and shape how entrepreneurs recognise opportunities. The defining characteristic of the realist approach, is the belief that entrepreneurial opportunities are objective realities that exist in the environment. Moreover, opportunities exist prior to the awareness of the entrepreneur about the opportunity and therefore can be "discovered" in the environment. Research in this area identifies the unique elements of the individual entrepreneur that enables them to identify opportunities that others overlook (Suddaby et al., 2015). If we follow the realist school of thought, the core commonalities that scholars have identified are, alertness, active search and prior knowledge.

According to Austrian economists *"opportunity by definition is unknown until discovered"* (Shane, 2000, 5) in other words it isn't the discovery (the search process) that makes the opportunity worth exploiting but how we define its value. In essence one can be active and alert in their search and acquire new information, but it is our prior knowledge that enables us to determine the value of the opportunity. This argument is supported by Venkataraman (1997), entrepreneurs are able to identify opportunities based on the information that they already possess. Each entrepreneur possesses an unique 'knowledge corridor' that enables them to not only identify but validate opportunities that others cannot.

Baron (2006) argues that the 3 core aspects of the realist approach to date have been studied independent of one another. His research proposes how the 3 core aspects can work in tandem, using a cognitive framework to join unrelated events, essentially 'connecting the dots'. The entrepreneur has experience (prior knowledge), ability to unconsciously identify unrelated trends, events, changes in society, technology, markets, policies etc. (alertness) and an openness to newness or overlooked areas (active search) to formulate into a discernible pattern.

## 2.8 Constructionist Approach

The constructionist approach argues that opportunities do not exist as an objective fashion in the environment, nor prior to the awareness of the entrepreneur (Suddaby et al., 2015). Rather opportunities are “created” by entrepreneurs and do not exist outside the perception of the entrepreneur. A constructionist approach to opportunity recognition has strong correlations with effectuation logic and bricolage (Alvarez et al, 2010). An entrepreneur using a constructionist approach would essentially ‘create their own future’ by determining their own opportunity and making do with the available resources to bring that reality to life. Often this approach is subjective to the entrepreneurs view and interpretation of the world and doesn’t validate the validity of said reality. What is interesting about this approach is how the entrepreneurs objective is to essentially ‘*construct, deconstruct and reconstruct an existing reality so as to form a new reality thus opportunity*’ (Alvarez et al, 2010). Constructionists believe that entrepreneurial opportunities arise, largely, as a process of collective sense making and therefore the entrepreneur must innovate products in parallel with innovating social acceptance for those products in the marketplace (Suddaby et al., 2015).

## 2.9 Evolutionary Realist Approach

Although the realist and constructionist approach each have their merits, their conflicting perception on the nature of the social world, leads to discrepancies. Scholars Azevedo, McKelvey and Campbell propose the evolutionary realist approach, which incorporates the constructionist perspective that opportunities do not exist independent of entrepreneur action and that an entrepreneurs actions form new opportunities. These actions are then tested against a realist approach for validity (Alvarez, 2010).

This approach has strong correlations with creation opportunity theory by Venkataraman and Schumpeter’s view on how entrepreneurs ‘*create new combinations of resources, which results in a new product/market* (Alvarez et al, 2010, 7). The realist approach view that opportunities are actively pursued and thus discovered within existing markets, whereas the evolutionary realist approach creates opportunities outside existing markets, in essence the opportunity doesn’t exist until the entrepreneur creates it. Alvarez et al. (2010) explains that it is this critical process of enactment that is core to this approach, ‘*Individuals do not recognise opportunities first and then act, rather, they act, wait for a response from their actions, and then readjust and act again*’. This approach has similarities to the lean approach and how start-up weekends work, quick ideation process, market validation, adjust response from the market and re-ideate again to create a minimum viable product. In essence this approach is both discovery and creation.



Sarasvathy (2001), distinguishes between causal and effectual explanations of entrepreneurial opportunity, which more or less corresponds with the difference between discovery and creation. Sarasvathy (2001) suggests that both constructs can happen simultaneously and that, in different contexts, one or the other might be predominant. Understanding the dynamics of opportunity recognition, thus, might rest on a more nuanced incorporation of both 'discovery' and 'creation' in which the approaches are not seen as opposite polar, but rather as representative of a complementary relationship.

### **2.10 Disruptive Innovation and Entrepreneurial Opportunity**

As with any entrepreneurial venture, opportunity recognition represents one of the most important early aspects of entrepreneurship. It is often seen as the first step in the process of entrepreneurship. The theory of DI suggests that there is a strong correlation between OR and DI, in order for a venture to potentially disrupt, certain market conditions firstly need to be identified. The authors have examined the three schools of thoughts and in the context of this study, they felt that the realist approach in particular Barons development of this approach of 'connecting the dots' (*as he further highlights how the three pillars of OR can also work in tandem with one another*) was the most fitting theory to apply in the context of DI. The authors will primarily focus on the 3 pillars of OR 'prior knowledge, active search and alertness and also examine if the ventures were able to formulate a discernible pattern.

### **2.11 Prior Knowledge**

Prior Knowledge (PK) is using one's own knowledge and expertise to identify opportunities within their specific field. Enhanced prior knowledge affects an individual's capability to find, associate, and decide on new information and allows that person to recognize and capitalize on certain business opportunities that others do not (Venkataraman, 1997). Knowledge in this context is defined as "*information gathered through rich and varied life experiences*" (Baron, 2006). They are specialists in their field, have a strong insight of their market / industry and awareness of customer needs. According to Christensen and Raynor (2003), a surprising number of businesses fail not because of technology but primarily because of an organisations inability to execute the technology fittingly. There is often a common belief that technological innovations lead to business opportunities. However Shane (2000) argues, "*entrepreneurs must first discover opportunities in which to exploit the new technology*".

This approach to opportunity recognition is subjective to an individual's own knowledge and experiences, thus entrepreneurs can only discover opportunities within their own knowledge

corridor (Tang et al, 2012). In other words information asymmetries between entrepreneurs lead to the discovery of unforeseen opportunities as not all opportunities will be recognised equally.

According to Shane (2000) there are 3 major dimensions of prior knowledge that are critical to the entrepreneurial discovery process; prior knowledge of markets, way to serve the market and insight to customer problems. Each dimension is linked but can create novel opportunities dependent on their knowledge.

As Venkataraman (1997) outlines; an entrepreneurs prior knowledge of the market, is resulting from their work experience, industry-specific expertise and education. With this knowledge, they can identify new opportunities that can serve the market in the best possible way. In addition, entrepreneurs who have a sound insight to customer problems play a key role in the discovery process, often is the case that entrepreneurs industry-specific experience and daily interaction with customers leads them to identify a solution to a specific problem. However in some cases, it is an entrepreneurs own prior knowledge and experience as a customer.

## **2.12 Active Search**

A well-grounded and common theme in opportunity recognition research is the crucial process of gathering information. To identify opportunities, entrepreneurs must gather, interpret, and apply information about specific industries, technologies, markets, government policies, and other factors (Ozgen & Baron, 2005). The obtained information not only plays a role in the recognition of opportunities but also helps the entrepreneur to evaluate the validity of their identified opportunity. Researchers note that entrepreneurs may identify opportunities more effectively than others when they actively gather and process information (Sarasvathy et al., 1998; Busenitz, 1996).

Active Search is when one engages in a proactive search for opportunities. Taking a formal, systematic approach to identifying various sources for appropriate information leading to the discovery of new business ventures. Obtaining appropriate information for instance relates to acquiring knowledge on business opportunities or to look for new ideas on products or services (Ozgen and Baron, 2005). What is interesting to note is that when we discuss the term ‘appropriate information’ often these types of entrepreneurs are less inclined to use traditional sources of information (public information, newspapers etc.), but they actively look beyond the obvious, niche pockets of valuable insights through their personal network of feeds, openness to new knowledge, in unknown fields outside their field of expertise (Baron, 2006).

The personal network of an entrepreneur plays a major role when it comes to active search for opportunities as communicating may help entrepreneurs to evaluate the viability of an idea (Kuckertz et al., 2017). The larger the entrepreneurs' networks, the more opportunities they tend to recognize. However, in some cases the entrepreneur tends not to talk about his or her ideas for fear of others stealing them (Kuckertz et al., 2017).

In sum, actively searching, accessing, retaining and integration of information into meaningful patterns contributes to identifying opportunities by entrepreneurs (Shane, 2000).

### **2.13 Alertness**

Alertness is an ability of individuals that makes them aware of changed conditions or overlooked possibilities (Baron, 2006). This approach differs from active search by taking a more passive approach - it is an unconscious awareness of unobservable opportunities. The term alert is abstract and thus not so easily understood in the same manner as the other pillars. Essentially these *'unobservable opportunities exist in an already existing reality and exist objectively and independent of the entrepreneurs perception and thus can only be discovered by special alert entrepreneurs'* (Alvarez et al., 2010).

Entrepreneurial alertness is closely related to active search and involves not only gathering, associating, and evaluating information on business opportunities, but is also linked to action (Tang et al., 2012). To identify an opportunity, one must first discover before they can act. When using the term discover in the context of alertness, it is critical to note that the opportunity does not yet exist, often the opportunity emerges based on speculation and in some cases this speculation can *'lead to the creation of a whole new class of goods that do not yet exist'* (Kaish & Gilad 1991, 47). It is the entrepreneurs foresight (vision) not solely the invention of something new, that can create new opportunities. Kirzner (1973) defines this approach as entrepreneurial alertness, meaning that the entrepreneur must *possess an unique preparedness to recognise them and act* (Kaish & Gilad 1991, 48).

## 3.0 Methodology

### 3.1 Case Studies

Case study research brings new insights and understanding on complex issues that require further investigation and analysis, due to limited research and understanding within the field. Yin (2009, p18) defines this methodology *as an empirical inquiry that investigates as contemporary phenomenon in depth within a real-life context; when the boundaries between phenomenon and context are not clearly evident*.

In the case of this study, we are proposing a ‘how’ question, which requires an explanatory approach (Yin, 1994), whereby the authors propose to interview multiple case studies to provide a rich and varied source of information for comparative purposes.

### 3.2 Interviews

In order to address the papers research question *‘How do ventures with disruptive characteristics approach opportunity recognition?’* the authors have adopted qualitative analysis. Qualitative research was selected as it is a research strategy that focuses on outlining in depth information, rather than gathering more superficial information. Because qualitative researchers ask broad, open-ended questions and remain intimately connected with the phenomenon of study, qualitative methods are uniquely positioned to generate new insights and to build new theory. In this particular field of study an in depth analysis seemed more fitting to help the authors address the research question.

The qualitative approach that will be most applicable for this study are interviews. The main advantage of interviews, is that they involve personal and direct contact, which often enables a more open dialog to evolve, but the interviewers must not only devise appropriate questions but also develop the appropriate skills to successfully carry out the interview.

Data will be collected primarily from carefully selected ventures. Selected ventures will be asked a series of semi-structured questions, with the interviewer watching out for key cues and to gently steer the interview without influencing the outcome. Initial questions will be prepared to enable the authors to guide the interview and address the research objectives, but with room to allow for additional questions to organically arise during the encounter.

Five out of seven ventures in the sample, were interviewed on multiple occasions as due to time limitations, ventures may not have the time to dedicate several hours for a single interview and a single long interview will be tiring and may affect the responses received. Additionally, the

authors will need time to review and analyse the data to adjust or add questions to ensure it addresses all research objectives. The authors will send the final interview summaries to the interviewees for final review to ensure the data from the interview has been correctly transcribed.

The format of the interview was formatted into 3 key areas: [1] interviewee, [2] venture and [3] opportunity recognition (OR) and can be found in [Appendix 7.2](#). OR was separated into 5 sub categories: the process, active search, alertness, prior knowledge and validity/feasibility. Each area had a set of variable questions, formatted in different structures, but essentially asking the same question to help the interviewee understand what will be asked. *'This style of questioning is informal, as the phrasing and sequencing of the questions will vary from interview to interview'* (Bryman & Bell 2011). Area 1 and 2 gave context and background information about the venture and the role of the interviewee and their relevance to conduct the interview. This eases the interviewee into the interview process and leads gently into area 3, it enabled the interviewer 'to build rapport' (Bryman & Bell 2011) with the interviewee. This process enabled the interviewee to talk freely about the initiation of the venture. By asking open question, the interviewee is free and open to discuss how the venture was founded and this exposed many novel insights to their OR approach. Prior to the interview, the authors sent the interviewees a general guideline and overview of the purpose and intention of the interview. This ensured clear instructions and clarity to put the interviewee at ease and comfortable leading up to the interview (Bryman & Bell 2011).

### **3.3 Theoretical and Empirical Outcome**

The construct of DI is a relatively new body of theory and there is a lack of clarity on the enablers of disruption, especially when it comes to making ex ante predictions. In light of this, the authors felt it was critical to understand ventures approach based on the parameters and dynamics of OR and how this is applied in the context of how these ventures cultivate potential disruptive opportunities. We aim to find an uniform approach by the samples to one or more pillars of OR; a method or characteristic that they share. Moreover, we aim to find out where exactly in the complex relationship of OR and DI future research should shed a light on.

### **3.4 Sampling**

The primary objective of the study is to identify how ventures with DI characteristics discover opportunities that could potentially lead to disruption. Since the event is ex ante, it is unknowable whether or not it will actually be disruptive, however the ventures are believed to

be in the process of disruption. In order to define whether a venture is in the process of disruption, we used the 3-step method proposed by Nagy et al. (2016):

*Step 1: Identify the innovation and its characteristics:* A (potential) disruptive venture can be identified by one (or a combination) of the following three characteristics: (1) radical functionality, (2) discontinuous technical standards and, (3) innovation's ownership (Nagy et al., 2016). Radical functionality (or new functionality innovation) refers to an innovation that allows users to adopt a new behaviour or accomplish a new task that was previously impossible and thus, creates new markets. Discontinuous technical standards refers to utilizing new materials or new processes in the creation of *existing* technologies and applications, thus changing an existing market. Innovation's ownership refers to introducing alternative forms of ownership in established industries, thus changing the current business model in a market. Each of the ventures that are used in the sample will have to fulfil at least one of the above mentioned characteristics.

*Step 2: Identify where in an organization's value chain the innovation is used:* The second step in identifying a potentially disruptive innovation is to understand what is aimed to be disrupted. Here the authors look at how the disruptive characteristic that the venture inhibits aligns relative to the existing value chain used by players in the marketplace. In this step the authors determine which part of the value chain is being addressed by the disruptive characteristic of the venture.

*Step 3: Compare the potentially disruptive innovation with technologies currently used in the market for that value chain segment:* The third step in understanding the potential disruptiveness of a venture is to examine the potential market size and change in market forces that innovation by the venture can cause. Here the authors look at the size of the market segments that are being addressed by the venture and if mass adoption is possible. Another aspect that is important here is to understand how the dynamic between stakeholders in the market will change and how it will change their behaviour. The venture must profoundly change the status quo in one or more nodes of the value chain through the disruptive characteristic that is identified in step 1.

### **3.5 Alternative Sampling Factors**

Additional sampling factors that are important to note but were not part of the selection criteria are profitability of the venture, size of the firm and number of years operating.

In current literature and in the media, DI is often discussed in the context of success and the term success is defined in terms of profitability, growth, size of the firm and number of years

operating. However, as Christensen (2015) argues, some disruptive innovations succeed and some don't. DI isn't measured based on profitability, size of the firm or the number of years in operation. A prime example is venture B, they have been operating since 2008, have 180 employees and a net worth of \$1bn, but they are still at the early stages of potential disruption.

For the purpose of the study, industry was not a critical factor in the selection process. Since this study aims to look at the process of opportunity recognition by a venture, the subject of the study is the venture and not a specific industry. Ventures were also not selected based on location. This was primarily due to taking into consideration timescales of the study and the difficulty in locating ex-ante ventures that display DI characteristics.

### **3.6 The Selection Process**

The seven ventures, featured in this study, were secured via personal recommendations and secondary research. The interviews took place with either founders, senior managers, scientists/technologists or product developers of the venture. Due to the nature of their role in the venture, they were able to provide rich insights into their approach to opportunity recognition in relation to DI.

The sample included ventures across various industries from tech, finance and science, with the majority primarily located in Sweden and the United States. Listed on the next two pages in Table 2 and 3 are the ventures that were interviewed. The tables outline information about the interviews and a company description. For the purpose of the confidentiality, the ventures identity remains undisclosed. The identified disruptive characteristics of the ventures can be found in Table 4 in [Appendix 7.3](#) and the role and relevance of the interviewees can be found in Table 5 in [Appendix 7.4](#).

**Table 2**

Code	Industry	Market	Employees	Year Established	Location	Format & Duration	
						Interview 1	Interview 2
A	Finance & Tech	B2C Service	2-10	2016	Sweden	Face-to-Face: 1.5 hours	Video Call: 30 minutes
B	Bio-Tech	B2B Service	50 - 200	2008	USA	Video Call: 2 hours	Video Call: 30 minutes
C	Industrial applications & Tech	B2B Service	2-10	2016	Sweden	Face to Face: 1 hour	Phone Call: 30 minutes
D	Transport & Tech	B2C / B2B Service	2 - 10	2016	USA	Video Call: 2 hours	Video Call: 30 minutes
E	Consumer Goods	B2C Product	11-50	2005	Sweden	Face-to-Face: 1.5 hours	No
F	Bio-Tech	B2B Service	2-10	2014	Sweden	Video Call: 1 hour	No
G	Steel / Manufacturing	B2B Service	2-10	2016	Sweden	Phone Call: 2 hours	No



**Table 3**

<b>Venture</b>	<b>Description</b>
<b>A</b>	Venture A operates in the fin-tech sector. The service they provide is using self-learning algorithms to detect risk to protect investments whilst ensuring a better return. How the technology works is based on the users economic situation, age and how much a client wants to invest, the technology will provide the client with an objective, risk-assessed recommendation on which stock to invest in. Within the next 2 months they will be ready to launch the product.
<b>B</b>	Venture B operates in the bio-tech sector, founded by 5 scientists from MIT. The company specialises in building with bacteria for industrial applications. They primarily work B2B within the speciality chemical sector, from cultured ingredients, strain improvement and creating enzymes.
<b>C</b>	Venture C develops AI software applications like predictive maintenance, anomaly detection, prescriptive solutions and multidimensional optimization as well as custom solutions for large industrial companies. The service provided by venture C is focused on big product categories targeting the industrial market. Venture C does both predictable deep learning and provides AI optimization solutions unlike most companies in the AI space who focus solely on one of the two. Venture C develops cutting edge industrial solutions with a high technical level and is on the forefronts of AI technology.
<b>D</b>	Venture D is active in the ridesharing economy providing various transportation services ranging from taxi-services to food delivery and speciality medical transportation. Venture D is a platform based start-up that helps to connect stakeholders in the transportation sector. Drivers provide their own services and venture D mediates between the driver and rider. Venture D utilizes blockchain and platform cooperatives to create self-regulating guilds of drivers providing various transportation services in cities all over the world. They are a premium service provider, highly focused on customer interaction and satisfaction. The guild structure is decentralized but wear the same brand-identity and values. The barrier of joining the platform for drivers as well as riders is low as it is a matter of downloading the application.
<b>E</b>	Venture E is a company developing and marketing its ground-breaking invention, - the airbag helmet for cyclists. This novel head protection represents a revolutionary design solution for urban cyclists' needs. With this fashionable safety product, which in case of an accident provides both for superior skull and brain damage protection, the venture addresses a market of estimated 150 million adult cyclists in Europe alone, of which more than approximately 80% include the fully untapped customer segment of cyclists currently not using any head protection. The venture found the solution to the many critical safety and habitual/design issues of cycle helmets by inventing an airbag cycle helmet in the shape of an ergonomically designed collar worn around a cyclist's neck. In case of an accident, electronic sensors will detect its user's abnormal movement and trigger instant inflation of an airbag.
<b>F</b>	Venture F is a bio based extraction platform technology. They have developed an unique and patented bio-based extraction platform technology. Where they can turn feathers into cattle feed.
<b>G</b>	Venture G is a company that produces steel powder from destructed firearms. Venture G buys destructed firearms from governmental destruction programs and turns the metal into high quality steel powder. They offer the powder by the kilo to B2B companies who in their turn can process the steel powder in many different ways; melting, mixing, pressing, but most importantly, 3d printing.

### 3.7 Limitations of Our Methodology

Factors of limitations of the study need to be accounted for when reviewing the sampling process and the methods used for analysis, it is critical for the study that the authors highlight where the limitations of the methodology may affect the data and conclusions. The following key areas were identified as potential limitation factors:

*Industry-specific:* Although the authors did not limit to a specific industry, it is important to consider this factor for future studies, does industry play a role in DI? Can certain industries such as technology driven industries display a higher aptitude to OR?

*Location-specific:* The primary reasoning for not limiting the study by region/country was due to time restrictions to locate ex-ante ventures. However, every region/country etc. develops at a different pace dependent on various factors (economy, society etc.) and this could potentially affect OR.

*Interview Questions:* The authors took a semi-structured approach to the interviews, with some questions as open - some potential limitations with open questions is that *'the answers will need to be sifting and coded in order for the data to be analysed'* (Bryman & Bell 2011).

The interview format for the first round of interviews was kept consistent, using the same template for each interview. The second round of interviews were less structured as it involved clarification and identifying gaps in the first round. The interview took place face-to-face, by phone or by video call. These different methods of interviews can affect how information is gathered in particular in phone or video call as subtle facial and body language gestures can form barriers or technical issues can affect the quality of the interview. The authors could potentially face technical issues in particular using video call and also language as some were not native English speakers. Other potential limitations are systematic bias, where the interviewer influences the respondents. (Bryman & Bell 2011).

*Data Processing:* During the interview and transcribing process, there are potential issues in variation of how the information is interpreted, which can affect the accuracy of the results.

*Data:* Locating potentially disruptive ventures proved to be very difficult for the authors. The authors faced several hurdles: [1] Identification of potential disruptive ventures is not well known or has limited exposure unlike proven disruptive firms. [2] There is a lack of understanding and confusion on what exactly enables disruption, which resulted in a lot of resources invested in sorting through the secondary research and personal recommendations

given. [3] Some ventures identified, when contacted were not interested in being interviewed. [4] Some ventures had limited time for an interview, which meant follow up interviews would not be possible. The authors undertook extensive research approaches to locate relevant ventures, due to this, data collection was time-intensive and thus results were limited.

### **3.8 Data Collection and Analysis**

[Step 1] The first round of interviews were set as 1 hour interviews but in many cases the time frame varied from 1 to 3 hours dependent on the interviewee. [Step 2 ] The second round of interviews were between 30 minutes to 1 hour. The majority of the interviews were recorded but in some instances the interviewees requested not to be recorded, in which case the interviewer, took notes during the interview. [Step 3] After each interview, the authors transcribed the interviews directly after the meeting took place to ensure as much accuracy during the transcribing process as possible and to also identify potential gaps in the interview. [Step 4] The interviews were divided up between the two authors to transcribe independently, followed up with each author reading the others transcription for corrections. [Step 5] The authors analysed the peer reviewed transcriptions to identify correlating patterns and gaps in the research. [Step 6] From this analysis, a new set of questions arose and the authors established a second round of interviews to address these anomalies/gaps for further clarity. Steps 3 to 5 were repeated, followed by [Step 7] sending the completed transcripts to the interviewees for corrections. [Step 8] The final step, involved the authors jointly analysing the data to pinpoint key correlation within the data sets. Each interview was systematically structured and modified into a written transcript and case summary, then further categorised the OR pillars. The data was cross-analysed using axial coding (Strauss & Corbin, 1998) to identify similarities, patterns in relation to the theoretical framework. The method enabled the authors to further dissect the data leading to critical insights and conclusions to be drawn.

## 4. Empirical results

### 4.1 Summaries of findings

#### Venture A

##### *Prior Knowledge*

The interviewee is the founder of the start-up and his background is in private banking, having worked at Dansk Bank in portfolio management for 6 years. His experience in the industry gave him in-depth market and consumer knowledge, which led him to identify problems the customer was experiencing during the investment process.

##### *Active Search*

However, the idea for his start-up did not start there, it gradually evolved over a span of 3-7 years and the initial seed of an idea stemmed from a conversation he had with some friends who wanted advice on where and how to invest. He advised them to not go the traditional route due to the high fees. At the time he didn't see any good solution that was simple, efficient and cheap, so he wasn't able to advise them. It was through personal observation and experience during his career and conversations he had with friends that alerted him to the current problems customers face within the investment sector. When the founder decided to pursue the idea, he was faced with great difficulty. He faced rejection of his idea from his manager at Dansk Bank and investors he pitched to. His manager did not see the potential value of the idea within the private banking sector, if they adopted his idea, the bank would stand to lose a lot of money, and many investors did not believe the finance sector was ready. Eventually the market shifted and fin-tech became a hot topic, which led to VC's contacting the venture directly and the founder was able to secure investment easily.

##### *Alertness*

A couple things happened during the discovery process that the founder had observed: New EU financial regulations which would mean companies cannot make money for selling funds. Technology was changing - companies like Klarna helped show people the way in Sweden in terms of digital transactions. The millennial market was changing the landscape as they weren't interested in the traditional approach, they wanted transparency and simple approaches. At the time no-one knew what Fintech was about.

All of these observations that the founder was alert to, enabled him to identify patterns that were emerging that would shape/change the future of the finance sector. An industry experience, his ability to unconsciously identify unrelated trends, events, changes in society,

technology, markets, policies etc. and openness to newness or overlooked areas led him to the discovery and creation of his company.

## **Venture B**

### ***Prior Knowledge***

The founder studied MIT, he specialised in computer and electrical engineering, for 40+ years and worked in various roles at MIT from PHD, professor, researcher etc. In the 1990s, he became bored with what he was doing and started to question what happens after Moore's Law, which led him to biology. Biology can be coded so the founder decided to go back into education and got a degree in biology and this is what led to the launch of the venture. When examining the founders background, it is evident that his prior knowledge was primarily within computer and electrical engineering. According to the interviewee it was not so much the founders prior knowledge that led him to identify an opportunity, rather it was the founders personal attributes and his ability to identify incredible insights, that made him able to see an opportunity before it presented itself. She states:

*“He is a visionary, he is the driving force, it was his mind-set and approach to things.”*

The company also had the support of 4 impassioned PHD students from various backgrounds within the scientific fields, a great mentor who played an influential role in the company and the founder had also prior experience in starting up a venture in tech and had built the precursor to the internet. The combination of the founders vision, combined with his network led to the establishment of venture B.

### ***Active Search***

Many opportunities present itself from other companies and primarily from the founder and his network. The founder regularly attends the world economic forum and the venture actively goes and meet specific customers, to gain market research and consumer insights. As the field of manufacturing with biology is still relatively new, it is critical for the venture to conduct this type of research themselves.

### ***Alertness***

The founder was able to identify incredible insights before they happened. He had a curious mind-set, which led him to question, probe and explore what might happen in the future. According to the interviewee, venture B was ripe for penetrating the market due to the founders alertness to the right time to enter, the founder identified the point when it would become affordable to read and write DNA and set to launch his company at that pivotal point.

## Venture C

### *Prior Knowledge*

The founder of venture C has a long entrepreneurial and IT history. After his academic years he started working for a tech start-up that later became one of the three biggest dotcom rockets. He then continued to work for several start-ups in the mobile solutions sector. Through working in these tech start-ups the founder of venture C had always been on the forefronts of technology and had been involved in over 10 start-ups. He was, for instance, involved in mobile apps before it became hot. At that time the founder developed an interest in semantics (predecessor of artificial intelligence) which was another new and developing technology, but never got materialized. When AI started to become a more widely emerging technology, it was quite organic for the founder to get involved and he joined an AI start-up in 2008. This venture was later acquired by one of the major tech-giants in early 2016.

The origination of venture C was very organic and straight forward for the founder and was very much based on prior knowledge. Being experienced and active within the field, the founder gathered a team of people who he had been working with previously. Previous ventures taught him how to start businesses, but also how to operate them. He mentions that he comes up with business ideas through experience. He argues:

*“You need experience; success has very little to do with the technology, idea or insights, because there are plenty of good innovative ideas that just do not materialize as a company. I have extremely clever friends with great business ideas, but they never execute them, because they don't have that drive to make that change.”*

### *Active Search*

To the question if the founder actively looks for business opportunities, he answers: *“Every minute I'm awake”*. He continues with explaining that he is always on the lookout for new ideas and always on the lookout for people with insights. According to the founder, whenever you start a company you need to have an insight that there is a need in the industry and then combine that with technology. For the case of venture C it was machine learning and the industrial sector. The founder picked this segment as he was looking for a market where AI solutions would mature over the next few years. The founder argues that in order to build an evolutionary company like venture C, you need to be able to have an exploratory process and approach to the market. Before venture C was founded, the founder was tapping into his networks and pursuing an agenda to get customers in that business area. He talked to potential customers a lot asking questions like; do you need this, do you need that, would you pay for this, how much

would you pay for this, if I made this for you, how much would you pay for it? Based on customer feedback he validated, but also adjusted his business idea/opportunity.

The founder also plays a role as business angel and invests in start-ups. He looks for people that have put a lot of time into something or are really aware of things that do not function well. He combines that insight with technology (either by himself or through other people) and creates a product or service that solves the particular problem. The rest, he argues, is up to how experienced someone is in starting up a company.

### ***Alertness***

Always being involved with IT-start-ups that are on the forefronts of technology makes the founder very alert to new or interesting developments within IT. The founder is in an environment where he can easily pick up on trends of technologies that are getting more and more interesting. For venture C that was also the case. He noticed that AI technology was getting more and more widely adaptable and therefore he thought it was worth exploring new market segments. He argues that external market factors like, consumer behaviour and market trends and values play a major role in being alert for opportunities.

## **Venture D**

### ***Prior Knowledge***

One of the founders recognized this opportunity while he was active as a driver on the platform of a competitor. The founder was trying to add additional services (scheduling and customer interaction) for customers he had on this platform. He found that about 25% of his customers wanted to know him as a person and wanted to get him as a driver again, however the platform wouldn't allow him to do so. As the founder wanted the freedom to deliver services himself while still being active on an universal platform, venture D started as a decentralized idea; let the drivers deliver the services themselves and venture D only takes a position as mediator.

Over the past 2 years the founder had different team compositions to further develop the business idea, however none of the team-compositions were particularly experienced. As of now venture D formed a team with a collective experience in over 21 start-ups in different industries and the business idea is rapidly evolving. The team shapes the business idea based on their values and previous experience in ventures.

### ***Active Search***

While further developing the business model of Venture D, the team is actively looking for opportunities or improvements. Venture D uses a very explorative way of development by

testing assumptions and adjusting accordingly. Some processes have been delayed because they believe that understanding the marketplace is more important and forms the foundation of the companies design. The result of this is that the venture pivoted a couple times and the current whitepaper (i.e. business plan) now addresses all stakeholders in the market. By now it turned into a quite radical innovation, through a very different business model.

The COO has different strategies to engage in active search, mostly through reputation and personal network. He goes to places where he can talk to smart people (in this case blockchain conferences) and tries to find the right ideas. Additionally, people bring other people with insights to him because of his experience and he also gets invited to speak at business related events as well. Every venture he is involved in is different, but he always looks at it like solving a puzzle, where the value proposition is central. He looks at what is weak in a business model and then tries to understand what is critical.

### ***Alertness***

The COO argues that you need to be aware of what is going on in a market. He has a general sense that blockchain is a major opportunity. In his lifetime he experienced about 5 of these opportunities (internet, VR, AI, Robotics & Blockchain). He sees a real disruption in marketplaces caused by blockchain. He argues that blockchain makes sense as a value propositions, now it is time to find the right application. He and the founder realised that the market leader in this space beats up on the drivers when competition increases (price goes down) and when there are not a lot of drivers available they beat up on the riders (price goes up). This is not a sustainable model they argue. He continues by saying that he observes the market as a whole and looks at different levels of the industry, the key players and how competitors market their service. In this way he stays alert to changes and opportunities.

## **Venture E**

### ***Prior Knowledge***

The venture was established during the founders final year of their master's thesis. They were not given any guidelines / direction or criteria to follow which gave them the freedom to experiment. This was both exciting and daunting for them as they didn't really know what they wanted to do other than something radical, which could potentially lead them to landing a full-time job. The founders background was primarily in Industrial Design, they had no experience of setting up a company or prior knowledge of the cycling industry.



### ***Active Search***

Once the idea was sparked, they conducted market research to validate their idea. They interviewed people who cycled and from that they found that the main reason why people loved to cycle was the feeling of freedom and they felt that by imposing a law which required them to wear a helmet was taking away that freedom. The founder stated:

*“It was interesting that there was a lot of emotions invested in the feeling of cycling and a lot of negative associations with the traditional bike helmets.”*

The cyclists felt that the traditional helmets took away the whole idea of biking, the freedom, but also their individuality, how they present themselves. This was the second criteria/problem that the founders identified from their market research - fashion was a really important aspect. Through this research, they identified an opportunity. Current new development of a bike helmet is limited, almost non-existent, their competitors use the same production methods, same materials and make only minor changes to the shape, colour / aesthetic look. The founders state:

*“Players in the market were not looking at this from another perspective”*.

It is important to note that the founders were not actively looking to set up a venture. At the time of study the notion of being an entrepreneur wasn't something they even considered as it wasn't something that was presented to them as an option during their studies. All students at that time, were simply looking to find a job with companies such as Ikea, Sony or with design consultancies, the founders were no different in that respect. Even when the idea started to take off, the founders were thinking of simply handing over their idea to an airbag company to develop, but with support and receiving 100,000 SEK they felt a sense of responsibility to at least try to launch the product.

### ***Alertness***

During that time, there was a lot of discussion around the introduction of a new law in Sweden which made it mandatory for children up to the age of 15 years old to wear bicycle helmets. This triggered a debate as to whether it should be extended to adults as well. The response from the public was negative with people stating *‘they would stop biking if that happens’*. This sparked curiosity with the two founders and they wanted to firstly understand why people were so outraged by this new law and secondly how they could resolve their concerns by creating a bike helmet they would happily wear, law or no law.

## **Venture F**

### ***Prior Knowledge***

The venture was established in 2012 by two researchers at the Department of Biotechnology at Lund University. It was during this period in which the two researchers (co-founders) came across the opportunity when they identified a cell-lysing bacterial could produce microbial cells without the presence of any other reagents and solvents. This opportunity has wide reaching application as it could also be used with oils, chemicals and nutritional supplements. Using their specialist knowledge within the field of bio-tech and bio-based materials, led them to the discovery of this opportunity. Although the team has specialists technical expertise, neither of them or their CEO have experience with the poultry industry.

### ***Alertness / Active Search***

At the time, the founders were working on a previous project, within the field of bioplastics. To create bioplastics using its current process is not efficient or cost effective, but through their research this led them to discover a better way of manufacturing. During that exact same time, the founders were trying to commercialise the process, they had a conversation with a poultry supplier about the problems they faced in getting rid of chicken feathers. This led them to recognise how they could apply their technology to transform waste (feathers) into a bio product.

## **Venture G**

### ***Prior Knowledge***

The two founders of Company G had no relation before and they met coincidentally. After having a conversation with each other, the opportunity for Company G arose. One founder used to be involved in firearm destruction programs together with the UN, the other founder has had a career as an art & creative director, with strong communication skills.

To the co-founder a creative process (in the context of pursuing a business idea) is two things, it's a hunch (a gut feeling) and your ability to understand the value. The latter is based on your previous experience, he says.

Apart from being co-founder at Company G, he works at a Stockholm based company that focuses on innovative projects. He says that he is fortunate to work there as they are very skilful in pursuing the innovation angle of projects with the emphasis on communications. He mentions that he founded companies before and he has been involved in other successful projects as well. He had been involved in the first credit card with automatic calculation of carbon footprint on

each spent euro, for example. So he has done work on what he likes to call world improving projects. The success of that company, he says, is thanks to the knowledge that they have in marketing.

The co-founder did an MBA where he learned a lot about building business models. He now combines his knowledge of business models with his knowledge of communication. He says that he doesn't do advertising anymore, the business model is the communication. It is integrated into each-other. They are now launching the first supply chain of steel from weapon destruction programs. Without putting the emphasis on communicating the symbolic value in the business model, it would be impossible.

### ***Active Search***

At the Stockholm based company where the co-founder works, he works with a lot with new products and services and he says that it's in their DNA to find new markets for clients. This same search has not been different for Company G. He explains that the concept of destroying firearms is nothing new, however as of now, the leftover metals are not being used due to their low quality. They did multiple chemical tests with batches that came out of these destruction programs and concluded that they cannot guarantee the quality. The batches are inconsistent and some could have high levels of metals that are absolutely not suitable for production or even being close to humans.

So they had to figure out how to tackle this problem. They did a lot of reading on the steel industry and had many discussions on how to tackle this problem. They had a number of universities looking into this for them as well. They also talked to other companies who are trying to do something similar (using the steel from destructed firearms). But he found out that they have no idea what they're doing. He asked them about the production process and quality, but the companies weren't able to answer that. They continued to talk to other companies in the steel industry, including production companies. At some point they ran into an innovative steel production company that confirmed that they could process the metal into steel powder. Together with this company they came up with a production method that gets rid of the unwanted metals and leaves you with quality steel. It took them quite a while to develop this method. The co-founder says that he was lucky with being in Sweden, as Sweden is on the forefronts of innovative steel production. He mentions that the next big thing in steel production is through steel powders as they can be used for numerous applications like melting, mixing and pressing, but most importantly, 3d printing.

Now that they found a way to produce a quality steel from the destructed firearms it was time to look for the right markets. The Stockholm based company, where the co-founder works, is part of a very successful Scandinavian agency network, that helped them in setting up meetings with potential customers. He met over 50 brands to validate the idea. Initially 5 companies signed up for prototyping with the steel powder. Company G has been talking a lot with these companies to truly understand the production process of these companies as it was that type of dialogue that made them define the market and also to work on the pricing model.

### ***Alertness***

There are a lot of destruction programs all across the world. Illegal firearms get seized by the government and end up on a big pile, then they are destroyed in destruction programs. In the initial conversation the co-founders had, the conclusion was that there was no commercial value in the steel that remains after the destruction, it is a low quality steel. In addition, steel prices are low, so there was no real value for the leftovers. However, the founder was alert by realising that there actually is a great value, as the leftovers are proof that the weapons are destroyed. It has a symbolic value, in terms of marketing and brand.

## **4.2 Findings & Cross-analysis on OR pillars**

Our empirical focus is driven with the motivation to understand how ventures with DI characteristics approach OR with findings analysed and presented in this section.

### ***Prior Knowledge***

Prior knowledge is defined as using one's own knowledge and expertise to identify opportunities within their specific field. However, it can also be how an individual gathers information through their rich and varied life experiences (Baron, 2006). From our data we identified that four out of seven founders were specialist in their field, with critical insight of their market/industry and awareness of customer needs, which enabled them to identify an opportunity. On the other hand, three out of seven founders had no prior knowledge of their market/ industry and were not specialist in the field they were penetrating, yet were able to identify an opportunity within that sector. The founder of venture E says;

*“I was a student in my final year master’s program, I knew nothing about cycling, the air bag industry or anything about running a company”.*

What is interesting is that out of these three ventures founders, two did have experience with starting ventures in the past. In fact, five out of seven ventures founders had prior experiences with setting up companies in the past and one out of the two that didn't have this experience,

had years of working experience within the industry that he is now starting a venture in. At least five out of the seven interviewees say it was their prior knowledge that led them to the identified opportunity. However, the founder of venture C points out that: *“It is not a one-man show.”* It is rather through the collective knowledge and experience of the people active in the venture and the external network of the venture, that they are able to identify an opportunity.

Another important finding is that the founders of four out of the seven ventures have been closely involved with disruptive innovations in the past. These four founders also had prior knowledge and experience in various different industries and disciplines, in contrast to the three founders that had not been involved in disruptive innovations in the past. Prior knowledge also seems to be a major factor in evaluating an idea in at least five out of the seven ventures. The founder of venture G states the following regarding the evaluation of an idea:

*“If you have a lot of experience you can determine the value of an idea. Once I understand the value of an idea and choose a direction, I never look back. After 25 years I am good at pinpointing whether an idea will work or not.”*

### **Active Search**

Active search is defined as proactively searching for opportunities by utilising various sources of information to discover new business ventures (Ozgen and Baron, 2005). All ventures engage in active search, whether it is to find opportunities or whether it is to validate insights or adjust identified opportunities. In all cases the founders went out to consult their networks; they all went out to actively network and talk to relevant stakeholders in the industry to gain insights. Traditional sources of information like newspapers and public information were not mentioned. This corresponds with the literature as Baron (2006) outlines that often these types of entrepreneurs are less inclined to use traditional sources of information, but actively look beyond the obvious. They search for niche pockets of valuable insights through their personal network of feeds. In some cases the reputation of the founders of the venture played a pivotal role in the discovery process as well. The founders of venture B, C and D, had people coming to them with insights or business ideas.

If there is a need of information or when assumptions are made that can't be answered by the prior knowledge of the founders, they go out to test assumptions or find people who can provide them with answers. An interesting finding here was that the ventures put an emphasis on building the business model on the data that was gathered, rather than creating a product or service. This correlates with Christensen's (2015) notion that the business model is often the

primary focus, not the product or service. Venture D, for instance, deliberately delayed processes that they were able to carry out already, because they first wanted to fully understand every aspect of the marketplace and its stakeholders. Similarly, venture G found out by actively searching that producing steel powder was the way to go, as they got an insight that 3d printing is majorly shaping the way we will produce certain steel products in the future, this made them change their business model. One of the founders of venture G says:

*“You set out to build something and it's all about building the wings on the way down, validation was an organic process where all the new data that came in, made us understand how to build the company and business model. It was all about getting out there presenting the idea, talking about all the problems we faced and open dialogue with all relevant stakeholders to improve.”*

What is interesting is that the four ventures with past experience in disruptive innovations, seem to engage in active search the most. It was these ventures who had the most exploratory approach to active search. It is noteworthy that they all took a similar perspective to active search; it was not one specific node of the value chain that they were interested in, it was rather the value chain as a whole of an industry. When taking this perspective they all showed to be objective and it was much about gathering as much information as possible on all stakeholders and clearly understanding how an industry is structured. This objectivity is described by Baron (2006) as openness to new knowledge, in unknown fields outside the field of expertise of the entrepreneur. The emphasis of this objective and extensive search was on consumers. Questions asked are: what kind of pain points do consumers have? Where in the value chain is this pain point created? The founder of venture G says the following regarding taking this perspective:

*“Obviously when you work like that you will end up with big ideas and disruptive business models as you look for solutions that are not just applicable to one consumer, but to an entire industry.”*

He seemed to have a good understanding of how markets are disrupted as he continues to explain:

*“There are a lot of markets that are dusty, and that is for a good reason; they are making a lot of money. So the players in that market are half asleep, or have no reason to look for innovation, they will be disrupted in a second.”*

This statement clearly corresponds with Christensen's (2015) notion that often incumbents focus primarily on sustained growth and profitability from their core customers. Lastly, he shows to be aware of how to search for disruptive opportunities as he explains:

*“Look for markets that are unchallenged for many years and then ask; how do you work towards an efficient consumer experience? The second you realize that an industry is outdated or has an inefficient consumer experience, an interesting conversation emerges with questions as how can we improve this?”*

In fact, all founders seemed to be fully aware of the pain points that consumers or other stakeholders in the industry were facing and it was from these pain points where the opportunities arose. This relates to the literature as Venkataraman (1997) explains that a sound insight to customer problems plays a key role in the discovery process and often leads to the identification of a solution to a specific problem.

### ***Alertness***

Alertness was a key attribute that all ventures exhibited. Entrepreneurial alertness is closely related to active search (Tang et al., 2012). The findings clearly indicate this relation as because of the active search, the founders are alert to changes or new information. Each of the ventures demonstrated a special alertness to these intangible opportunities for example, venture A observed critical changes in policies and market conditions, technological development and consumer behaviour which led him to identify a pattern and leading to the discovery of his opportunity. The founder of venture B, was constantly probing, exploring and questioning what might happen in the future and challenging existing theories. According to the interviewee it was because of this that he was able to identify incredible insights before they happened.

Especially when the founders are actively gathering information from all stakeholders in the industry, and when the value chain is researched as a whole, founders seem to be more alert to any change. As the COO of venture D explains:

*“I observe the market as a whole and look at different levels of the industry, the key players and how competitors market their service. In this way I stay alert to changes and opportunities.”*

The theory on alertness also shows that alertness is related to action (Tang et al., 2012). Some founders state that having an idea is one but being able to carry it out is another. Once an opportunity is found, it is crucial to act in order to validate and test whether it is an opportunity

worth exploring. The founders of venture C and G explain that you need a certain intrinsic motivation that makes you act upon information that comes in. The founder of venture G says:

*“Finding an opportunity is one, but obviously the next step is to validate. The hunch (gut feeling) is the first step and then it's all about working towards a structured process where you validate each step. You need a drive other than money to do that process”.*

Similarly, the founder of venture C says the following:

*“I have extremely clever friends with great business ideas, but they never execute them, because they don't have that drive to make that change”.*

### **4.3 Other Findings**

During the interviews, and through the analysis and discussions, we found recurring themes within the data that potentially present insights in the enablers of disruption. These themes were indirectly linked with the three pillars of OR. In this section we outline these findings.

#### ***Mind-set***

One recurring theme that founders talked about while elaborating on their ability to identify and pursue opportunities was having the right mind-set. The first interesting finding about having a certain mind-set was that founders said you need a higher purpose when pursuing opportunities, often this higher purpose was related to a social cause or improvements of society. It seems that this is especially applicable to disruptive innovations as 5 out of 7 ventures in some way are addressing a social cause. This finding can be clearly illustrated in a statement by the founder of venture G, he has founded ventures in the past and like venture G they also had a social cause:

*“I have a drive other than money. I think that anything that can be connected to a social cause or a world problem is very suitable for innovation. It makes people fight harder, worker harder and think harder, which is what is exactly needed in innovation. You need a higher purpose and money is just not enough. That's why most of my projects are related to a social cause or world problems. When you address these type of world problems, innovation is the way to go. I have had this focus (addressing world problems) in my career for the past 6 years.”.*

The COO of venture D has a similar mind-set. He has been a vegan for 35 years and a practitioner for non-violence. He has interests in and worked with low eco footprint products and non-profit organisations. He joined venture D because he liked the CEO, and because the



venture aligns with his values of fairness and efficiency, he then shaped the business model so that a win-win situation is created for all stakeholders in the market, while having the lowest corporate footprint. Venture D aims to be a lean company that facilitates and not dominates

Other founders also show a desire to contribute to a world improving change. The founder of venture F, for instance, also had started a number of companies, generally in the field of sustainable development, both aid/humanitarian work and clean-tech. He also worked as a consultant for the UN. The founder of venture E, in her turn, initially didn't even think of starting a venture, all she knew was that she wanted to do something that would make a '*radical change*'.

The founder of venture B does not play an active role in the company but still goes to work every day. On occasions he will drop into a meeting and is able to offer valuable insights and recommendations despite not having any knowledge or direct involvement of the project. Instead the founder spends much of his time in his office '*working on personal projects*'. This was significant for the interviewee to mention as it was to highlight the fact that the founder is actively curious and engaged in projects not directly related to the company. This shows an certain intrinsic motivation that the founder has. The interviewee describes the founder as '*a real character*' which has also shaped the company culture and how they approach innovation. The interviewee says:

*"The founder is the driving force of the company and it is his mind-set and approach to things that makes how he identify novel opportunities."*

It is noteworthy that the founders of the two ventures that are not closely related to a social cause both show an intrinsic motivation other than money as well.

The second interesting finding of having the right mind-set that can be drawn from the data, is that you need to be future-oriented, but respect the current business model. This finding is illustrated in a statement by the founder of venture G:

*"It's about mind-set, think of the banking industry for instance, the people who work there are extremely smart and skilful people, however they have one clear instruction; optimize the existing business model. There is no people in the company that are doing what they are supposed to do and that is thinking about future threats. For established companies it's hard to innovate as you would need to hire people that are looking at ways to change the business model, whereas at the same time you have people working*

*on how to optimize the existing business model. That's not going to work, that is a friction you can't have in a single company.”.*

This statement relates to Christensen's (2015) notion that profiting from the current business model by incumbents often seems better than writing it off. Additionally, sustaining innovations are often valued over disruptive innovations by incumbents as they prioritize their existing customers (Christensen et al., 2016). Regarding respecting the current business model the founder of company G says:

*“In order to pull off disruption, is understanding and respecting the current model. Because they do what they are supposed to do and often do it really well. Find out what they are really good at, because that will likely give you the insight on how to disrupt the market. If you don't respect that you will not gain that knowledge.”.*

This way of thinking also seems to be observable in other founders of the interviewed ventures. The opportunity of the founder of venture A was arguably even too future-oriented as his manager and many investors did not believe the finance sector was ready. The literature describes that managers typically hesitate to support new product concepts whose market is not assured (Christensen, 2003). Eventually the market caught up and fin-tech became a hot topic, which led to investors contacting the founder of venture A directly and then he was able to secure investment easily. In the literature we find that not all innovative ideas can be shaped into disruptive strategies, as sometimes the necessary preconditions do not (yet) exist (Christensen, 2003).

The founder of venture B was praised by the interviewee for his personal attributes, his ability to identify incredible insights, he was able to see the opportunity before it presented itself - *'he is a visionary'*. He has a curious mind-set, which led him to question, probe and explore what might happen in the future. The founder identified the point when it would become affordable to read and write DNA and set to launch his company at that pivotal point. The founder of venture D, in his turn, states that in his lifetime he experienced about 5 disruptive opportunities (Internet, VR, AI, Robotics & Blockchain) and that he foresees a real disruption in marketplaces caused by blockchain.

### ***Technology***

Another recurring theme throughout the sample is the use of novel technology. Christensen and Raynor (2003) and Kirzner (1973) state that technology isn't the main driving force when it comes to innovation, however, our research makes it evident that technology does play a crucial

role when it comes to disruptive innovation. All ventures inhibited the use of novel technology ranging from artificial intelligence, blockchain technology and bio-technology to novel steel production technology and airbag technology. All these technologies are relatively new and the ventures seem to be on the forefronts. The founder of venture C states:

*“The fundamental point about how to innovate is to combine an insight, an understanding, something that not enough people do or understand and then combine that with technology. It could be a service as well, but in my life at least it has always been technology.”*

## 5. Conclusions and Implications

The aim of the paper was to contribute new insights on how ventures with disruptive characteristics approach OR. The construct of DI is a relatively new body of theory and there is a lack of clarity on the process of disruption, especially when it comes to making ex ante predictions (Nagy et al., 2016). It is critical to understand how the process of OR influences the process of disruption. Studying the approach to OR by ventures with disruptive characteristics, offers an unique insight into the process of disruption as we found a consistent pattern amongst the majority of the ventures regarding their approach towards active search and their mind-set.

Especially the perspective of the ventures towards active search seems to be uniform. It was by taking an objective “bird-eye” view on all dimensions of the industry, that the ventures were able to understand the current business model in an industry and figure out the pain points that stakeholders are facing. The imperative data needed to identify a disruptive opportunity seems to be scattered across the industry; every node of the value chain and every stakeholder in the industry is a piece of the puzzle, with the end consumer being the most important piece. Shaping the disruptive business model runs in parallel with obtaining and interpreting the information and is based on addressing the pain points that stakeholders are facing. In some cases the ventures needed to slightly pivot as new data was coming in from all corners of the industry. Having this “bird-eye” view on the whole industry and all its stakeholders, makes the ventures to be alert to changes.

When actively searching with this perspective, having a future-oriented mind-set together with a higher purpose seems to be a prerequisite. Being alert is crucial when it comes to being future-oriented as it makes the opportunity seekers aware of market trends and shifts that form the foundation of the future of an industry. Being aware and comfortable with novel technology seems to be important too, as through novel technology new applications and more efficient processes are made possible. Mind-set is an abstract form and thus not only unique to the individual but not easily characterized. The personal attributes of the founders seemed to play a key role in the identification of the opportunity for the ventures as they showed a strong intrinsic motivation, other than money. The ventures are pursuing opportunities that address a (latent) need of a large group of people or stakeholders, often linked to a social cause or major problems. Fulfilling a need for a large group of people or stakeholders asks for an efficient and comprehensive approach, which perhaps needs to be disruptive by nature relative to the existing approach.

Lastly, the collective prior knowledge and experience of a venture and its external network seems to at least play two vital roles in the process of disruption: (1) Evaluation and interpretation of the obtained data, and (2) The ability to come up with a disruptive solution. Novel technology seems to contribute greatly to the latter.

### **Implications for future research**

Understanding the linkages between disruptive innovation and opportunity recognition within the context of ex-ante ventures is critical to contribute new insights within the field of entrepreneurship. The authors have attempted to piece together a snapshot of this phenomenon. In order to provide a more conclusive and well-rounded perspective, the authors iterate the need to establish further research within this field, in particular the need to conduct a comparative study on the approach to opportunity recognition between disruptive and non-disruptive ventures. The ability to come up with a disruptive solution is just as much part of the opportunity recognition process as the identified need or problem. This is supported by Davidsson's (2015) argument that imaginary combinations of product/service offerings; potential markets or users, and means of bringing these offerings into existence are guiding the process of opportunity recognition. The true nature of disruption must be grounded in the ability of a venture to come up with a solution and not in its ability to identify the need as the need exists without the solution. As we found that the ability to come up with a solution is strongly related to the collective prior knowledge and experience of opportunity seekers, we suggest that future research should have a focus on the prior knowledge aspect of opportunity recognition in order to understand the nature of disruption.

## 6. References:

- Adner, R. (2002). When are technologies disruptive? A demand-based view of the emergence of competition. *Strategic Management Journal*, 23(8), pp. 667–688.
- Alvarez, A, S, Barney, B, J, Young, L, S (2010). Debates in Entrepreneurship: Opportunity in Formation and Implications for the Field of Entrepreneurship. Part of the Handbook of Entrepreneurship Research: An Interdisciplinary Survey and Introduction. USA: Springer.
- Anthony, S, (2016). Kodak’s Downfall wasn’t about Technology. *Harvard Business Review*. Available online: <https://hbr.org/2016/07/kodaks-downfall-wasnt-about-technology> [Accessed 22nd February 2018].
- Baron, A, R (2006) Opportunity Recognition as Pattern Recognition: How Entrepreneurs ‘Connect the Dots’ to Identify New Business Opportunities. *Academy of Management Perspectives*. Vol 20. Issue 1.
- Busenitz, L. W., (1996). Research on Entrepreneurial Alertness. *Journal of Small Business Management* Vol. 34 Issue. 4, pp. 35-44.
- Christensen, M, C & Raynor E, M (2003). *The Innovator's Solution: Creating and Sustaining Successful Growth*. Massachusetts: Harvard Business School Publishing.
- Christensen, C.M. (2006). The ongoing process of building a theory of disruption. *Journal of Product Innovation Management*, 23, pp. 39–55.
- Christensen, M,C, Raynor, E, M & McDonald, R (2015). What is Disruptive Innovation? *Harvard Business Review*. Available online: <https://hbr.org/2015/12/what-is-disruptive-innovation> [Accessed 2nd February 2018].
- Christensen, C. M., McDonald, R., Altman, E. J., & Palmer, J. (2016). *Disruptive Innovation: Intellectual History and Future Paths*. Harvard Business School.
- Danneels, E. (2004). Disruptive technology reconsidered: a critique and research agenda. *Journal of Product Innovation Management*, 21(4), pp. 246–258.
- Davidsson, P. (2015). Entrepreneurial opportunities and the entrepreneurship nexus: A re-conceptualization. *Journal of Business Venturing*, 30(5), 674–695.
- Govindarajan, V. and Kopalle, P.K. (2006). The usefulness of measuring disruptiveness of innovations ex post in making ex ante predictions. *Journal of Product Innovation Management*, 23, pp. 12–18.
- Hang, C.C., Chen, J. and Yu, D. (2011). An assessment framework for disruptive innovation. *Technology Management for Global Economic Growth*, 18-22 July, pp. 1-7.

- Kaish, S & Gilad, B (1991). Characteristics of Opportunities Search of Entrepreneurs Versus Executives: Sources, Interests, General Alertness. *Journal of Business Venturing*. Vol. 6, No.1, pp 45-61.
- Kaplan, S. (2012) Leading disruptive innovation. *Ivey Business Journal Online*. (July/August 2012) Available Online, <http://www.iveybusinessjournal.com>.
- King, A. & Baartartogtokh, B. (2015). How Useful is the Theory of Disruptive Innovation? *MIT*. Vol. 57, No, 1.
- Kirzner, I. (1973). *Competition and Entrepreneurship*. Chicago: University of Chicago Press.
- Kuckertz, A, Kollmann, T, Krell, P & Stöckmann, C (2017). Understanding, Differentiating, and Measuring Opportunity Recognition and Opportunity Exploitation. *International Journal of Entrepreneurial Behaviour & Research*. Vol. 23, No: 1, pp 78-97
- Lepore, J (2014). The Disruption Machine. What the Gospel of Innovation gets Wrong. *Annals of Enterprise by The New Yorker*. Available online: <https://www.newyorker.com/magazine/2014/06/23/the-disruption-machine> [Accessed 3rd February 2018]
- Mcdougall, M. (2014). An Investigation of the Theory of Disruptive Innovation : Does the Cryptocurrency Bitcoin Have the Potential to be a Disruptive Innovation Relative to an Existing Market? Master's Thesis, Edinburgh Napier University, Available online: <http://www.soc.napier.ac.uk/~cs104/mscdiss/moodlemirror/student/d3.pdf>. [Accessed on 9th February 2018]
- McMullen, S. & Shepherd, D. (2006). Entrepreneurial Action and the Role of Uncertainty in the Theory of the Entrepreneur. *Academy of Management Review*. Vol. 31, No. 1, pp 132–152.
- Nagy, D, Schuessler, J & Dubinsky, A (2016). Defining and Identifying Disruptive Innovations. *Industrial Marketing Management Journal*. Vol 57, pp 119 - 126.
- Rahman, A, A, Hamid, A, Z, U & Chin, A, T (2017). Emerging Technologies with Disruptive Effects: A Review. *Perintis eJournal*, Vol 7, no 2, pp 111-128.
- Ozgen, E & Baron A, R (2005). Social Sources of Information in Opportunity Recognition: Effects of Mentors, Industry Networks, and Professional Forums. *Journal of Business Venturing*. Vol. 22, No. 2, pp 174 – 192

- Reagan, J. L. (2014). Predicting disruptive innovation: Which factors determine success? Available online: <http://search.proquest.com/docview/1654787515?accountid=44407>. [Accessed on 13th February 2018]
- Sandström, C., Berglund, H. & Magnusson, M. (2014). Symmetric Assumptions in the Theory of Disruptive Innovation: Theoretical and Managerial Implications. *Creativity and Innovation Management*, 23, 472-483.
- Santandreu, D. (2017) Have disruptive innovations arrived at the gates of academia? PhD, University of the West of England, Bristol. Available from: <http://eprints.uwe.ac.uk/27223>
- Sarasvathy, S. D. (2001). Causation and effectuation: Toward a Theoretical Shift from Economic Inevitability to Entrepreneurial Contingency. *Academy of Management Review*. Vol. 26, No. 2, pp 243–263.
- Sarasvathy, D. K., Simon, H. A., & Lave, L. (1998). Perceiving and managing business risks: Differences between entrepreneurs and bankers. *Journal of Economic Behaviour and Organization*, Vol. 33, pp. 207–225.
- Schmidt, G.M. and Druehl, C.T. (2008). When is a disruptive innovation disruptive? *Journal of Product Innovation Management*, 25, pp. 347–369.
- Schwab, K (2016). The Fourth Industrial Revolution: what it means and how to respond. *World Economic Forum*. Available online: <https://www.weforum.org/agenda/2016/01/the-fourth-industrial-revolution-what-it-means-and-how-to-respond/> [Accessed 2nd February 2018]
- Shane, S (2000). Prior Knowledge and the Discovery of Entrepreneurial Opportunities. *Organization Science*. Vol. 11, Issue. 4: 448-469.
- Shane, S (2003) A General Theory of Entrepreneurship. The Individual-Opportunity Nexus. Northampton, MA: Edward Elgar.
- Sood, A. & Tellis, GJ. (2011). Demystifying disruption: a new model for understanding and predicting disruptive technologies. *Marketing Science* Vol. 30, Issue. 2: 339–354
- Strauss, A. L., & Corbin, J. M. (1998). *Basics of qualitative research: Grounded theory procedures and techniques* (2nd ed.). Thousand Oaks, CA: Sage.
- Suddaby, R, Bruton, D. & Steven, S (2015) Entrepreneurship through a Qualitative Lens: Insights on the Construction and/or Discovery of Entrepreneurial Opportunity. *Journal of Business Venturing*. Vol. 30, No,1
- Tang, J, Kacmar, M, Busenitz, L (2012). Entrepreneurial Alertness in the Pursuit of New Opportunities. *Journal of Business Venturing*. Vol. 27. No 1.



- Venkataraman, S. 1997. The Distinctive Domain of Entrepreneurship Research: An editor's perspective. In J. Katz, & R. Brockhaus (Eds.), *Advances in Entrepreneurship, Firm Emergence, and Growth*, Vol. 3: 119–138. Greenwich, CT: JAI Press.
- Yin, K,R. 2009. *Case Study Research: Design Methods*. 4th Edition. USA: Sage Publication Inc.
- Yin, K,R. 1994. *Case Study Research: Design Methods*. 2hd Edition. USA: Sage Publication Inc.
- Yu, D., Hang, C.C., 2010. A reflective review of disruptive innovation theory. *International Journal of Management Reviews* 12 (4), 435–452.

## 7. Appendix:

7.1 Table 1 – Summary of three identified pillars of disruptive innovation

Category	Characteristic
<b>Market segment</b>	Disruptive innovations either enter at the low-end of the market, create new markets (Christensen, 2015; Nagy et al., 2016), or penetrate the market from niche to mainstream (Govindarajan & Kopalle, 2006). The disruptive innovations offer new value propositions to attract a new customer segment or the more price sensitive mainstream market (Govindarajan & Kopalle, 2006). The market segments where disruptive innovations are introduced, are often overlooked by incumbents (Christensen, 2015).
<b>Process</b>	The disruption of a market often takes years (Christensen, 2015); it is a process of how a firm takes a series of actions leading to a novel outcome. The process often involves the incorporation of a new technology, new materials or more efficient (production) processes/standards, that benefit the new/low-end market (Nagy et al., 2016). A different set of features and performance attributes relative to the existing product are introduced which are in the early stages unattractive to the mainstream and usually attracts a niche segment (Govindarajan & Kopalle, 2006). The mainstream market starts to adopt the disruptive innovation as it matures over time and fulfils more needs.
<b>Business Model</b>	Disruptors often build very different business models than incumbents (Christensen, 2015), which changes the dynamic between stakeholders in an industry. The change in dynamic often has to do with the introduction of alternative forms of ownership (Nagy et al., 2016). When the ownership of a certain product or service changes, it often drastically changes distribution, price and functionality as well.

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## 7.2 Interview Question Format

**INTERVIEW 1:**  
**A Study of Firms Approach to**  
**Identifying Opportunities to Disrupt the Market**

<b>Company</b>	
<b>Interviewee</b>	
<b>Interviewer</b>	Jenny Lee & Remie Bastiaansen
<b>Date</b>	
<b>Time</b>	
<b>Format</b>	Google hangouts
<b>Skype</b>	Remie Bastiaansen: remiasaus   Jenny Lee: jbvlee
<b>Phone</b>	Remie Bastiaansen: +31 619 22 65 26   Jenny Lee: +46 7691 77449

### 1.0 Overview of the Interview:

In the context of the master program in Innovation & Entrepreneurship at Lund University, we are conducting interviews for our thesis. The goal of the thesis is to learn more about the process of innovation in particular how disruptive companies identify opportunities that have the potential to disrupt the market. The thesis seeks to address the question: How do firms identify opportunities that have the potential to disrupt the market?

### 1.1 Aims & Objectives

The aim of this research is to investigate how disruptive firms identify opportunities that have the potential to be disruptive. By providing an overview of literature and theories on disruptive innovation and opportunity spotting the paper will present key findings on whether there is a set methodology to identifying disruptive opportunities.

### 1.2 The Interview

The interview will take around 45 - 60 minutes and will only be used for the purpose of our thesis. Participant information will be anonymous.

The format of the interview will cover 3 key areas, with a more detailed analysis of the third area - opportunity Recognition:

- You
- The Company
- Opportunity Recognition

## INTERVIEW 1:

### Interview Questions:

<b>Research about the company and the individual must be carried out prior to the interview</b>	
<b>Introduction:</b> We will begin the interview to firstly establish a background overview about yourself, your background, your experiences and your role in the company.	
<b>Section 1: You</b>	
1.1	<b>Can you tell me a bit about yourself, your background in terms of your field of study, career history, experiences, expertise, which industry/sector they have primarily worked in etc</b>  Other Questions: <ul style="list-style-type: none"><li>• Is this their first venture? Or have they founded other ventures? What were they? Which industry? Market etc</li></ul> Company related questions: <ul style="list-style-type: none"><li>• What is their role in the current company?</li><li>• What are they responsible for? What do they do?</li><li>• It is important to try to gauge an understanding that if they are not the founder, what role they play in terms of DI.</li></ul>
*Insert Answer Here*	
<b>Section 2: The Company</b>	
2.1	<b>Can you provide us with a brief overview of the company (What, Who, Why, The Team)</b> What is the company? Describe the service / product? How does it work? - the tech? What is its USP? what makes its unique/novel/innovate/different to others? What makes it disruptive according to them? How did you know this idea had the potential to disrupt the market? Would you say your ideas serves an overlooked segment?

**INTERVIEW 1:**

	<p>What is the target audience / market?</p> <p><b>The Team</b></p> <p>Who is in the team?</p> <p>What is their role?</p>
<p>*Insert Answer Here*</p>	
<p><b>Section 3: Opportunity Recognition</b></p> <p>Opportunity recognition is viewed as a key step in the entrepreneurial process. As part of our research we want to understand, how you (your company) identified this opportunity, whether you had a specific approach / methodology or if it was an idea that just organically emerged.</p>	
<p><b>3.1</b></p>	<p><b>The Process:</b></p> <p><b>This is quite a general broad question, but think back to the very start of the idea, and can you describe how you came up with this idea? What was the beginning stages. Can you describe the journey.</b></p> <ul style="list-style-type: none"> <li>• Talk us through how you came up with the business idea.</li> <li>• Describe to us the process you undertook in how you identified an opportunity, leading to the creation or your business?</li> <li>• Can you pinpoint the exact moment the idea materialised?</li> </ul>
<p>*Insert Answer Here*</p>	
<p><b>3.2</b></p>	<p><b>Active Search:</b></p> <ul style="list-style-type: none"> <li>• How do you identify / find opportunities?</li> <li>• Where do you look? Conferences / your network / journals etc</li> <li>• Do you have specific sources of information you go to?</li> <li>• Do you have a set methodology approach?</li> <li>• Do you conduct market research to identify opportunities/needs?</li> </ul> <p>niche pockets of valuable insights through their personal network of feeds, openness to new knowledge, in unknown fields outside their field of expertise (Baron)</p>

## INTERVIEW 1:

*Insert Answer Here*	
<b>3.3</b>	<b>Alertness:</b> <ul style="list-style-type: none"><li>• Do you actively look for opportunities?</li><li>• To what extent do external market factors influenced/shaped your idea?</li><li>• How were you were aware of this market factors/influences?</li></ul> <p>*market factors = consumer behaviour, new technology, changes in policy/regulations etc</p>
*Insert Answer Here*	
<b>3.4</b>	<b>Prior Knowledge:</b> <ul style="list-style-type: none"><li>• How much of your past experience in that specific industry has led to the discovery of this opportunity?</li><li>• You have founded ventures in the past, how much of this experience has influenced how you identify opportunities?</li><li>• What role did your network play in the origination of this business idea?</li><li>• How much of your experience in the industry/sector played a role in how you recognised that this was an opportunity worth exploiting?</li></ul>
*Insert Answer Here*	
<b>3.5</b>	<b>Value/ Feasibility:</b> <ul style="list-style-type: none"><li>• What were the key indicators that alert you to the fact that the opportunity was worth pursuing?</li><li>• How did you decide on the validity of this business idea making it worthwhile to pursue?</li><li>• How did you assess the feasibility of the business idea?</li></ul>
*Insert Answer Here*	

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**7.3 Table 4 – Identified disruptive characteristics of the ventures**

<b>Disruptive Characteristic &amp; Category</b>			
<b>Code</b>	<b>Radical Functionality (market)</b>	<b>Discontinuous Technical Standards (process)</b>	<b>Innovation Ownership (business Model)</b>
A	A are targeting the niche market with the vision to make this product available to the mainstream. According to A, investment services are currently only available to a small circle of extremely wealthy individuals and is only offered in the traditional bank advisor format. Banks are not currently interested in adopting this approach as essentially they will lose money. As this company grows, and establishes trust in the marketplace, A believe that this will become a mainstream solution. A are adopting AI technology to change the way users are given advice on investment. This approach has the potential to disrupt the existing method, which is through a bank advisor, making it more affordable.		
B	Venture B leverages the power of biology for manufacturing, which has the potential to disrupt traditional methods of manufacturing in existing markets. This type of manufacturing also allows for new applications, thus creating new markets. B can potentially apply this technology across a broad spectrum of consumer and industrial products, leading to greater efficiency and affordability. However, this approach is not yet widely adopted. An example of the novelty of their services is how they are able to recreate the smell of an extinct flower or the smell of rose from yeast.		
C		The disruptive characteristic of venture C can be described as discontinuous technical standards as the AI applications provide smoother and more efficient processes. It's a new approach and a new technology in an existing market. Processes (like predictive maintenance) are getting cheaper and better and are becoming more widely available.	
D		Venture D has two disruptive characteristics: discontinuous technical standards by utilizing blockchain to streamline processes and change of ownership by creating a decentralized operation structure with autonomous and self-regulating nodes. By eliminating a central corporate structure, venture D has a lean organisation structure and a substantially lower corporate footprint. Venture D is deploying a different business model compared to other players in the market. Additionally, venture D is the lowest cost provider in the market compared to competitors as they have the lowest cost of acquisition and the lowest cost of operations, by leveraging blockchain technology.	
E		Venture E is taking a different approach than the current	

		<p>process/method of bicycle helmet safety. Existing helmets utilise the same production methods and materials, and design with only minor variation in terms of the outer appearance (colour/shape etc.). Venture E removes the entire helmet to create an invisible helmet that only appears when there is a threat to the cyclists safety. Using airbag technology to develop a unique helmet, without compromising on the wearers safety - combining fashion, freedom and safety.</p>	
F	<p>Venture F's protein technology is creating a more efficient and cheaper process in bio based materials. Compared to currently available solutions, the method is completely bio based (they only use microbes) and also selective – this means that their solution only lyses the material it should, and leaves the material of interest (such as the PHA or the protein) intact. It is also cheaper. Currently, there is no existing way to do something meaningful with chicken feathers.</p>		
G	<p>Venture G takes a different supply chain process in the steel industry. It addresses a social cause by using destructed firearms as their supply. On the one hand Venture G works closely with the government and politics on the other hand Venture G supplies B2B companies with high quality steel powder with a symbolic value. They produce steel powders which are suitable for different applications but most importantly for 3d printing, which is at the moment majorly changing the way of production in the steel industry.</p>		

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**7.4 Table 5 – Interviewees role and relevance**

Venture	Interviewee Role & Relevance
<b>A</b>	The interviewee is the founder of the start-up and his role within the company is Head of Product Development.
<b>B</b>	The interviewee is the Project Manager, working directly under the Creative Director, however her job title does not communicate the broadness of her role, from business development, marketing to brand strategy. She has a deep insight into the company, both how it was formed, the founder and the company culture.
<b>C</b>	The interviewee is the founder of the venture and his role within the company is CEO.
<b>D</b>	The interviewee is the COO who works closely with the founder and CEO. The COO has played a big role in extending the initial identified opportunity. He identified all stakeholders and changed the business model to address all stakeholders. He is responsible for the current whitepaper that represents the business opportunity. The COO can be described as the strategic business developer of the venture.
<b>E</b>	The interviewee was one of the co-founders of the venture, a self-taught entrepreneur and executive. She worked on the product from concept to launch (10years), but is no longer active within the venture.
<b>F</b>	The interviewee is the CEO of the venture. He works very closely with the founders but is primarily responsible for business development and looking for new opportunities to grow the company and utilise the technology in novel ways. Prior to him coming on board the company had not accelerated, but since he joined they have progressed substantially.
<b>G</b>	The interviewee is the co-founder of the venture. Together with one other co-founder they came up with the idea of venture G. The interviewee is involved in all facets of the venture, but is mainly responsible for strategy and all communications related to the venture.

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