

Human and Non-Human Actors in The Gestation Process of Entrepreneurial Opportunities

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Key words: Actor-Network Theory, entrepreneurial opportunities, failure, interaction, non-human actors

Abstract

Objectives

Entrepreneurial opportunities are what make entrepreneurship research distinct from other research domains and have received considerable interest among entrepreneurship scholars. Yet the conceptualizations of opportunities lack construct clarity, and there is a need for a more interactive perspective that also recognizes the role of non-human actors. We address these omissions and present a new model of the gestation of entrepreneurial opportunities using the Actor-Network Theory (ANT). This approach is useful to study the output of networks that 'configure ontologies' and entrepreneurial opportunities and take into account the roles of non-human actors.

Prior Work

Entrepreneurial opportunities have been conceptualized as objective, subjective/ social constructive, a combination of both, and as a multi-level and multi-dimensional concept that consists of the constructs External Enablers, New Venture Ideas, and individual Opportunity Confidence.

Approach

To facilitate our review of the opportunity literature, we build on the reviews of Davidsson (2015), George et al. (2016) and Hansen et al. (2016). We also review articles that refer to opportunities and were published in higher-ranking business and management journals (where most opportunity research is published (George et al. 2016) such as: *Academy of Management Perspectives*, *Academy of Management Review*, *Entrepreneurship: Theory and Practice*, *Journal of Business Venturing*, *Journal of Business Venturing Insights*, *Small Business Economics*, and *Strategic Entrepreneurship Journal*.

Results

A key determinant in the opportunity gestation is the exploitation of the 'New Venture Idea' and its dimensions of enabler (i.e., internal vs. external) and originality (i.e., existing vs. non-existing). We show that the interaction between the actors is initiated with the conception of the new venture idea; that non-human actors can have a determinant effect on how opportunities are (are not) exploited; and that entrepreneurs apply both actions related to discovery and creation simultaneously.

Implications and Value

We seek to offer five contributions to the literature on entrepreneurial opportunity and failure. First, we suggest viewing the entrepreneurial process as concurrent, in contradiction to the sequential linear and iterative processes suggested in current opportunity literature. Second, we suggest a new definition of entrepreneurial opportunities and seek to advance the objective vs. subjective discussion towards an equilibrium state of construct coherence. Third, we also suggest that entrepreneurial failure can be attributed to the durability of non-human actors. Fourth, entrepreneurial failure can also be due to entrepreneurs losing the sense of belonging. Finally, entrepreneurial failure can be viewed as entrepreneurs discontinuing the process at an inconvenient moment in time.

Acknowledgements

We would like to thank Jeroen Kraaijenbrink who provided feedback on earlier versions of this paper.

Introduction

Entrepreneurial opportunities are what make entrepreneurship research distinct from other research domains (Shane & Venkataraman 2000). It comes as no surprise that the topic has received considerable interest among entrepreneurship scholars. Opportunities are essential for gains in profit, but can also lead to losses. Scholarly efforts to conceptualize this elusive character of opportunities have argued for objective (e.g., Shane & Venkataraman 2000; Shane 2000), subjective/ social constructive (e.g., Alvarez & Barney 2007; Venkataraman & Sarasvathy 2001) and mixed approaches (Hansen et al. 2016). Others have deemed the objective vs. subjective dichotomy as fruitless and of marginal utility in furthering our knowledge about entrepreneurship (Dimov 2011). The conceptualization of opportunities lack construct clarity (Suddaby et al. 2015) due to unclarity of the entrepreneurial process (Wood 2017), and “regardless of whether social environments are objective or subjective phenomena, the impact they have on individuals’ intentions are real just the same” (McMullen and Shepherd 2006, p.149).

Recent efforts have proposed new conceptualizations of the opportunities. For example, Davidsson (2015) proposed a multi-level and multi-dimensional reconceptualization of opportunities that consists of the constructs External Enablers, New Venture Ideas, and individual Opportunity Confidence. Grégoire et al. (2010) and Vermeire and Meuleman (2016) introduced a time component to opportunities. Despite advances in entrepreneurial opportunity research, there is a need for a more interactive perspective (Shepherd 2015). In addition, the role of non-human actors in the opportunity process is understudied (Lamine et al. 2016). There is little attention to how these actors determine which and how opportunities can be exploited, whereas other research disciplines (e.g., product design) points to an indispensability of materials’ technical and sensorial properties and meanings in determining products (Karana et al. 2008).

We respond to these omissions in opportunity research and study *how human and non-human actors interact during the gestation of the process of entrepreneurial opportunities*. In this endeavor, we draw on the Actor-Network Theory (ANT) (Latour 1987). This approach is useful to study the output of networks that ‘configure ontologies’ (Callon 1999) and entrepreneurial opportunities (Korsgaard 2011). The ANT approach does not a priori define the identities of the actors (i.e., the attributes, roles, and preferences) in the process but sees these as emerging from the interactions (Callon 1999). This point of departure permits the recognition of ambiguity in the emergence of identities and allows to explicate the concurrency of interactions. The approach allows researchers to capture lived experiences (Steyaert 2007) and permits to treat time within the process (Garud et al. 2014). The ANT approach seeks to understand how both human and non-human actors strive to enroll actors and gain support, and how the actions ultimately lead to social order and power. For example, although there has been a need for an electric car for decades, the size, weight, limited capacity and the high cost of producing car batteries have for a long time inhibited the exploitation of the opportunity (Dijk et al. 2013). Even today with the advance of the battery technology, the charging infrastructure remains a powerful determinant of the introduction of an electric car in a country (Sierzchula et al. 2014). The increase in sales of electric cars in countries such as Norway and the United States of America is largely due to the government subsidies and tax credits to reduce the purchasing costs of electric cars for consumers (Zhou et al. 2015).

In this conceptual paper, we build on the established opportunity literature to present a model of the gestation process of entrepreneurial opportunities. A key determinant in the evolution of opportunities is the exploitation of the ‘New Venture Idea’ (Shepherd 2015; Davidsson 2015). We view the new venture idea as codified into materiality (e.g., business plans and pitch decks) and propose that the dimensions of enabler (i.e., internal vs. external) and originality (i.e., existing vs. non-existing) are important in determining the gestation of opportunities. We further show that the non-human actors can have determinant effects on the gestation of opportunities and how opportunities are (are not) exploited. In addition, we show that opportunity process consists of elements of both discovery, evaluation, exploitation (Shane & Venkataraman 2000) and creation (Sarasvathy et al. 2010; Alvarez & Barney 2007).

We seek to offer five contributions in the literature of entrepreneurial opportunity and entrepreneurial failure. First, research suggests a lack of clarity in the entrepreneurial process and this lack is seen a cause for definitional fragmentation of the opportunity construct (Wood 2017). We suggest that the interaction between the actors and the entrepreneurial process is concurrent and in contradiction to the current literature that posits sequential linear and iterative processes. This view depicts the entrepreneurs’ realities as dealing with multiple needs of different stakeholders in dynamic environments. Second, we propose a redefinition of the opportunity construct, and we seek to advance the discussion towards an equilibrium state of construct coherence (Wood 2017). Third, the current theorization of opportunity lacks interaction among the stakeholders (Shepherd 2015), and the role of non-human actors is understated (Lamine et al. 2016). We seek to address these omissions by advancing a line of thought suggesting that the interaction between human and non-human actors are present during the entire entrepreneurial process, and non-human actors are vital in the gestation process of opportunities. The interaction between the actors shows that entrepreneurial failure can also be attributed to the durability of the non-human actors. Fourth, as actors seek to establish new identities, the tension between balancing multiple identities that are subjected to approval from actors and create uniqueness, can result in entrepreneurs losing senses of belonging. The associated negative emotions can have detrimental effects on entrepreneurial action and cause failure. Finally, a concurrent entrepreneurial process suggests seeing the

results of interaction as many successes and failures (Sarasvathy 2002). Therefore, we suggest the entrepreneurial failure is when an entrepreneur discontinues the process at an inconvenient moment in time.

2. Literature review

There is rich literature on opportunities covering the cognitive and behavioral processes of entrepreneurs and organizations in the opportunity exploitation/ creation, the outcomes of the process, and the environmental context in which the process is embedded (Hansen et al. 2016). We briefly discuss the ANT approach and summarize the relevant opportunity literature through the lens of the ANT.¹

2.1 The Actor-Network Theory

The ANT is an approach to study the “relationality and materiality of the world” that assumes heterogeneous networks consisting of both human and non-human actors (Law 2009, p.142). The actors² have agency and shape one another (Korsgaard 2011). The actors acquire identities (Korsgaard 2011) that consists of attributes, roles, and preferences, that are obtained through the network which may offer resistance (Law 1992). The identities of the actors are not a priori defined by the researcher but determined by the interactions between the actors (Callon 1999). Social order and power are created through complex interactions called translation (Law 1992). In the translation actors take calculated efforts to become indispensable, take on roles and mobilize allies (Callon 1984). The success of the translation by actors are contingent on the durability and spatial mobility of the actors, and the ability to anticipate the responses of the actors subjected to translation (Law 1992). Durability implies the ability to resist change (i.e., material) determined by ordered patterns of relations of actors (i.e., strategic) that limits what is possible (i.e., discursive) (Law 2009) thus suggesting path-dependency. Durability is further increased when the durability is integrated within the network. In all, translation starts with humans (non-human actors do not have impetus) who shape non-human actors and diffuse these in time and space (Korsgaard 2011).

The ANT approach is useful to study interactions between actors in a network, the output of a network that ‘configure ontologies’ (Callon 1999) and explore the process of technological development and adoption (Cressman 2009). That the entrepreneurial process is embedded in networks is also acknowledged by entrepreneurship scholars (e.g., Jack & Anderson 2002). Entrepreneurial process is also seen as path-dependent (Alvarez & Busenitz 2001) where actors and opportunities are malleable (Sarasvathy & Dew 2005), and resources are fungible (Dew et al. 2004). The process is characterized by enrollment of actors for support (Sarasvathy 2001) and legitimacy (Tsang 1996), and the creation of identities (Stryker & Burke 2000; Shepherd & Haynie 2009a) in the pursuit of competitive advantages (Covin & Miles 1999). In addition, the products of the opportunity exploitation are economic artifacts (Grégoire et al. 2010) that are output of interactions between human and non-humans (Alvarez, Young, & Woolley, 2015), embedded in networks (Holcombe 2003; Hoang & Antoncic 2003; Arenius & Clercq 2005) that are ex-ante uncertain (McMullen & Shepherd 2006).

Definitions of the entrepreneurial opportunity also implicitly suggest an ANT approach (Garud & Giuliani 2013). For example, opportunities are seen as imagined future ventures, future action paths or imagined future states (Davidsson 2015) indicating that opportunities are in part the results of action by humans. An idea that is discovered (Short et al. 2010), goods, services, raw materials, and organizing processes (Shane & Venkataraman 2000; Shane 2012), and a set of environmental conditions (e.g., competitive imperfections, Alvarez & Barney 2010) that lead to introduction (Dutta & Crossan 2005) point to non-human actors. Next, we will provide a more elaborate discussion of how current theorization of opportunities fits within the four principles of ANT: 1) Heterogenous networks of actors, 2) Actors’ attributes, roles, and preferences, 3) Co-shaping, social order and power, and 4) Outcomes of the actor-network.

2.2 Heterogenous networks of actors

The entrepreneurial process consists of both human and non-human actors (Alvarez et al. 2015). Humans are for example entrepreneurs, investors, suppliers, and customers. Non-human actors are for example technology, institutions, materials (e.g., metal, plastic, wood), and documented business plans. The individuals are heterogeneous as the entrepreneurial process is distributed over many individuals (Garud & Karnøe 2003). Team formation (Ruef 2010; Ruef et al. 2003) is key as no individual disposes over all the resources that are required in the entrepreneurial process. Apart from individuals in the entrepreneurial process, non-human resources have also been considered important in the gestation of opportunities. Essential non-human resources are financial, physical and technology resources. However, the intangible human resources of (entrepreneurial) human capital (Erikson 2002) and social capital (Davidsson & Honig 2003) are considered the most vital entrepreneurial resources. This consideration is not surprising as only humans have impetus

¹ The goal of this study is not to present a systematic review of the literature on entrepreneurial opportunity. However, to embed our model into the literature of opportunity, we conducted a literature review. To facilitate our review we built on the reviews of Davidsson (2015), George et al. (2016) and Hansen et al. (2016). We also review articles that refer to opportunities and were published in higher-ranking business and management journals (where most opportunity research is published (George et al. 2016) such as: *Academy of Management Perspectives*, *Academy of Management Review*, *Entrepreneurship: Theory and Practice*, *Journal of Business Venturing*, *Journal of Business Venturing Insights*, *Small Business Economics*, and *Strategic Entrepreneurship Journal*.

² When referring to ‘actors’ the authors imply both human and non-human actors, if not otherwise mentioned.

(Korsgaard 2011). The individual and social networks influence opportunity recognition (Ardichvili et al. 2003) and the mobilization of resources that are required in the entrepreneurial process (Bhagavatula et al. 2010). Social capital also influences the first sale (Davidsson & Honig 2003) and venture performance (Stam et al. 2014).

Non-human actors that also have received much attention are institutions. Institutions, formal and informal, are viewed as the 'rules of the game' (North 1990). The institutions are mental models (i.e., ideas and beliefs) that shape routine behavior in our society (Jennings et al. 2013).

2.3 Actors' attributes, roles, and preferences

All actors acquire attributes, roles, and preferences. These are the inherent qualities, the function assumed in the actor-network, and their likings towards particular situations. Preference refers especially to the agency of the actors; the power of an actor to choose between different courses of action, and shape the environment to his/her likings (Shiga 2007). Agency is the root of resource idiosyncrasy (Penrose 1959) that allows individuals to build unique relations with the world.

The attributes, roles, and preferences are the identities of the actors (Stryker & Burke 2000). For instance, humans can assume the identities of entrepreneurs. Actors also aspire towards future identities (Farmer et al. 2011). Especially at the initiation of the actor-network, entrepreneurs have imagined futures (Dimov 2004). Therefore, entrepreneurial identities are also seen as 'the constellation of claims around the founders, organization, and market opportunity of an entrepreneurial entity that gives meanings to questions of 'who we are' and "what we do" (Navis & Glynn 2011, p.480). The more central the identities assumed, the more the actors will behave according to the assumed identities (Stryker & Burke 2000).

The attributes, roles, and preferences are not defined before the researcher studies the actor-network (Callon 1999). The ANT posits that actors assume identities during the evolution of the actor-network and can only be determined ex-post by researchers. At the initiation of the process the identities are ambiguous (Turner 1974). Actors acquire their identities based on their attributes and also in relation to other actors (Hytti & Heinonen 2013). Specifically, in constructing their social identities, entrepreneurs divide claims into 'not me' and 'me' (Jones et al. 2008).

The process of assuming identities is fluid and can change during the entrepreneurial process (Mathias & Williams 2017), and entrepreneurs can take several identities simultaneously (Mathias & Williams 2017; Jain et al. 2009). Identities are continuously constructed and reconstructed, and as the identities should be acknowledged within the network, it is not always that the preferred identities are taken (Warren 2004) but the ones that have gained support (Charness et al. 2005).

The identities that are taken influence the behaviors of the actors (Stryker & Burke 2000) and which type of opportunities, risks, and decisions are pursued (Mathias & Williams 2017). For example, Farmer et al. (2011) found in a sample consisting of non- and nascent entrepreneurs that the entrepreneur identity aspiration is positively related to entrepreneurial discovery and exploitation behaviors. Alsos et al. (2016) show that entrepreneurs that take the Darwinian identities (Fauchart & Gruber 2011) are more inclined towards causal behaviors, and entrepreneurs that take the Communitarian identities are more inclined towards effectual behaviors. In the process to pursue opportunities, entrepreneurs are continuously managing their identities in relation to their stakeholders to avoid conflict (Shepherd & Haynie 2009b). For instance, towards investors entrepreneurs seek to make legitimate claims of how their aspired identities fit institutional conventions and their distinction from these conventions are meaningful (Navis & Glynn 2011).

Non-human actors also assume attributes, roles, and preferences. The attributes determine to what ends the artifacts are used. For example, sapphire crystals have flexural strengths of 760 MPa³ and are one of the most wear resistant materials (Dobrovinskaya & Lytvynov 2009). Due to these properties, sapphire glass is commonly used in watch glasses (Dobrovinskaya & Lytvynov). Non-human actors also have agency as they can resist change because of their durability (Shiga 2007).

2.4 The translation

The translation is the core of the entrepreneurial process where actors take calculated efforts to become indispensable, take on roles and mobilize allies (Callon 1984). For example, entrepreneurs take action (Dimov 2011), test their ideas and develop knowledge that is necessary to sell the products (McKelvie & Wiklund 2004). Entrepreneurs also strive to change institutions and laws or create entirely new ones (Alvarez et al. 2015). Moreover, potential customers communicate their needs to the entrepreneurs (Godley & Casson 2014).

The translation process is initiated by humans as these are the only actors with impetus (Korsgaard 2011). There are several motives behind initiating the actor-networks. For example, out of necessity, seeing an opportunity (Reynolds et al. 2002), as a hobby (Giacomin et al. 2011), natural succession, by chance (Orhan & Scott 2001), and a need for independence (Hessels et al. 2008). The government also has a role in the initiation of entrepreneurial action by creating the right incentives (Isenberg 2010) and infrastructures (Van De Ven 1993).

³ Flexural strength, also known as bend strength, is the ability of the material to resist load when it bends. It is commonly measured in megapascals (MPa). 760 MPa is approximately six times greater than the flexural strength of normal window glass.

In the translation process, humans use non-human actors. Non-human actors are used to representing ideas of entrepreneurs and enroll others, to facilitate collaboration (Jacucci & Wagner 2007), to aid entrepreneurs in organizing the entrepreneurial process (e.g., as a product to meet the needs of the end customers), and to accelerate the entrepreneurial process (Lamine et al. 2016). The process is accelerated through the creation of legitimacy (Tsang 1996) and the reduction of information asymmetry (e.g., the use of business plans in attracting funding (Aernoudt 2005; San José et al. 2005) and the reduction of uncertainty (Alvarez & Barney 2005).

2.5 Co-shaping, social order, and power

In the translation process, actors co-shape each other and create patterns of relationships. Humans are particularly taking actions to enroll more actors to advance their ideas (Koning 2003). In doing this, they adapt (Baron 2000) and are open to suggestions from others (Augier & Sarasvathy 2004). Individuals use artifacts to exercise influence on each other (Jacucci & Wagner 2007). For instance, the use of business plan to acquire capital (Aernoudt 2005; San José et al. 2005).

Humans shape non-human actors too. Humans combine and process materials in search for a value that is recognized and accepted by the stakeholders. Entrepreneurs also create institutions that can facilitate the exploitation of opportunities (Battilana et al. 2009).

Conversely, non-human actors also shape humans. For instance, resources (or the lack thereof) shape the cognitive process and actions of entrepreneurs (e.g., Sarasvathy 2001; Baker & Nelson 2005). Also, institutions (Battilana et al. 2009) such as technology (Pinch 2008) and opportunities shape individuals (Alvarez et al. 2010).

Non-human actors can also constraint the possibilities of other non-human actors. For example, technologies can provide constraints on how materials can be shaped into products (Bloch 1995).

Results from the co-shaping process between actors are social order and power (Law 1992). Social order and power are the ability to influence actors and resist their influence (Law 1992). When artifacts are used, humans do not thoughtlessly accept the ideas put forward but reinterpret these artifacts from their point of view and context (Gherardi & Nicolini 2000). Individuals also strive for the control of resources through the social position (Burt 1992) and use social power for resource mobilization (Dorado & Ventresca 2013).

2.6 Outcomes of the actor-network

The actor-network produces several outcomes (Hansen et al. 2016). We propose three main outcomes: 1) Opportunity (e.g., Alvarez & Barney 2013; Fletcher 2004), 2) Value (e.g., Lee & Venkataraman 2006; Ardichvili et al. 2003) and 3), Products (Grégoire et al. 2010; Alvarez et al. 2015).⁴

First, the entrepreneurial action to seize one opportunity results in the creation of complementary opportunities (Holcombe 2003) such as the case with breakthrough technologies paving the way for incremental and imitative opportunities. In the process of restoring equilibrium in a market (Kirzner 1973), the same actions also destroy equilibrium in other markets and create new opportunities.

Second, the value is also created in the entrepreneurial process (Ardichvili et al. 2003). We view value as the usefulness of an economic commodity (Bowman & Ambrosini 2000). When resources are combined to create value, two types processes take place: 1) Routinized process and 2) Exploratory processes (O'Reilly & Tushman 2013). The latter process is associated with entrepreneurship (Hitt et al. 2006).

Finally, the value is captured in products (we view products as both goods and services). Customers derive value from products both as stand-alone offering and part of a total package (Salem Khalifa 2004), and from a relationship with the supplier (Lindgreen & Wynstra 2005).

In summary, our review of the opportunity literature shows that the entrepreneurial process consists of human and non-human actors that assume identities in relation to each other during their interaction (and not before). The initiation of the process to assume identities is ambiguous and several identities are simultaneously constructed. In the interaction between the actors, humans use non-humans to enroll other actors, and also advance the entrepreneurial process. Mutual co-shaping takes place between the actors, and a result is a social order and power. Finally, the main outcomes of the process are opportunities, value, and products. Taken together, these insights lead to a model of the gestation of opportunities where the interactions between human and non-human actors start with the initiation of the process, the durability of non-human actors have a determinant effect on how the opportunity is (is not) exploited, and the interactions take place concurrently. These insights are discussed next.

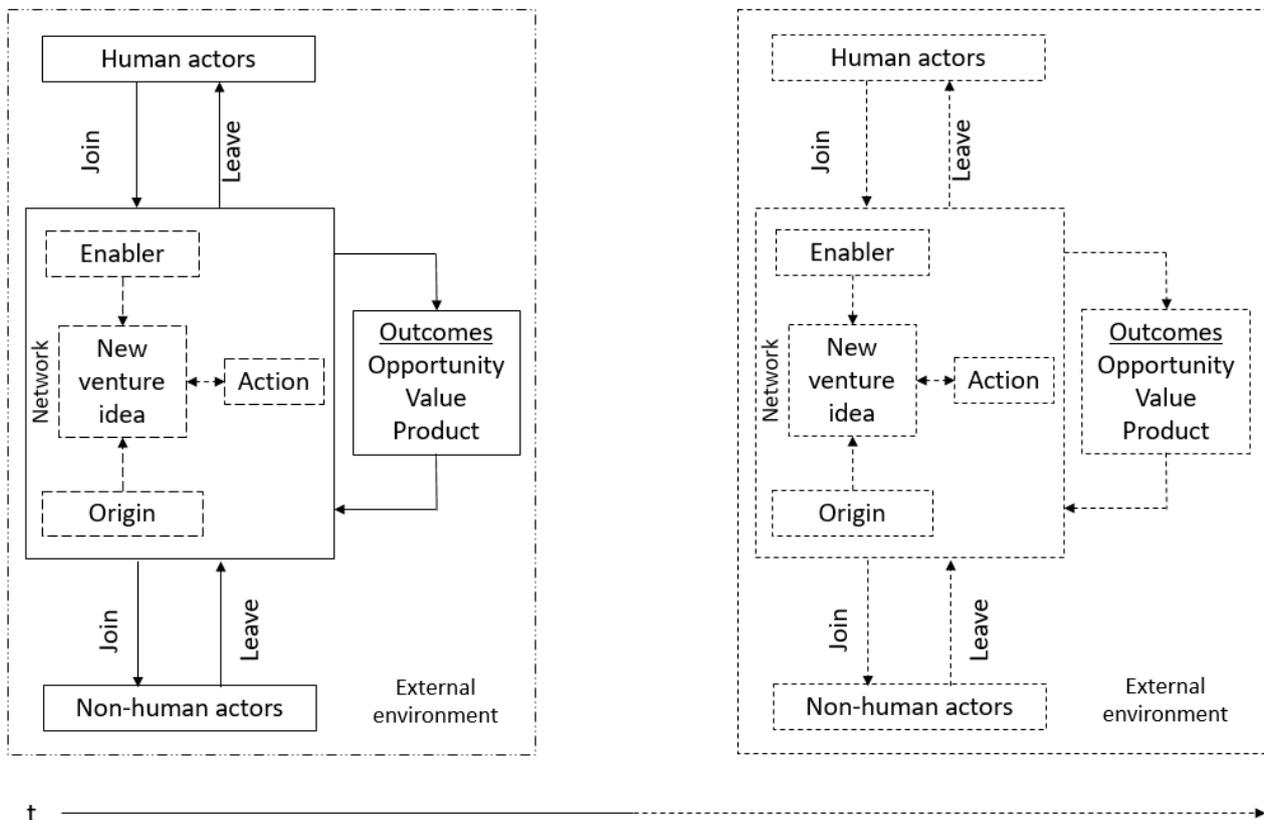
3. The gestation of entrepreneurial opportunities

Building upon established literature, in Figure 1 we present the gestation model of entrepreneurial opportunities. The opportunity literature views opportunities from both cognitive and behavioral perspectives (Hansen et al.

⁴ Although firm creation is often seen as an outcome of the opportunity process (e.g., Choi & Shepherd 2004; Shane 2001; Baron 2008), opportunity exploitation also incurs inside organizations (Burgelman 1983; Covin & Miles 1999). Therefore, we do not discuss firm creation as an output of the model.

2016). However, central to our model is the actions taken by the actors (e.g., Dimov 2011). Cognitive elements are not ignored but become part of the actor-network when the cognitive elements are codified into artifacts. The process is initiated by humans and continues to an indefinite time because social construction is an ongoing process (Callon 1986; Dimov 2007). We draw on the construct New Venture Ideas (Davidsson 2015) to elucidate the interaction between the actors.

Figure 1 A model of gestation of entrepreneurial opportunities



3.1 The initiation of the human and non-human interaction

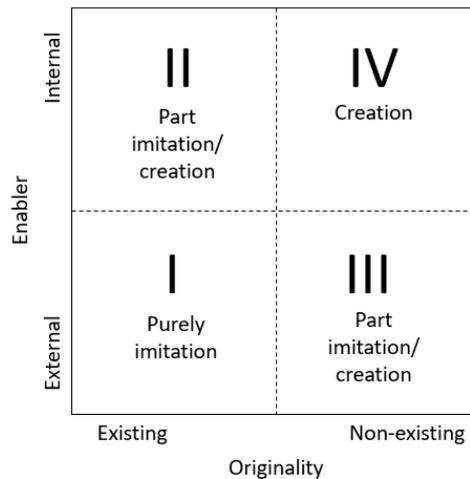
The actor-network consist both of human and non-human actors, and the interactions between these actors initiate with the concept the New Venture Idea (Davidsson 2015). The new venture idea is the initial conception of the product an individual wish to bring to the market. However, we view the idea as codified into materiality, e.g., business plans and pitch decks. The new venture idea has two important dimensions that can influence subsequent interactions between the actors: the enabler and the originality. The enabler refers to the factors that create conditions for products to be sold at greater than their cost of production (Shane & Venkataraman 2000). Enablers can be external such as changes in technologies, demographics, and regulatory frameworks (Davidsson 2015). Enablers can also be internal such as sheer imaginations of individuals (Dimov 2004). The originality refers to the embeddedness of the *new* opportunity in *other* opportunities. As we discussed before, the entrepreneurial action to seize one opportunity results in the creation of complementary opportunities (Holcombe 2003). Opportunities can be very novel but also an imitation of what already exists (Alvarez & Barney 2007). The dimensions are not binary but should be viewed as different ends on a spectrum; from mostly external to internal enablers, and from mostly existing to non-existing originality.

Using the dimensions of enabler and originality, we can distinguish four scenarios that determine the nature of a new venture idea (see Figure 2). Scenario I (i.e., external enabler and existing origin) is the true imitative opportunities where a demand for the product and the factors to develop the product and bring this to the market already exist (Sarasvathy et al. 2010). Scenario II (i.e., internal enabler and existing origin) and III (i.e., external enabler and non-existing origin) are those opportunities where only the supply or demand exists. Finally, scenario IV (i.e., internal enabler and non-existing origin) is where the opportunity is truly unique and can be spoken of the creation of opportunities (Sarasvathy et al. 2010; Alvarez & Barney 2007).

Each quadrant has implications for the information that exists (and the associated uncertainties) and determines the action of the individuals (Sarasvathy et al. 2010). When the nature of the new venture idea lies in quadrant I (i.e., external enabler and idea that is based on another opportunity that has been exploited), the market needs might be existing (Ramoglou & Zyglidopoulos 2015), and be exploited by alert actors (Shane 2000; Kirzner 1978) that have the right network (Baker et al. 2005). However, when the nature of the new venture idea lies in quadrant IV (i.e., internal enabler and idea that is original), the environmental conditions that

can allow for such an idea to lead to products that are introduced in a marketplace might not exist. Under these conditions, the human-actor needs to create the right conditions for the introduction of the product, and thus an opportunity is created (Alvarez & Barney 2014; Alvarez & Barney 2007). In other words, the nature of the new venture idea determines if actions that are labeled as ‘discovery’ or as ‘creation’ are more appropriate for the idea.

Figure 2 Nature of new venture ideas



In addition, the nature of the new venture idea also shows that the interaction between humans and non-humans can initiate at the conception of the idea. For example, when an individual is informed of new technologies or changes in demographics through media (e.g., Internet, radio, and television).

3.2 The durability of non-human actors

The interaction between the actors continues throughout the gestation of the opportunity. Our model emphasizes the power of non-human actors over the humans’ abilities to move across the gestation of entrepreneurial opportunities. It is not only humans that have preference and agency, but also artifacts (Law 1992; Shiga 2007). Artifacts cannot be solely viewed as subjective interpretations of individuals where individuals attribute meanings to artifacts, but artifacts must also be viewed as objective realities. Despite humans’ ability to modify artifacts, technologies do not always permit humans to bend artifacts to their will due to the persistent durability of the artifacts. For example, alchemists have not been able to make precious metals. Thus artifacts have objective realities that shape humans and their ideas of the venture to be constructed (Gaglio & Katz 2001). For instance, enabling technologies is a factor that influences individuals consideration to advance to opportunity exploitation (Choi & Shepherd 2004). Therefore, “regardless of whether social environments are objective or subjective phenomena, the impact they have on individuals’ intentions are real just the same” (McMullen & Shepherd 2006, p.149).

3.3 The temporal dimension and concurrency of action

The temporal dimension is an important component of this model (McMullen & Dimov 2013). The temporal dimension addresses how the actor-networks and opportunities evolve with time. Time is continuous because social construction is an ongoing process (Callon 1986; Dimov 2007). We posit two types of temporal transformation. First, there are changes within the actor-network. The actors, their attributes, roles, and preferences change. Through the ongoing process of translation, new attributes, roles, and preferences are obtained. Actors are open to adjusting (Baron 2000) to the translation process of others (Augier & Sarasvathy 2004). For example, a potential customer that turns into a co-inventor (Lettl et al. 2006) and afterward accidentally becomes an entrepreneur (Shah & Tripsas 2007). Actors can also come to the realization that the opportunity is not interesting for them but someone else (Shepherd et al. 2007).

The constellation of the actor-network also changes. New actors enter the network (Sarasvathy & Dew 2003; Engel et al. 2017) while existing actors leave the network making the actor-network dynamic. In addition, the new venture idea also changes. New actors that enter the actor-network give their meanings to the new venture idea. For example, Davidsson et al. (2006) show that the greater the reliance on external financing and a dominant customer, the larger the change in the idea. The venture idea also changes as the enablers change during the entrepreneurial process. The new venture idea changes from ambiguously described desires to defined projects (Klofsten 2004; Sarasvathy 2001). For example, Justin.tv was pursuing the opportunity to offer lifecasting services on the Internet (Kumparak 2014). The venture allowed individuals to stream their lives live on the Internet. However, with the rise of online video gaming, it became very popular that individuals were lifestreaming their online video games. Justin.tv changed their idea from a lifecasting to online video game streaming in 2011. In 2014 the venture was sold to Amazon for US\$ 970 million (Shontell 2014).

Second, as the actor-network evolves with time, there are changes with the outcomes of the actor-network. As opportunities, value and products are outcomes of the actor-network, different dynamics between a new constellation of actors, evolving identities and co-shaping result in changes in the outcome. Opportunities are transformed in the process (Mole & Mole 2010; Sarason et al. 2006), the value is refined (Ardichvili et al. 2003), and products reconfigured to be able to deliver the value. In other words, what can constitute to be an opportunity continually changes with time.

3.4 The concurrent process of opportunity

Thus far we discussed how the new venture idea starts the initiation of the gestation of entrepreneurial opportunities, and showed how non-human actors could exercise determinant effect on how opportunity is (is not) exploited. Using four quadrants, we explained how the interactions between the actors are influenced by the nature of the new venture idea. However, the reality is much fuzzier than a new venture idea as part of only one quadrant. New venture ideas are more likely to be a combination of internal and external sources, and a mix of imagination and inspiration of other exploited opportunities. For example, (potential) customers do have existing needs, but entrepreneurs have to also enact the (potential) customers to want the specific products that the entrepreneurs can develop. Therefore, we suggest that the interaction between the actors consists both of elements of discovery and creation.

We view several reasons as for why entrepreneurs simultaneously discover and create opportunities. In the entrepreneurial process, entrepreneurs interact without having prior knowledge of the results of their interaction. At the initiation of the process, actors have not assumed identities which makes it difficult for the actors to anticipate the responses from their actions. During the gestation of the process, the anticipations remain ambiguous because actors are continually (re)constructing their ideas. In addition, when actors seek to shape other actors, the other actors will not reluctantly accept the ideas proposed but will subject these with their own meaning. The other actors can also be durable and not modify their identities. Also, new actors that join the network bring new meaning to the new venture idea and exercises efforts to shape identities of the existing actors. Furthermore, changes in the enabler of the new venture idea can also influence the meanings and identities that are (re)constructed. The dynamic process of (re)construction of identities and the associated ambiguities can lead actors to rely more on creating the opportunity (Sarasvathy 2001).

However, not all interactions require entrepreneurs to create opportunities. There are actors that have very durable characters that are difficult to shape. Because of the durability, in the interactions between entrepreneurs and these actors, entrepreneurs will accept the 'objective' realities. Under these conditions, entrepreneurs focus on recognizing differences between the realities and act more in line with discovering opportunities.

4. Implications

In this study, we propose a new model of the gestation of entrepreneurial opportunities. The model is based on the ANT approach (Latour 1987). The model views the actions by entrepreneurs involved in the gestation process as both discovery and creation of opportunities, and the nature of the new venture idea as a determinant for the actions taken by individuals. Using this model, we would like to suggest implications for the literature on opportunities and entrepreneurial failure.

4.1 Theoretical implications

Opportunities have been conceptualized in distinct ways (Hansen et al. 2016; Davidsson 2015). For example, as objective, profitable, latent in the market and waiting to be discovered (McMullen et al. 2007; Shane & Venkataraman 2000), as subjective to creation by entrepreneur (Venkataraman & Sarasvathy 2001; Alvarez & Barney 2007), and new ventures ideas that are made possible due to external enablers and are pursuit due to high opportunity confidence (Davidsson 2015). As a result, there is lack of construct clarity (Suddaby et al. 2015). We showed that opportunities should be viewed as a multi-dimensional concept including both objective and subjective elements, which are embedded in the dimensions of the enabler and originality of new venture ideas. Objective and subjective elements cannot be considered to be bipolar (Suddaby et al. 2015). Therefore, we suggest viewing the entrepreneurial process neither with sequential nor non-linear phases (Wood 2017) but as evolving interactions of actors that simultaneously include discovery, evaluation, exploitation (Shane & Venkataraman 2000; Shane 2000) and creation (Sarasvathy et al. 2010; Alvarez & Barney 2007). The entrepreneurial process consists of different actors that require different actions that can be applied concurrently. For example, the discovery of customers' needs while lobbying governments to pass new laws that will make the introduction of the idea in the marketplace legal.

The concurrent view of the entrepreneurial process view departs from popular views that posit the process as sequential linear (e.g., George et al. 2016) or iterative (e.g., Sarasvathy & Dew 2003). These views of the entrepreneurial process suggest that the opportunity (and actions of the actors) advances along defined stages. For instance, Bhave (1994) proposes a stage of filtration, followed by refinement, and finally, physical creation, Shane and Venkataraman (2000) propose identification, evaluation and exploitation, and Bakker and Shepherd (2016) propose prospecting, developing, and exploiting (in Wood 2017). We believe that our

concurrent view of the entrepreneurial process provides a more realistic view of reality where entrepreneurs exploit opportunities that address multiple needs of the stakeholders in a dynamic and complex environment.

In addition, we suggest viewing entrepreneurial opportunities simply as being a set of factors that can lead to the introduction of one or more new products in the marketplace by a group of individuals. Note that we do not define the individuals to be entrepreneurs because the entrepreneurial process is distributed over different actors (Garud & Karnøe 2003). By putting forward this broad definition, we seek to reconcile the view of opportunity towards an equilibrium state of construct coherence (Wood 2017). This definition also allows researchers to model the process with actors taking part of the actor-network since the beginning of the actor-network formation and thus meet the criteria to be explanans (Davidsson 2015).

The factors that can lead to the introduction of new products can take different forms. For example, changes in technology or demographics (e.g., Davidsson 2015) but also pro-actively created by human-actors (e.g., Sarasvathy et al. 2010). New technological advances can lead to solutions for which problems have not yet been identified (Alvarez et al. 2010). Thus opportunities are outcomes of the actor-network (Korsgaard 2011). However, we also view opportunities as already in existence (Shane 2000). These opportunities are created by entrepreneurs when they act on other opportunities (Holcombe 2003). When entrepreneurs create new products, these can also lead to complementary products. For example, opportunities that have been possible due to the Internet, in this case the web browser, came into existence due to the amount of information on the Internet that was difficult to gain access and read. It is especially for these opportunities that an alert entrepreneur (Shane 2000; Kirzner 1978) is required to identify and exploit.

We would like to offer three contributions also to the literature on entrepreneurial failure. First, research about entrepreneurial failure suggest that failure has to do with human actors (e.g., entrepreneurs' mistakes in planning and resource allocations, and government not creating right incentives) (e.g., Cardon et al. 2011) However, we suggest that failure is also due to the durable character of artifacts. For example, Clinkle, a mobile payment startup founded in 2011 by Lucas Duplan (Shontell 2014). The startup used high-frequency sound to transmit between users, and a patent was granted in March of 2015. Clinkle raised up to US\$ 30 million from investors (Constine 2015). Though the startup and technology showed promise, the technology ultimately did not work because common background sounds interfered with the technology (Shontell 2014). Though Duplan was successful in enrolling actors that assumed the roles of investors, he was unable to shape the technology to withstand the interference from other sounds. Thus, the technology was durable and resisted being changed, and the startup failed.

In addition, less attention is given to the (re)construction of identities during the process and its contribution to entrepreneurial failure. The continuous efforts of entrepreneurs to reconstruct their identities (Warren 2004) also plays a role in failed opportunities. The process to (re)construct entrepreneurial identities contains ambiguity (Turner 1974), and entrepreneurs strive for both distinctiveness (Navis & Glynn 2011) and support (Charness et al. 2005). However, gaining distinctiveness can be at the expense of a sense of belonging (Shepherd & Haynie 2009a) and support. Entrepreneurs can experience negative emotions in what can seem to be a hopeless endeavor for new identities. The negative feelings reduce the energetic behavior, creativity, persuasion, judgments and decision-making, and tendency to seek social contacts (Baron 2008), all that are necessary for successful opportunity exploitation. The lack of a sense of belonging reduces the entrepreneur's ability to enroll other actors and establish closure.

Finally, failed opportunities is viewed not as a 1/0 dichotomy where one either succeeds or fails but as tensions between many successes and failures (Sarasvathy 2002). Thus, we suggest that failure is when entrepreneurs discontinue the translation at the time of failures. Like Vince Lombardi would say "winners never quit, and quitters never win." Viewing the opportunity failure as an accumulation of smaller failures emphasizes the role of the actors during the gestation of the opportunity. Failure is only when the actors discontinue the process. In other words, in theory, if actors would have unlimited resources (from financial to emotional and family support) at their disposal, the gestation of opportunity would not know failure but will be ultimately successful.

4.2 Implications for practice

We would like to make two recommendations to entrepreneurs. First, we showed that non-human actors are present in the entire gestation of the entrepreneurial opportunity, and these actors can obtain durable characteristics that are persistent and can cause failure. This suggests that entrepreneurs should focus on what (and also whom) they can shape and control. Entrepreneurs should recognize which actors are malleable and redirect their resources and efforts to enroll those actors into the opportunity process. Especially because entrepreneurs are resource constraint, entrepreneurs should invest their resources wisely.

However, this recommendation comes with a caveat. We show that the entrepreneurial process consists of many successes and failures, and the entrepreneur fails when the entrepreneur discontinues pursuing the opportunity. Therefore, our second recommendation to entrepreneurs is that they should continuously invest in the acquisition of resources (i.e., financial, tangible, emotional, psychological and spiritual). The more resource entrepreneurs can acquire the longer entrepreneurs can continue with the pursuit of the opportunities.

4.3 Limitations and future research

Our broad view of opportunities allows us to ask valid questions (Kuhn 1970) to further our understanding of this process. We would like to suggest the following areas for future investigations. First, we discussed how the contextual differences in the nature of the new venture idea create selective entrepreneurial action (Sarasvathy 2001). However, the entrepreneurial context is much more dynamic than we presented in this article. It consists of spatial, temporal, social, institutional (Zahra & Wright 2011; Welter 2011), sectoral, technological and organizational dimensions (Autio et al. 2014). The entrepreneurship discipline will benefit if future research will be conducted on how the nature of the new venture idea changes with the context and how the changes influence the gestation of entrepreneurial opportunities.

Second, a vital component of the ANT approach is the translation where actors strive to become indispensable. In addition, there is complexity where several translations occur simultaneously (Korsgaard 2011). Studying the gestation of opportunities through the ANT approach thus means that there is distributed agency (Garud & Karnøe 2003) and researchers seek to understand how different entrepreneurs compete to exploit the same opportunities. The competition element in the gestation of opportunities merits more attention.

Third, there is a plurality of definitions of the entrepreneurial team. Commonly, these definitions consist of a number of team members, which have financial interest, and that take entrepreneurial action. For example, Cooney (2005, p.229) define the team as “two or more individuals who have a significant financial interest and participate actively in the development of the enterprise,” and Kamm et al. (1990) as “two or more individuals who jointly establish a firm in which they have a financial interest.” Ensley and Banks (1992) and Gartner et al. (1994) have changed the individuals that take entrepreneurial action to individuals that have influence on the strategic choice. In line with this change, Ensley et al. (1998) propose that entrepreneurial teams consist of those individuals that participate in jointly establishing a firm, have a financial interest and have direct influence on the strategic choices. Harper (2008) applies a broader definition of the entrepreneurial team as “a group of entrepreneurs with a common goal that can only be achieved by appropriate combinations of individual entrepreneurial actions.” Our analysis of the entrepreneurial process from an ANT approach shows that the current definitions of the entrepreneurial team are not valid due to not taking all the relevant actors into account. For example, the lead customer (von Hippel 1986) is not involved in the establishing a venture, neither has financial interest. However, the lead customer is essential in developing the product and has direct influence on strategic choices. Therefore, we suggest that future research work towards a redefinition of the entrepreneurial team.

Finally, what are the different types of failures and under which circumstances do they occur? A great part of entrepreneurship literature on failure attributes the failure to the actions of the entrepreneur. However, when using an ANT approach, the identities of the actors are not priority-defined. This act allows researchers to investigate also the role of other actors in entrepreneurship failure (e.g., Olaison & Meier Sørensen 2014; McGrath 1999). For example, what are the roles of the potential customers, self-diagnosing of needs, and accurately communicating these to the entrepreneurs (Godley & Casson 2014; von Hippel 1994)?

5. Conclusion

In closing and the spirit of good academic practice, we would like to invite scholars to critique our model with the hope to further advance our understanding of the entrepreneurial opportunity.

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