Entrepreneurial cognition: how to make sense of self-efficacy.

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Entrepreneurship is gaining more and more popularity among professionals and researchers nowadays. Nevertheless little remains known about the knowledge structures entrepreneurs use to make decisions or assessments regarding entrepreneurial opportunity developments. This paper aims to uncover possible factors affecting the opportunity development of entrepreneurs using the concepts self-efficacy and sense breaking. The study does so by firstly studying literature for evidence indicating possible relations between the core concepts. Secondly 35 entrepreneurs conducting business start up activities were studied using qualitative and quantitative measures, hereby the self-efficacy and sense breaking of entrepreneurs is measured as well as the development of opportunities. Thirdly the measured concepts were tested for independence and direction, with self-efficacy as the independent variable, sense breaking as a mediating variable and opportunity development as the dependent variable. Strong associations were found in the study between the sense breaking of entrepreneurs and opportunity developments, meaning if an entrepreneur has an elevated state of sense breaking its opportunities will have increased development. Also a weak relation between the self-efficacy and sense breaking of entrepreneurs was found, suggesting that both studied concepts either directly or indirectly influence the development of opportunities by entrepreneurs.

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1. INTRODUCTION

The adage 'where there's a will there's a way' implies that if you have the right mindset you can succeed in almost anything. Previous studies have indicated that Self-efficacy; 'the capabilities to mobilize the motivation, cognitive resources, and courses of action needed to exercise control over events in their lives' (Wood and Bandura, 1989), influences the success of an entrepreneurial venture (Prajapati and Biswas, 2011). A recent study called for further research on the topic of entrepreneurial self-efficacy, and noted out the potential added value of understanding this cognitive aspect of entrepreneurship (Naktiyok, Karabey and Gulluce, 2010). It is also argued that cognition and sensemaking of an entrepreneur provide crucial input at the business model design and sensemaking processes of other managers, which are important to the success and survival of a venture (Gioia et al., 1993; Sosna et al., 2010). This shows that both self-efficacy and sensemaking processes influence the success of an entrepreneurial venture and thus the entrepreneurial opportunity development of a venture. Krueger and Dickson (1994), noted in their study on self-efficacy and opportunity recognition that an increased self-efficacy leads to increased perception of opportunities (Krueger and Dickson, 1994).A later study done by Mohammed and Billings (2006), supported that self-efficacy does influence the framing of opportunities however it does not contribute to the framing of threats (Mohammed and Billings, 2006). This study attempts to indentify firstly whether the self-efficacy of an entrepreneur has influence on the sensemaking mechanism sense breaking. Secondly this study explores whether self-efficacy and sense breaking influence the development of entrepreneurial opportunities. To assess this the question, '*to what extent does the self-efficacy of an entrepreneur affect sense breaking and to what extend does this lead to entrepreneurial opportunity developments* ?' is asked. By conducting this research we can get insight on the effects of self-efficacy on opportunity developments and sense breaking, also we get insights on how and if this sense breaking mechanism affects entrepreneurial opportunity development. Likewise, by answering this research question we get insight on entrepreneurial cognition a relatively novel concept focusing on; 'the knowledge structures that people use to make assessments, judgments, or decisions involving opportunity evaluation, venture creation, and growth' (Mitchell et al., 2002:97; Haynie and Shepherd, 2009). Self-efficacy and sense breaking represent two of these knowledge structures, as self-efficacy relates more to the intrinsic motivation. Sense breaking in this aspect is a knowledge system people use to make assessments involving tradeoffs between current and desired state of a business opportunity.

In order to answer the research question a literature study will be done regarding the key concepts self-efficacy and sense breaking. Followed up by an explanation of methodology used to assess numerous exit interviews taken from entrepreneurs attending Venture lab Twente.

2. THEORY

Entrepreneurial cognition, or the knowledge structures people use to asses judge and decide on opportunity evaluation, venture creation, and growth (Mitchell et al., 2002), can be subdivided into three levels: the individual level, firm level and environment level. This research focuses on the individual level as we study individual self-efficacy, sensemaking and cognition. A known mechanism to assess the cognitive perception of an individual is sensemaking, as shown by Weick in his analysis of the Mann Gulch Disaster (Weick, 1993).More recently the use of sensemaking is gaining popularity in entrepreneurship research, as several researchers have attempted to use sensemaking for analyzing entrepreneurs. This is mainly done by looking at how entrepreneurs build their reality and make sense of this reality (Holt and Macpherson, 2010; Bettiol, Di Maria and Finotto, 2012). These studies show that sensemaking mechanisms yield relevant insights into the ways in which entrepreneurial cognition influences business opportunity development. Below, the literature on sensemaking; sense breaking and self-efficacy are described in more detail.

2.1 Sensemaking

Sensemaking can be defined as making sense in an ongoing process looking at people, events or actions (Miles, 2012). We choose to use Sensemaking mechanisms because Sensemaking analyses provide us with better understanding of cognitive micro processes of entrepreneurs. Also sensemaking reminds us that action is just ahead of cognition which would emphasize the importance of knowing what affect sensemaking mechanisms in entrepreneurs (Weick, Sutcliffe and Obstfeld, 2005).Sensemaking takes place when searching for meaning because sensemaking mechanisms allow us to examine the complex process through which entrepreneurs socially construct their realities (Weick, 1995). This means that through sensemaking mechanisms we can gain insight on the cognition of entrepreneurs including self-efficacy of entrepreneurs. Sensemaking is also aimed at creating meaningful opportunities for the future and making these opportunities understood by others (Gioia and Mehra, 1996). Previous research has shown that 'When both sense breaking and sense giving practices are successful, members positively identify with the organization or venture' (Pratt, 2000).This leads to the question: is positively identifying with the organization as an employee the comparable to positively identifying with an opportunity as an entrepreneur? It can be argued that the difference between entrepreneurs and managers lie in its goals in the business (Stewart and Roth, 2001).Hereby Indentifying opportunities is one of the most important abilities for the success of an entrepreneur (Ardichivili et al., 2003). Whereas identification of the organization by employees has impact on the satisfaction of the employee and success of business (Mael and Ashforth, 1992; Lee, 1971). Thus it can be said that identifying with the organization and identifying opportunities both have impact on the success of a business. As identification is the first step in any business activity it could mean that developing an opportunity requires some kind of identification. This could mean when entrepreneurs successfully practice sense breaking they might positively identify and grow with business opportunity developments. Below the concept sense breaking is explained and put into context with opportunity developments.

2.1.1 Sense Breaking

The sensemaking mechanism this paper focuses on is sense breaking, as the name suggests sense-breaking is closely related to sensemaking. Sense breaking is the activity of breaking down meaning and questioning. By breaking down meaning a void is created, which can be filled again using sensemaking techniques. This shows the relevance of Sense-breaking as an effective mechanism in looking at human change (Pratt, 2000; Lawrence and Maitlis 2007). The concept of sense breaking itself is build around the construction of identity (Weick, 1995), where according to Ashforth, Harrison and Corley (2008), sense breaking is the first step in creating a narrative identity. In the process of creating a narrative identity sense breaking can only be used to initiate organizational identification, whereas actual meaning is given by sense giving (Ashforth et al., 2008). When an individual's sense of identity is disrupted; sense breaking, they ask questions about the relevance of a venture (George and Chattopahyay, 2005), thus individuals compare their current self with their ideal self creating a 'satisfaction gap' (Ashforth

et al., 2008). It can be said that sense breaking consist of a questioning who an individual is, when one's sense of self is challenged (Pratt, 2000). In the context of entrepreneurial opportunity development it could be argued that entrepreneurs identify opportunities by breaking down sense, as they compare an opportunity to a desired state of the opportunity by that creating a satisfaction gap.

2.2 Self-efficacy

Previous research by Zhao Seibert and Hills (2005) revealed that people partially become entrepreneurs because they believe they can do so, thus because their self-efficacy is high (Zhao et al., 2005). This raises the question of whether a high self-efficacy affects the success of an entrepreneurial venture. A study undertaken in India among entrepreneurs in the handcraft sector attempted this, which positively tested the relation between self-efficacy and success among 148 entrepreneurs (Prajapati and Biswas, 2011).Another recent study proved that in a dynamic environment high self-efficacy improves performance of an entrepreneur (Hmieleski and Baron, 2008). The challenge now is to see whether self-efficacy also has impact on the development of opportunities. Ozgen and Baron (2007) studied this theme and found a significant positive relation between self-efficacy and opportunity recognition (Ozgen and Baron, 2007). A later study by Gibbs (2009), confirmed these results and restated that self-efficacy has a positive influence on opportunity recognition (Gibbs, 2009). Drnovšek, Wincent & Cardon (2010), found in their research on entrepreneurial self-efficacy at business startups that self-efficacy influences the development of new ventures. However having a high self-efficacy does not directly imply success, as success depends on having the right set of self-efficacy skills (Drnovšek et al., 2010). Thus it can be said that having a strong self-efficacy influences the course of a new venture. Whether a new venture is successful depends on the strength of a self-efficacy aspect and the nature of the opportunity.

About self-efficacy in relation to sensemaking the following can be said, it is known that self-efficacy influences and gets influenced by entrepreneurial behavior (Wood and Bandura, 1989).A research by Bettiol et al. (2012) states that sensemaking can be seen as a crucial characteristic in entrepreneurial behavior (Bettiol et al., 2012).This would imply that sensemaking influences and gets influences by self-efficacy. To understand the effects of self-efficacy on perception of sense breaking of entrepreneurs, and the effect of self-efficacy on entrepreneurial opportunity developments we need to make the concept of self-efficacy measurable, which is done in section 3.1. Below you will find the conceptual framework in which main concepts will be ordered in a model.

2.3 Conceptual Model

To get a clear oversight on the concepts used throughout this paper the conceptual framework was built. The framework consists of the three main concepts, self-efficacy, sense breaking and opportunity developments. The framework can be found in figure 1. In the framework we look at the possible influence of self-efficacy on sense breaking, which in turn positively or negatively influences the development of entrepreneurial opportunities. Furthermore the framework looks at the direct relation between self-efficacy and entrepreneurial opportunity development. Notable in the conceptual model is the relation between self-efficacy and sense breaking of an entrepreneur. To assess the development of entrepreneurial opportunities sense breaking will be used to gain an indication on whether sense breaking affects opportunity development. We choose to use sense breaking as the main measure due to several reasons namely: Sense breaking is a rather dynamic concept which helps us observe and explain disruptive events noted by entrepreneurs during opportunity development. We choose to use the concept sense breaking due to its nature as an analytical tool for assessing disruptive phenomena.

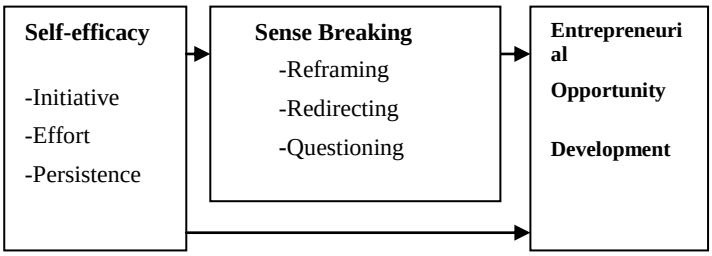

Figure 1. Conceptual Model

The three main things that will be studied are the relation between -self-efficacy and sense breaking, the relation between self-efficacy and opportunity development and the relation between sense breaking and opportunity development. In the methodology section below the methods and techniques used to measure the theorized concepts will be explained and validated. To study these three relations and eventually answer the research question three hypotheses are developed in accordance to the theory.

H1: ***If the self-efficacy occurrences are high then the opportunity development of entrepreneurs will be elevated.***

H2: ***If the self-efficacy occurrences are high then sense breaking activities of entrepreneurs are higher.***

H3: ***If sense breaking is high then the opportunity development of entrepreneurs is elevated.***

3. METHODOLOGY

This research will make use of mixed methods in order to answer the research question. Mixed methods offer an important approach for generating research questions providing warranted answers, and notably provide reliable research findings and outcomes (Johnson, Onwuegbuzie and Turner, 2007). Mixed methods are defined as 'Multiple ways of seeing, hearing and making sense of the social world, using qualitative and quantitative research methods (Greene, 2007; Johnson et al., 2007). To answer the research question, entrepreneurs which are conducting business opportunity developments will be studied. In this research self-efficacy and opportunity development will be measured using quantitative measures analyzing the profile survey and end monitor. Sensebreaking and opportunity development will be assessed using qualitative measures studying the exit interviews; hereby opportunity development is measured with both qualitative as quantitative measures. The data is attained from the Venture lab Twente an organization helping starting entrepreneurs by giving them advice and guidance. In this research data is collected through interviews using codebooks and predefined scales. Hill and Levenhagen (1997), state that data coding for qualitative research consists of three steps developing and coding domains construct core ideas and develop categories for cross analysis (Hill and Levenhagen., 1997). Furthermore Hill et al., (2005), recommends using at least 15 participants for this type of research which we satisfy as N=35. In this research first we broke down the concepts sense breaking and self-efficacy into observable phenomena translated into codeword's. Then the phenomena were coded into categories so that it can be used for

assessing our hypotheses. In the next sections the methods of collecting data on self-efficacy will be explained, followed by an explanation of how we measure sense breaking occurrences. Finally the use of discourse analyses and statistics throughout this study will be explained.

3.1 Measure of self-efficacy

In order to asses self efficacies, a self-efficacy scale is used (GSE), the general self-efficacy scale was developed to get insight in the generalized expectations of a person's capabilities. The GSE scale consists of seventeen items, representing the three main aspects of the scale (Sherer et al., 1982; Sherer and Adams, 1983). These three aspects are, (1) Initiative: The willingness to initiate certain behavior. (2) Effort: The willingness to expend effort to complete certain behaviors. (3) Persistence: The persistence in face of adversity. According to theory the three aspects combined form self-efficacy (Sherer et al., 1982). Previous research notes that the self-efficacy scale is the appropriate tool to measure self-efficacy in which the scale was tested for stability and validity (Sherer and Adams, 1983; Imam 2007; Sherer at al., 1982). A study done by Bosscher and Smit (1998), pointed out that the self-efficacy scale should be interpreted as a uni-dimensional broad construct, which is in accordance to the scale, reassuring its reliability (Bosscher and Smit, 1998).The self-efficacy of entrepreneurs will be assessed using an end monitor filled in by attendees of the VLT program assessing their own self-efficacy. The self-efficacy monitor consists of 17 self rated measures which relate to self-efficacy occurrences in entrepreneurial opportunity development. The quantitative data attained from the scale will be recoded into three categories high/med/low (Appendix 3), this will be done in order to make the three hypotheses testable.

3.2 Measure of sense breaking

In order to assess sense breaking we will make use of three core concept deprived from a research by Vlaar, Fenema and Tivari (2008) on sense breaking and dispersed team members (Vlaar et al., 2008). Hereby sense breaking acts are differentiated into three distinct categories, (1) reframing, (2) redirecting and (3) questioning. Reframing is a measure for activities which are related to the reframing of previously held concepts by self or team members. Redirecting can be seen as the activity of redirecting attention (of team members) or self, by this searching for possible solutions. The third activity questioning is the activity of questioning existing assumptions held by an individual, this is done through the study of disapproval negotiation and refusal by self or other parties. By using these three concepts as a measurement we can get a means of identification for the concept sense breaking. To asses and measure each of the three concepts related to sense breaking a codebook is used (Appendix 2), which links keywords to each of the three categories (Kaffka, Singaran, Kraaijenbrink and Groen, 2013).These three categories will be used to assess the effect of self-efficacy levels on sense breaking occurrences, and the effect of sense breaking on opportunity development. To use the data attained it will be recoded into two categories namely some and high according to the sense breaking occurrences and number of categorical occurrences (Appendix 3). To assess reliability of coding and the codebook, researcher triangulation was done in order to validate the concepts measured and to attain reliability in coding. The reliability in coding was checked by another researcher, making the data attained valid and reliable.

3.3 Measure of opportunity development

For the final part of this study the development of entrepreneurial opportunities will be assessed. At which we measure the development of entrepreneurial opportunities as 'gestation' or start-up activities. These activities are measured through 28 starts up activities; these activities replicate PSED activities from a study by Gartner, Shaver, Carter and Reynolds (2004). To assess the development of entrepreneurial opportunities profile surveys and end monitors of entrepreneurs involved in the VLT program are studied, where development is measured as the difference in gestation activities over the course of a year (Appendix 4). Also to both use qualitative and quantitative measures exit interviews are studied. These exit interviews were assessed using a codebook looking for keywords related to gestation activities, somewhat replicating most of the activities from the PSED scale. The data attained from coding the exit interviews was rechecked using Cohen's kappa resulting in an IRR of .903. These two sets of raw data allow us to assess overall development of entrepreneurs over a period of 1 year and grant the opportunity to categorize this data to make it applicable for this study. The data attained from the survey and monitor will be categorized into two categories namely moderate development and elevated development (Appendix 3).

3.4 Discourse analysis

To analyze qualitative data from the exit interviews we used discourse analysis. Discourse analyses are used to look at interviews and more specifically the coding procedure. Hereby it is attempted to re-interpret certain lines of text, making possible 'codeword's' visible. These code words are linked to certain actions and indicate the self-efficacy and sense breaking of an entrepreneur. The specific codeword's are listed in the two codebooks (Appendix 1 and 2). In self-efficacy discourse analyses are used to gain insight on social relations, in which we attempt to find specific actions in speech which indicate self-efficacy. In sense breaking discourse analyses are used to asses certain actions in speech which relate to sense breaking. Hereby discourse analyses are used as a tool to study the mind and sense making of entrepreneurs (Wetherell, Taylor, and Yates, 2001). Discourse analysis is also used to asses' entrepreneurial opportunity development. This is done by studying the written personal indication of satisfaction of one's opportunity development. This enables the measurement of the concept opportunity development in categories varying from low-med-high. In the next part the methods to assess opportunity developments are explained followed by a section on statistical measures used to answer the research question.

3.5 Statistics

Apart from the use of codebooks and discourse analyses, this research will apply two statistical measures to the collected data namely the lambda and the chi square statistic. Babbie (2009), advises the use of these two statistical analyses with categorized nominal/ordinal data (Babbie, 2009). The lambda statistic is used to double check data which does not comply with the minimum requirements of the chi square statistic. In order to assess the three hypothesis asked the research will make use of the X^2 independence statistic hereby we identify whether the three categorical variables are actually independent of each other or not (de Veaux, Velleman and Bock, 2011). In order to validate the use of the X^2 statistic we need to satisfy several assumptions and conditions. Firstly the data is counted: the dataset used in this research is counted as we count instances of sense breaking, self-efficacy and the level of opportunity development. Secondly each sample was independent of the other; this assumption is met as the samples were individual

interviews conducted on entrepreneurs attending Venture lab Twente measuring personal development. Thirdly the sample was randomly chosen and the total sample does not represent more than 10% of the total population n=35 which is less than 10% of all entrepreneurs. Lastly the expected cell frequency needs to be >5, this will become evident when conducting the chi square test, thus we will continue with the tests and we set the significance level at 0.05. This shows all condition to use the chi square statistic are met thereby validating the use of the X^2 independence statistic to check the three studied hypotheses (de Veaux et al., 2011). In the next section the reliability and validity of the research is pointed out.

3.6 Reliability and Validity

In order to continue with the research we must ensure the validity and reliability of the research. This is already discussed in each method part; below you can find the measures related to validity and reliability of this research.

To ensure validity and reliability of the concept self-efficacy and Sense breaking a codebook was modified according to Hill et al., (1997; 2005). Also the concepts of self-efficacy and sense breaking were constructed according to self-efficacy and sense breaking theories (Sherer et al., 1982; Sherer and Adams, 1983: Kaffka et al., 2013; Vlaar et al., 2008). The validity and reliability of the self-efficacy measure has been proven by numerous researchers and authors (Sherer and Adams, 1983; Imam 2007; Sherer at al., 1982). Researcher triangulation was conducted after this with another researcher in the field of entrepreneurial cognition making the codebooks and study appropriate for this specific research and sample. Finally to check the reliability of the coding Cohen's kappa was used to check the inter rater reliability, which resulted for opportunity development as κ =.903 the inter rater reliability for sense breaking was not tested, but results were rechecked. To get a clear overview of the procedures tests and methods used a framework was build which can be found in figure 2.

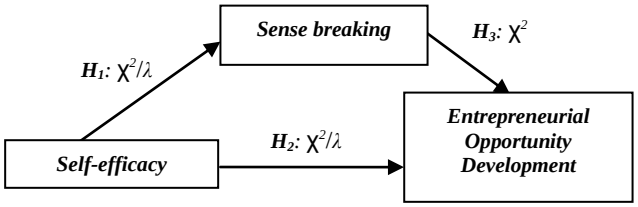

Figure 2. Methodological framework

In the next part of this study the result will be shown and the hypotheses are answered.

4. RESULTS

In the following section the results for each of the variables will be revealed, after this the three hypotheses results will be examined. Firstly the results of the self-efficacy will be looked at; self-efficacy was measured using the general self-efficacy scale (Sherer et al., 1982). The results of the scale showed that on average entrepreneurs attending VLT scored themselves with a 3.6/5 with a standard deviation of .5. Secondly the sense breaking results will be looked at, a total of 64 sense breaking instances occurred. The 64 occurrences varied over the three categories with 30 reframing instances, 19 redirecting instances and 7 questioning instances. Thirdly the opportunity results will be looked at; to measure opportunity development two measurements were conducted. The first qualitative measurement using the gestation codebook resulted in 137 indications of self-efficacy varying over 13 categories. The quantitative results are the development of entrepreneurs over 1 year time. On average entrepreneurs changed 5 activities a year, ranging from 0 to 16 activities. In the next three parts the results of the chi square statistic and lambda statistic will be revealed. Followed be the conclusion and answering of the research question.

4.1 H1

In this part the first hypothesis *if the self-efficacy occurrences are high then the opportunity development will be elevated* is answered. In this we analyze the relationship between the dependent variable opportunity development and the independent variable self-efficacy. First the results of the chi square analysis of independence will be shown; in case the chi square cell frequency is not met a lambda analysis is done to see if the results of the chi square can be double checked. In each of the statistical calculations we attempt to disprove the null hypothesis: self-efficacy and opportunity development are not related.

To answer the first hypothesis firstly the sell frequency must be checked. For hypothesis one the cell frequency is not met with 2 cells (33%) being below 5, we will continue with the chi square and recheck the results using the lambda statistic. The chi square of H_1 is for the qualitative analysis 3.898 and its lambda .235, for the quantitative analysis a chi square of 1.234 and a lambda of .056 were found. This means both the statistics probability do not meet the required significance levels (table 1).To answer hypothesis 1 it can be said that we fail to reject the null hypothesis and thereby fail to prove that the variables self-efficacy and opportunity development are related.

4.2 H2

The second hypothesis *If the self-efficacy occurrences are high then sense breaking activities are higher*, is answered in this part. Here self-efficacy is treated as the independent variable and sense breaking as a mediator variable.

In order to answer the second hypothesis the cell frequency condition must be checked, for the second hypothesis the cell frequency is not met with 2 cells (33%) exceeding the minimum cell frequency of 5. Therefore we will proceed to calculate with both a chi square and the lambda. The chi square of hypothesis 2 is 4.644* and the lambda is .267 (table 1), the chi square is slightly elevated and therefore significant at a .10 level. Since the cell frequency is not met and the lambda still lies relatively low, we reject the null hypothesis at a.10 significance. However as this study attains a .05 significance fail to prove that self-efficacy and sense breaking are significantly related. But there is prove for a weak relation between the two with self-efficacy as the independent variable.

4.3 H3

The third and final hypothesis to be assessed is the hypothesis; *if sense breaking is high then the opportunity development is elevated.* Here sense breaking is treated as the mediator variable and opportunity as dependent variable.

The cell frequency of hypothesis three for both qualitative and quantitative data meets the n >5 condition therefore we will use the chi square statistic to answer the hypothesis. The result of the chi square statistic on the relation between sense breaking and opportunity development (qualitative measured) is 1.373 this relation does not seem to be significant. The second chi square is conducted on the relation between sense breaking and opportunity development (quantitative measured), this resulted in a chi square of 6.076 (table 1). This is a significant result on a significance level of .05, this mean that the null hypothesis

can be rejected and it seems there is evidence to assume that sense breaking is related to the opportunity development of entrepreneurs. We therefore get guided into the direction of accepting the third hypothesis making sense breaking and opportunity development related concepts. Below the summarized results can be found in table 1.

	Variables	N	χ^2	λ
H_1	SE→$OD_{qualitative}$	35	3.898	.235
	SE→$OD_{quantitative}$	35	1.234	.056
H_2	SE→SB	35	4.644*	.267
H_3	SB→ $OD_{qualitative}$	35	1.373	N/A
	SB→ $OD_{quantitative}$	35	**6.076****	N/A

***- Significance at .01 level
** - Significance at .05 level
* -Significance at .10 level

Table 1. Summarized results statistical tests

5. CONCLUSION

In this part of the paper the research question will be answered using the results of the analysis. After this the answer will be linked to theories which will eventually lead to the discussion.

In order to answer the research question '*to what extent does the self-efficacy of an entrepreneur affect sense breaking and to what extend does this lead to entrepreneurial opportunity developments* ?'We draw our analysis, using the results of the three hypotheses in relation to the research question.

We only found a weak relation between self-efficacy and sense breaking. This means that self-efficacy seems to weakly influence the sense making of entrepreneurs. We did not find any relation between self-efficacy and opportunity development. This indicates that the self-efficacy of an entrepreneur does not greatly impact the development of opportunities. We conclude that opportunity development does not directly rely on a person's self-efficacy. There was however a relationship between sense breaking and opportunity development which would imply that even though self-efficacy influences sense breaking and sense breaking affects opportunity development there is no direct link between self-efficacy and opportunity developments. Thus to definitely answer the research question it can be said that self-efficacy weakly influences sense breaking, and this sense breaking leads to higher opportunity development. However self-efficacy seems to have no direct influence on opportunity development.

When looking back at the theory, it was assumed that self-efficacy influences both the success of a venture and the recognition of opportunities (Drnovšek et al., 2010; Ozgen and Baron, 2007; Gibbs, 2009). In the analysis there was no significant relation between self-efficacy and opportunity developments, however the results indicate that self-efficacy is an antecedent of opportunity developments, as it weakly influences sense breaking of individuals. This is in line with most of the theory, in which there are hints that self-efficacy influences entrepreneurial behavior and thus sense breaking of an entrepreneur (Wood and Bandura, 1989; Bettiol et al., 2012).

Secondly theory indicated that sense breaking, entrepreneurs reframing redirecting and questioning actions, would reflect in more consciousness thereby increasing the development of an entrepreneurial opportunity (Mael and Ashforth, 1992; Lee, 1971). The results seem to complement the theory indicating a significant relationship between sense breaking and opportunity development.

In the next part the implications of the results will be discussed leading to the limitations and suggestion for further research.

6. DISCUSSION

In the following part the results attained in this study will be used to discuss both theoretical and practical implications of this study. Leading to the limitations of this paper and a section dedicated to future research.

When looking at the three hypotheses and the research question in relation to the various theories discussed in this paper, many questions arise. Even though the results of the study were somewhat in line with theory studied earlier in this research, some results remain underrepresented in other theories and studies. When looking at the key concepts studied, it firstly became evident according to theory that self-efficacy leads to success and identification and development of new ventures (Ozgen and Baron, 2007; Prajapati and Biswas, 2011; Drnovšek et al., 2010). The results of this study however do not seem to recognize any direct relation between self-efficacy and opportunity development. Opportunity development was measured as gestation activities, thus there seems to be reason to question the role of self-efficacy on the development of new entrepreneurial ventures. This study however does not reject the fact that self-efficacy might be influencing opportunity developments, the role as a direct influence is however questioned. When looking at the role of self-efficacy on sense breaking however according to the results of this study there seems to be a weak relation. This seems to be in line with theory and it could be assumed that self-efficacy seems to be influencing the sense breaking of entrepreneurs to some extent. Self-efficacy can be conceptualized as the antecedent of opportunity development as it is known that it helps identification it seems to somewhat be an indirect enabler for the development of new ventures, instead of being closely related to opportunity development. The role of self-efficacy as an indirect enabler comes from the results of the analysis on sense breaking and opportunity development. Here sense breaking measured in reframing redirecting and questioning, seems to be significantly related to opportunity developments. This result is also the strongest tested relation in this study, therefore it can be said that sense breaking seems to be leading to opportunity developments. So far we found out that self-efficacy is weakly related to sense breaking and sense breaking is related to opportunity developments, meaning that sense breaking of an individual could either be a representation of development or it could mean that sense breaking leads to higher opportunity development. This implies that we must consider the role of sense breaking as a determinant of development, and self-efficacy more as a facilitator of sense breaking.

When looking at the results from a practical point of stance things become more complicated. To discuss implications on practicalities we must first look at the key concepts again and put these in a more practical setup. Self-efficacy is the capability to mobilize control over events in an entrepreneurial context. . Whereas sense breaking more a mechanisms to break down sense of situation, thereby allowing 'room' for improvements. This study found that first one must mobilize

control over external events, in order to break sense of these events. By breaking sense of events one can reframe redirect and question certain events, and by doing this process one is more likely to successfully develop an opportunity. When looking at the practice of entrepreneurship the results of this study could be used by professionals to become aware of the importance of one's self. When facing opportunities one must be able to set course and act on an opportunity through self-efficacy. Development is enabled by a constant process of breaking down sense and meaning of events. Through this, one can make sense out of a situation and capitalize itself to act upon events, leading to a higher opportunity development. For practice this implies that entrepreneurs should always try to question their existing assumptions and knowledge. And put effort in reframing and redirecting the newly obtained knowledge into creating a new form of 'logic'.

To link all this back to the development of entrepreneurial cognition, it can be said that through this research we learned about the sense breaking mechanism and its implications on the growth of a novel venture, as well as the fact that the self-efficacy of an entrepreneur influences the sense breaking of entrepreneurs. With this knowledge we can gain a better understanding of the cognition of entrepreneurs and asses their knowledge structures better. In the next part the limitations of this study will be discussed followed by suggestions for future research.

6.1 Limitations

In this research there are several limitations, the first and perhaps most influential limitation regarding the sample is its sample size. I this research a number of 35 units were analyzed for a qualitative analysis this sample size is rather small and thus might slightly influence the results making perhaps less reliable. The second limitation is the limited background theory on sense breaking, as only one theory was used to validate the concepts measured. The lacking of sense breaking literature is likely due to its novelty, as the concept of sense breaking is rarely used on entrepreneurship and opportunity development. The third limitation seems to lie in the nature of the qualitative codebooks, as coding can be somewhat unreliable. In this research maximum effort was put into triangulating the qualitative data and rechecking the coding. However due to the ambiguity of the exit interviews studied interpretations might differ for each individual making the coding somewhat less valid. Lastly the difference in results for qualitative and quantitative analyses seems to be indication that one of the two measures seems to be less valid. This is most likely caused by the small numbers mentioned before.

6.2 Future research

As entrepreneurship is becoming a more and more desired to study and practice we must learn more about the cognition of entrepreneurs, this research was made in response to a call to research by Mitchell et al., (2002) requesting researchers to develop entrepreneurial cognition. In this paper we make steps into understanding the effects of self-efficacy and sense breaking of opportunity developments however too many question marks remain. The exact effect of self-efficacy on sense making mechanisms such as sense breaking remains unknown as only a weak relation was found. Secondly little remains known about the concept sense breaking in relation to entrepreneurial studies, also few details known about the antecedents of sense breaking and its exact effect on entrepreneurs and new ventures. If we find out what influences sense breaking we can get more insight on the way successful entrepreneurs make and brake sense of situations. This would enable us to provide better guidance and higher success rates of new ventures as sense breaking seems directly related to opportunity developments.

7. ACKNOWLEDGEMENTS

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9. APPENDIX

Appendix 1. Gestation activities (opportunity development codebook)

Codes	Abbrevation	Explanation
Team members,	TM	
employees searched/hired	EMP	halftime or some assignments: 0,5
customers/client	Cl	
business plan/model development:	BP	
Supplier/distributor development:	SD	
Personality development	PD	
Actions according to feedback from panel	AFP	
Actions according to feedback from coach	AFC	
Product development	ProDev	Equipment purchased, information gathered
Investor/financing in negotiation	FN	
Investor/financing found	FF	
prototype in development	PTDev	
prototype done	PTdone	
Product done	ProDone	
Patent development	PatDev	

Appendix 2. Codebook Sense Breaking

CODES AND CORRESPONDING SIGNAL WORDS

Sensebreaking is NOT all instances of something new. It's got to be different! It's got to interrupt a flow, or a pattern.

- **Reframing: looking at things differently; change previously held conceptions**
    - Key words: then I thought/believed that, now I think/believed this; changing or rearranging existing view on business idea; rethink something. ; looking at something. with different eyes; other perspective; getting different/changing/reconfiguration/altering concept of something; (re)positioning oneself or one's business;
    - Another way of doing something. (Based on a new or different conception of something)
    - Learning about one's own personality (in relation to venture, or just in terms of personality development)
    - Learning + signal word of reframing (see this list)
    - new idea BUT ONLY if it's in combination with a signal word of RF (see this list)

- Becoming aware of something /realizations/clarifications/insights (e.g. 'It became clear'), BUT only if :
    - it is about a change/ something that the respondent realizes/becomes aware of which is different from previously thought/having been aware of, or:
    - clarification & becoming aware WITH signal word of reframing, or:
    - Clarification & becoming aware in combination with VP/mode of organization: is reframe
- To do something which is very important to 'achieving one's goal' (figure of speech, indicating motivation which is value-driven)
- Shift of attention/focus of goals, mission, vision; revising goals, mission, vision
    - Examples: De Hoon: Jim Anderson + value proposition

- **Redirecting: being 'pulled towards'**
    - (to enter) new/different market;
    - different product or technological application/possibilities which were not considered before;
    - new co-worker/employee; new customer;
    - Adding something new, at a suggestion of third party, to existing
        - Also in terms of process improvement of business (administration, chain management, HRM, financial aspects e.g. subsidies; ONLY improvements; if it is fundamentally different approach/way of doing things = RF)
    - (potential) new niches, (potential) new partner (must be explicitly stated that it is for one's business if it concerns a *potential* new niche)
    - intensification/concentration of focus/attention
    - new mode of production, due to third party (e.g. new/bigger client orders)
    - learning + signal word of redirecting (see list)
    - New way of calculation or re-doing the way calculations are done
    - clarification & becoming aware WITH signal word of redirecting (see this list)
    - clarification & becoming aware of/insights in combination with new market/product/application or other signal word of RD: is redirecting
    - new idea BUT ONLY if it's in combination with a signal word of RD (see this list)

- **Questioning: negative feedback, disapproval**
    - Indication of disapproval. E.g. key words: mustn't, shouldn't, rather not, don't, won't work
    - Complaints, dissatisfaction of parties (related to business idea/proposals/projects)
    - Also negotiations

- Refusal /withdrawal by other parties
- In willingness to deliver, e.g. supplies or payment of invoices, by third parties

Appendix 3. Categorization scheme.

Self-efficacy

35 exit interviews

18 categories measured

(Sherer et al., 1983)

Categorizedaccording to percentiles into 3 categories high/medium/low

Statistics

SE

N	Valid	35
	Missing	0
Mean		66.9143
Median		69.0000
Mode		62.00
Std. Deviation		9.90654
Minimum		36.00
Maximum		90.00
Percentiles	25	62.0000
	50	69.0000
	75	72.0000

Categories are Low= 0-62 med=63-72 high 73+

Sense breaking

35 exit interviews

3 categories measured

(Kaffka et al., 2013)

Categorized into some/high Sensebreaking. According to percentiles and the previous 3 measured categories.

Statistics

SB

N	Valid	35
	Missing	0
Mean		1.6000
Std. Error of Mean		.17489
Median		2.0000
Mode		1.00
Std. Deviation		1.03469
Minimum		.00
Maximum		4.00
Sum		56.00
Percentiles	25	1.0000
	50	2.0000
	75	2.0000

Categories are 0-1= some 2 + = high. Also to have high SB occurrences need to be in 2 of the three measured categories

Opportunity development

35 end monitors, 35 profile surveys, 35 exit interviews

Difference between end monitors and surveys measured and the Exit interview gestation occurrences measured

Categorized into 2 categories moderate/high according to the median and percentiles

Statistics

		ODexit	ODinend
N	Valid	35	35
	Missing	0	0
Mean		3.9143	5.3714
Median		3.0000	4.0000
Mode		3.00	2.00
Std. Deviation		1.88448	4.47927
Minimum		1.00	.00
Maximum		8.00	16.00
Percentiles	25	2.0000	2.0000
	50	3.0000	4.0000
	75	5.0000	9.0000

For the exit interviews 1-3 low
4-8 high

For intake and end 1-4 low
5-16 high

Appendix 4. Opportunity development Profile survey and End monitor

1.3 While no startup experience is required for VentureLab, you may have been involved in business start-up activities before. Please indicate which of the following activities you have done before. Please make a response in each row of the table.

	Yes	No
01. Spent a lot of time thinking about starting a business		
02. Took classes or workshops on starting a business		
03. Saved money to invest in a business		

04. Invested own money in a business		
05. Developed a prototype, model or procedures for the product/service		
06. Defined market opportunities		
07. Purchased raw materials, inventory, or supplies		
08. Prepared a business plan		
09. Organized a start-up team		
10. Purchased or leased major items like equipment, facilities or property		
11. Started marketing or promotional activities		
12. Arranged child care or household help to allow time for business		
13. Established credit from a supplier		
14. Filed income tax return		
15. Devoted full time to business		
16. Applied for a patent, copyright, or trademark		
17. Developed projected financial statements		
18. Opened a bank account exclusively for a business		
19. Received money, income, or fees from sale of products or services		
20. Asked financial institutions or people for funds		
21. Received funds from financial institutions or people		
22. Hired employees or managers		
23. Paid income taxes for income generated through a business		
24. Realized monthly revenues that exceeded monthly expenses		
25. Had a separate phone listing for a business		
26. Had a separate phone line for a business		
27. Had a website exclusively devoted to a business		
28. Registered a business officially		

2.6 When you started in VentureLab, we asked you which business start-up activities you have been involved in before. Since you probably have performed additional activities now, we ask you this question again. Please indicate which of the following activities you have ever done before. Please make a response in each row.

Note: this question does not refer only to the past four months, but to any time until today.

	Yes	**No**
01. Spent a lot of time thinking about starting a business		
02. Took classes or workshops on starting a business		
03. Saved money to invest in a business		
04. Invested own money in a business		
05. Developed a prototype, model or procedures for the product/service		
06. Defined market opportunities		
07. Purchased raw materials, inventory, or supplies		
08. Prepared a business plan		
09. Organized a start-up team		
10. Purchased or leased major items like equipment, facilities or property		
11. Started marketing or promotional activities		

12. Arranged child care or household help to allow time for business		
13. Established credit from a supplier		
14. Filed income tax return		
15. Devoted full time to business		
16. Applied for a patent, copyright, or trademark		
17. Developed projected financial statements		
18. Opened a bank account exclusively for a business		
19. Received money, income, or fees from sale of products or services		
20. Asked financial institutions or people for funds		
21. Received funds from financial institutions or people		
22. Hired employees or managers		
23. Paid income taxes for income generated through a business		
24. Realized monthly revenues that exceeded monthly expenses		
25. Had a separate phone listing for a business		
26. Had a separate phone line for a business		
27. Had a website exclusively devoted to a business		
28. Registered a business officially		

Appendix 5. Output results statistical tests

Result H1: ***If the self-efficacy occurrences are high then the opportunity development will be elevated.***

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.898[a]	2	.142
Likelihood Ratio	4.038	2	.133
Linear-by-Linear Association	3.760	1	.052
N of Valid Cases	35		

a. 2 cells (33.3%) have expected count less than 5. The minimum expected count is 3.89.

Directional Measures

			Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Lambda	Symmetric	.158	.116	1.252	.211
		SelfEfficacy Dependent	.095	.181	.502	.616
		OppDevExitInt Dependent	.235	.145	1.456	.145
	Goodman and Kruskal tau	SelfEfficacy Dependent	.050	.048		.185[c]
		OppDevExitInt Dependent	.111	.101		.151[c]

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on chi-square approximation

Directional Measures

			Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Lambda	Symmetric	.056	.108	.502	.616
		SelfEfficacy Dependent	.095	.181	.502	.616
		OppDevScale Dependent	.000	.000	.[c]	.[c]
	Goodman and Kruskal tau	SelfEfficacy Dependent	.019	.034		.516[d]
		OppDevScale Dependent	.035	.061		.549[d]

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Cannot be computed because the asymptotic standard error equals zero.

d. Based on chi-square approximation

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.234[a]	2	.540
Likelihood Ratio	1.257	2	.533
Linear-by-Linear Association	.898	1	.343
N of Valid Cases	35		

a. 2 cells (33.3%) have expected count less than 5. The minimum expected count is 3.43.

Result H2: ***If the self-efficacy occurrences are high then sense breaking activities are higher.***

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.644[a]	2	.098
Likelihood Ratio	4.731	2	.094
Linear-by-Linear Association	1.931	1	.165
N of Valid Cases	35		

a. 2 cells (33.3%) have expected count less than 5. The minimum expected count is 3.43.

Directional Measures

			Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Lambda	Symmetric	.167	.141	1.115	.265
		SelfEfficacy Dependent	.095	.143	.636	.525
		SenseBreaking Dependent	.267	.161	1.456	.145
	Goodman and Kruskal tau	SelfEfficacy Dependent	.056	.051		.148[c]
		SenseBreaking Dependent	.133	.110		.105[c]

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on chi-square approximation

Result H3: ***If sense breaking is high then the opportunity development is elevated.***

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.373[a]	1	.241		
Continuity Correction[b]	.689	1	.407		
Likelihood Ratio	1.381	1	.240		
Fisher's Exact Test				.315	.204
Linear-by-Linear Association	1.333	1	.248		
N of Valid Cases	35				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 7.29.

b. Computed only for a 2x2 table

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	6.076[a]	1	.014		
Continuity Correction[b]	4.494	1	.034		
Likelihood Ratio	6.215	1	.013		
Fisher's Exact Test				.019	.017
Linear-by-Linear Association	5.903	1	.015		
N of Valid Cases	35				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 6.43.

b. Computed only for a 2x2 table