

**SENSEMAKING AND THE CONSTRUCTION OF GROWTH-BASED STORIES ON
OVERCOME UNCERTAINTIES IN THE INNOVATION ECOSYSTEM**

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Abstract

Innovation ecosystem is composed of interconnected and interdependent organizations that affect and are affected by the overcome uncertainties by the focal company and the upstream and downstream organizations. Traditional approaches to uncertainty management it objectively, neglecting the construction phase of the decision-making process. Thus, the following question is framed: *"How do the entrepreneurs of the innovation ecosystem create sense of the uncertainties overcome?"* This question will be answered by the perspective of Sensemaking, which is defined as the process by which people try to understand ambiguous issues or events, misleading or confusing. For this, a hybrid method will be proposed, including bibliometric and content analysis from the perspective of Sensemaking in organizations. As contribution it is proposed a framework of overcome uncertainties by the Sensemaking perspective.

Keywords: Sensemaking, Innovation Ecosystem, Uncertainty Management, Overcome Uncertainty.

1. Introduction

The way organizations management uncertainties is critical to the success of developing a radical innovation (Maine, Thomas, & Utterback, 2014). Traditionally, the literature offers a number of uncertainty management approaches that focus only a particular firm (e.g. Ahmet Erkoyuncu, Roy, Shehab, & Kutsch, 2014; Hoffmann, Schiele, & Krabbendam, 2013; Vilko, Ritala, & Edelmann, 2014), ignoring the cases in which companies collaborate in the development of radical innovations, as in an innovation ecosystem (Adner & Kapoor, 2016). In addition, these approaches treat uncertainty objectively, neglecting the construction phase of the decision-making process. Thus, it is understood that the following gap still needs to be filled: *"How do the entrepreneurs of the innovation ecosystem make sense of the uncertainties overcome?"*

Innovation Ecosystem is composed for network of interconnected and interdependent companies, which include focal company, clients, suppliers and complementary innovators (Gomes, Facin, Salerno, & Ikenami, 2016). The individual business activities of these organizations share the fate of all other stakeholders in the innovation ecosystem (Moore, 2006). Therefore, the uncertainty overcome by one company defines the fate of the others within the innovation ecosystem.

Uncertainty can be understood as the perceived inability of a manager to predict something accurately (Milliken, 1987) or as information deficiency that encompasses indefinite and ambiguous outcomes associated with various factors and may be an unexpected event or situation (Perminova, Gustafsson, & Wikström, 2008) and these situations are impossible to measure by probability (Knight, 1921). This occurs in partially observable or random environments (Milliken, 1987). However, the overcome uncertainty we define as situations impossible to be measured by probability, but the perception of this situation occurs and in the sequence occurs the management, and the result will depend on the experience of the entrepreneur.

The gap addressed will be filled by the perspective of Sensemaking, which is understood as the processes by which people or groups of people try to understand ambiguous, equivocal and confusing problems (Brown, Colville, & Pye, 2015). It is the

vehicle through which the information exchanged, is refined, filtered and connected, influencing the next step and thus contributes to the formation of the company identity (Weick, Sutcliffe, & Obstfeld, 2005).

Main relevance of this article stems from the object studied, since it applies to a set of organizations, unlike previous studies that are analyzed by a single company. To this end, a hybrid methodology, including bibliometric and content analysis from the perspective of Sensemaking in Organizations, was adopted to build the framework of Uncertainties overcome in the innovation ecosystem. Thus, the study will contribute to the theory of Sensemaking for the uncertainties management and an alternative managerial framework to manage uncertainties at the macro level (innovation ecosystem).

2. Methodology

Systematic review literature of the Sensemaking in organizations proposed in this study includes bibliometric and content analysis. Bibliometric studies are known for the ability to quantify written communication (Ikpaahindi, 1985) and for citation analyzes that can identify relevant articles in a given area (Chai & Xiao, 2012). Analysis of content is a technique of investigation that through an objective, systematic and quantitative description of the content interpretations are extracted about a certain subject. It is developed through partially refined techniques (Flick, 2009). Traditionally, content analysis occurs in textual materials, which can be manipulated by the researcher to respond to literature gaps (Bauer & Gaskell, 2008). Combination of bibliometric and content analysis become relevant in this study to identify evolution, gaps and trends in Sensemaking in organizations (Carvalho, Fleury, & Lopes, 2013).

2.1 Sample description

Data used were extracted from the international database “Web of Science of Clarivate analytics”. This database was chosen because of its resources, such as abstracts, authors, institutions, number of citations, references cited, journal impact factor, among other factors essential for bibliometric, social network, and content analysis.

For the selection of these data a search was used in the main collection of the database with "Sensemaking" in the title that resulted in 553 titles. Following filters were applied: (1) Management; (2) Business; (3) Operations research management; (4) Article; and (5) Review. To capture how Sensemaking is being addressed in the management and operations of companies with critically reviewed data by peers.

After this step, 262 articles were left, which after careful reading of all the abstracts, 27 were found to have escaped the purpose of Sensemaking defined in this research (the processes by which people or groups of people try to understand ambiguous, equivocal and confusing problems). Or the articles did not address the process of Sensemaking even containing the term in the title. The final sample was 235 articles published in 99 different journals, from 1988 to December 2017.

2.2 Bibliometric Analysis Procedures

In this phase of the research, a process of bibliometric analysis similar to that carried out by (Gomes et al., 2016). Quantification of the textual data was done in Excel and based on the final sample of 235 articles. In this stage it was possible to define the number of articles published per year in each magazine and thus to define which magazines published the most, it was also possible to highlight the type of material that the magazines publish.

For social networks, Vosviewer software was used, which helped identify the most relevant authors in the area, the most used keywords, and the most cited references. Three were the social networks developed in this research: (1) Documents Quotes Network highlights the strength of the most influential documents in a given sample. This network was chosen because analyzes that resulted in highlighting documents from the selected sample itself; (2) Co-Citations network which present the cited references from the articles in the original sample (other types of references, such as books or conference papers, which are not indexed in the Web of Science may appear but were incorporated into the analysis because they are often mentioned in the articles of the selected sample); (3) Keywords Network, which is relevant to understand what terms are worked on articles in that area.

2.3 Content Analysis Procedures

Document citation network was chosen to select articles for content analysis because the analysis and result of the documents are from the sample itself. With the documents highlighted in each cluster of the network it was possible to highlight the following topics: (1) Sensemaking Definition; (2) Process and Perspective Sensemaking; (3) What methodology was used and why it was chosen; (4) Future research suggestions for each document.

With these data, it was possible to construct the conceptual model to answer our initial question: *"How do the entrepreneurs of the innovation ecosystem create sense of the overcome uncertainties?"*

For resume and illustrate the process following in this research we construct figure 1.

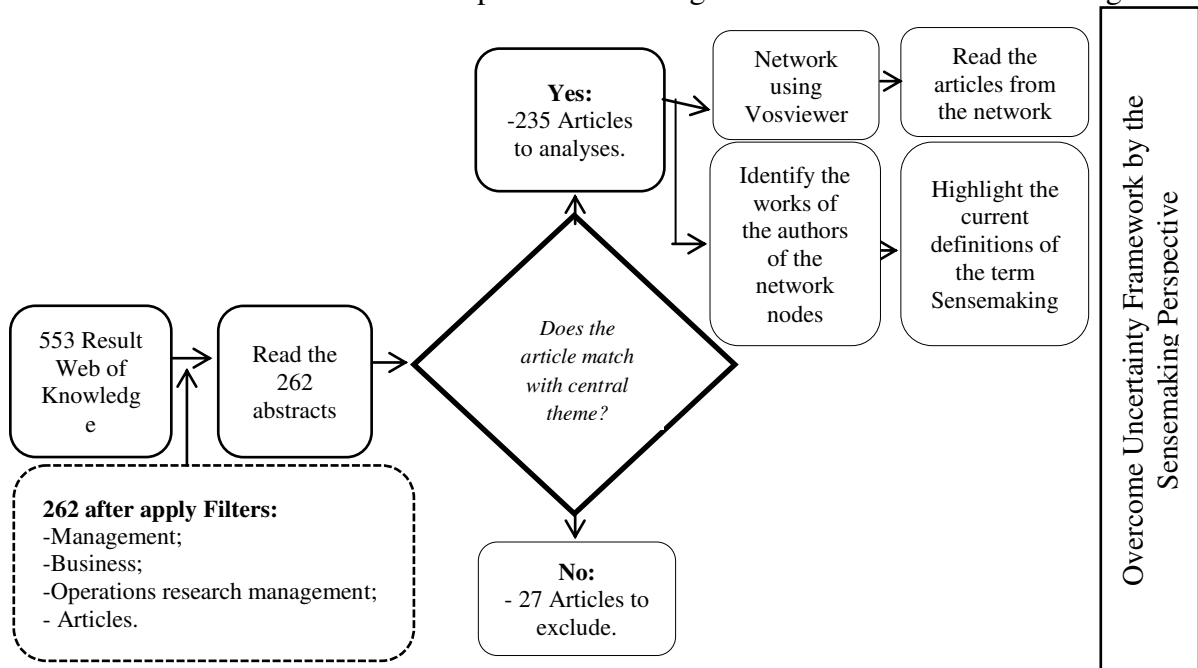


Figure 1: Construction Phases Overcome Uncertainty Framework by the Sensemaking Perspective

Source: Authors (2019).

3. Bibliometric Analysis

Bibliometric analysis helps to identify which journals publish the most about sensemaking and which publish more theoretical articles. Highlighting the most prominent journals of the Administration that publish these types of articles and when the publications began to appear, as well as when the publications reached maturity.

We summarize the main findings in Table 1, and it is possible to state that the Journal Human Relations is the journal that most publishes about the topic sensemaking of the selected sample and the journal that publishes more theoretical articles on this subject is the Academy of Management Review, Organization Science, and Journal of Management Studies. Already Academy of Management Review has the greatest impact factor.

In the selected sample, only 13 journals of the 89 published 4 or more articles about Sensemaking since 1988. Before 2008 the publications occurred timidly after this period there was a rise of the research on sensemaking that lasts until the present years.

Table 1: Main findings of Bibliometric Analysis

Journal	JCR (2016)	Empirical	Theoretical	1988-1992	1993 - 1997	1998 - 2002	2003 - 2007	2008 - 2012	2013 - 2017	TOTAL
Human relations	2,622	12	3	0	1	1	2	8	3	15
Journal of management studies	3,962	9	6	1	0	4	5	3	2	15
Academy of management journal	2,147	7	3	0	2	0	2	4	2	10
Industrial marketing management	3,166	7	2	0	0	0	1	2	6	9
Journal of organizational change management	0,761	7	2	0	0	0	2	4	3	9
Organization science	2,691	3	6	0	2	2	1	1	3	9
Management learning	1,836	4	4	0	0	1	0	0	7	8
Organization studies	3,107	7	1	0	0	1	2	2	3	8
Scandinavian journal of management	1,450	5	2	0	0	0	0	2	5	7
Academy of management review	9,408	0	6	0	0	2	1	1	2	6
Journal of applied behavioral science	1,436	4	1	0	0	0	0	4	1	5
Journal of organizational behavior	3,607	5	0	0	1	1	1	0	2	5
Culture and organization	0,489	3	1	0	0	0	0	2	2	4
Total		73	37	1	6	12	17	33	41	110
<i>Other journals have published three or fewer articles in the selected period</i>										

Source: Authors (2019).

For construction of the framework, we chose to sweep the main contributions about Sensemaking in the summaries of the selected sample and deeply analyze all the articles selected in the nodes of the social network of document citation. The extracted network is illustrated in figure 2 and the findings are reported from the theoretical sensemaking context.

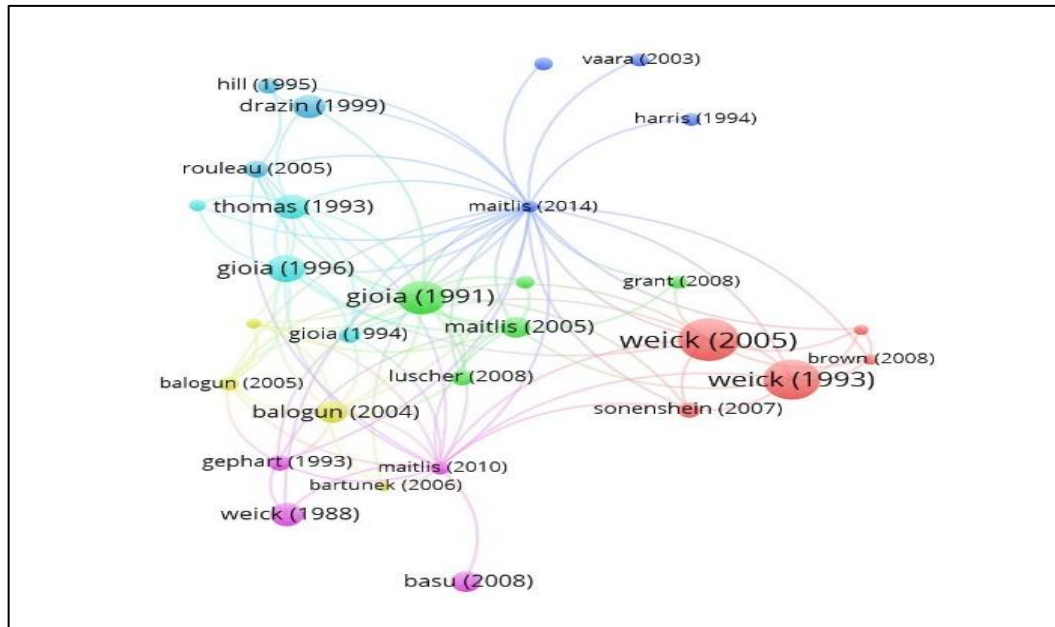


Figure 2: Documents Citations Network

Source: The authors, (2019). Extracted from the Vosviewer Program with the final sample of 235 articles.

4. Theoretical Context Sensemaking in Organizations

Sensemaking is a conversational and narrative process (Balogun & Johnson, 2004) based on social and psychological perspectives (Sonenshein, 2007) in which individuals create meaningful new, ambiguous, confusing or uncertain questions or events (Maitlis & Christianson, 2014). This sense is created by orderly efforts to interpret meanings of past events (Weick, 1993) that results in cognitive maps of the environment (Basu & Palazzo, 2008).

Stigliani and Ravasi (2012) warn that Sensemaking in Organizations is different because it must be treated in a collective way, that is, the members of the organization in this modality exchange provisional understandings and come to terms about consensual interpretations and a action's course. Thus Sensemaking group is nurtured by individual efforts of interpretation. Gephart (1997) shows that Sensemaking is fundamental to organizational behavior because Sensemaking creates and constitutes the organization and its structure as a set of assumedly shared meanings. If Sensemaking is interrupted, the organization collapses or disintegrates.

Sensemaking in Organizations can be understood as the process by which various information, insights, and ideas merge (Dougherty, Borrelli, Munir, & O'Sullivan, 2000) into a stream of organizational experiences that can be used as a stepping stone to the strategic action (Blatt, Christianson, Sutcliffe, & Rosenthal, 2006). As organizations are streaming their members use stories from past experiences to sort, label, and make sense of that flow (Weick, 2012). The process of making sense of this flow can be creative (Drazin, Glynn, & Kazanjian, 1999) and it comes down to comparing, deciding, and returning if necessary (Gioia & Chittipeddi, 1991). But members only use stories of past experiences that are plausible (Weick et al., 2005), and which are socially accepted by colleagues in the organization (Harris, 1994).

Already Rouleau (2005) states that Sensemaking is related to how managers understand, interpret and make sense for themselves based on the information about strategic change. And Vaara (2003) reports that Sensemaking highlights complex sociopsychological processes through which organizational actors interpret organizational phenomena and then build socially or enact their realities.

For Weick (1995) e Weick et al. (2005) The Sensemaking in Organizations is composed of seven perspectives: (1) Grounded in identity construction; (2) Retrospective; (3) Enactive of sensible environments; (4) Social; (5) Ongoing; (6) Focused on and by extracted cues and; (7) Driven by plausibility rather than accuracy. MacKay and Parks (2013); Sandberg and Tsoukas (2015) complemented the literature with the prospective concept and Brown et al. (2015) with concepts of macro e micro Sensemaking.

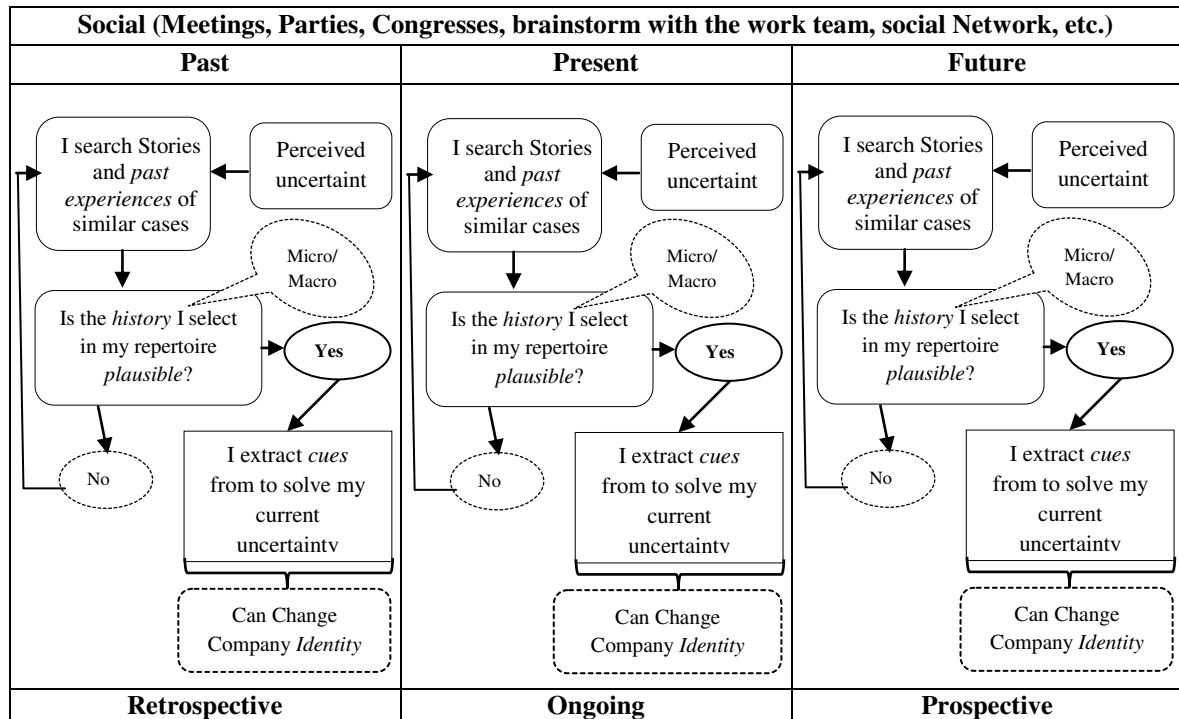


Figure 3: Sensemaking Process
Source: The Authors (2019).

Figure 3 illustrates the Sensemaking concepts drawn from bibliometric and content analysis. With this, it is possible to illustrate that *Sensemaking in Organizations* is a *macro* process because it is based on *plausible stories* and experiences of other companies that are drawn from the *social* environment, so when a company perceives an uncertainty or challenge, they searches for *past experiences* stories themselves or their partners, if history is not plausible the company will look for another plausible story (Gioia & Chittipeddi, 1991). However, if the story is plausible the company will *extract cues* to solve the current uncertainty, and the way the company chooses to overcome this current uncertainty can modify your *identity* and consequently the *future decisions* of the company.

Identity is a set of elements that the company considers to be durable, central, and distinctive as the mission and core values (Frandsen, 2017). The Sensemaking process is a flux in *ongoing* (Weick, 2012), so present reality is based on *retrospective* efforts (Weick, 1993) and all past and present efforts will can be influence the decision-making process of the company in *future decisions* (Sensemaking *prospective*).

In the sequence we will develop the framework to answer the question initially raised and thus demonstrate conceptually how entrepreneurs construct decisions about uncertainties.

5. Developing the Conceptual Framework

Figure 4 illustrates the union of the Sensemaking Theory with the Uncertainties Management in the innovation ecosystem. The union of these two approaches will be built through the stories overcome uncertainties. Overcome uncertainties are understood as situations that

cannot be measured by probabilities, but that are somehow detected by a leader, managed and solved, resulting in something positive for the company and its partners.

These stories are triggers fired in the innovation ecosystem that help construction identity of the focal company and its links. This article argues that when links of the innovation ecosystem perceive an uncertainty, they look for solutions retrospectively in stories of past experiences. These stories are drawn socially within or outside the company environment so entrepreneurs filter to identify plausible stories that inspire solutions to the current problem. The chosen solution can change the identity of the company and influence future decision-making and the innovation ecosystem. Following topics will detail this union.

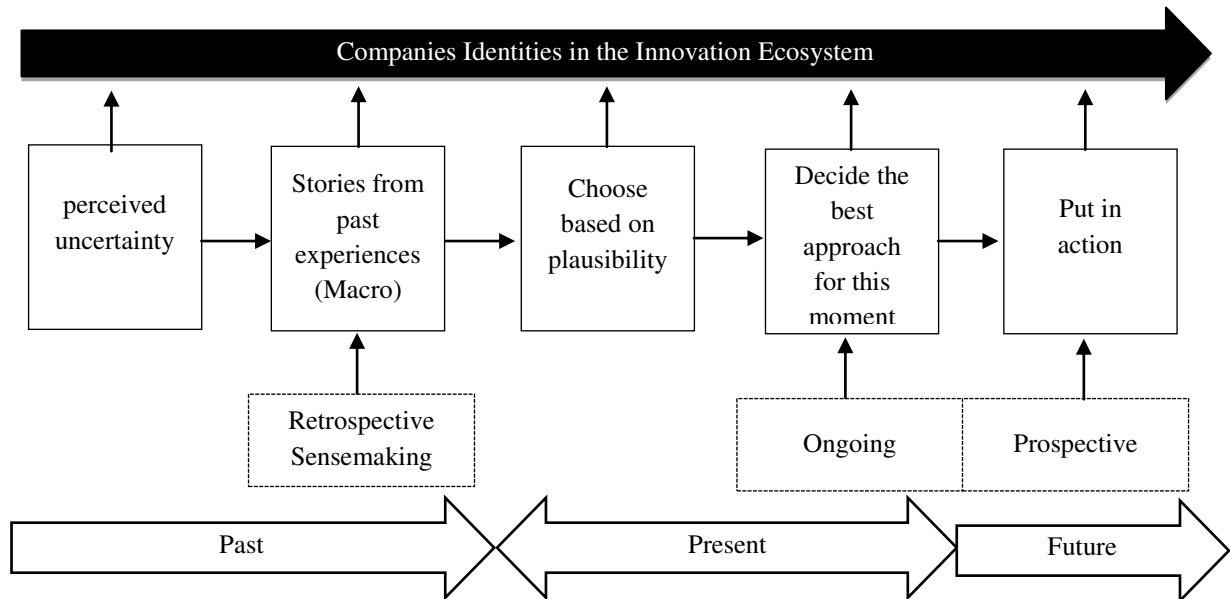


Figure 4: Sensemaking Process in Companies and Innovation Ecosystem
Source: The Authors (2018).

5.1 Plausibility and Overcome Uncertainty Stories

There is no single truth in the process of Sensemaking. Instead, there is the continuous narrative of an emerging story and observed data, being comprehensive and resilient in the face of criticism (Weick et al., 2005). Thus, the plausibility in the stories of overcome uncertainties rests on the comprehensiveness of data and information inserted in the innovation ecosystem, however, it will not be precise, being able to contain errors and biases of the experimenter and the participant of the history.

In the search for meanings people tend to describe the best stories, but never the story with accurate information and data. In addition, plausibility is perceived differently between groups. So what is plausible for a link in the innovation ecosystem may not be plausible for other links, because plausibility rests also on the listener's perception.

Innovation ecosystem leaders do not need to understand the current situation or the problems accurately to solve them, they just need to understand the circumstances that seem to be moving toward general, long-term goals. The objectives of plausibility are to ground the stories of uncertainties overcome in the innovation ecosystem and to keep Sensemaking in motion in the innovation ecosystem.

Proposition 1: The plausible stories of overcome uncertainties influence the learning cycle of the innovation ecosystem.

5.2 Retrospective Sensemaking and Overcome Uncertainty Stories

The retrospective Sensemaking process illustrated in Figure 4 is based on stories of overcome uncertainties, thus being stories of past experiences. In this sense, the uncertainties that the leaders perceive in the present are influenced by the experiences of uncertainties surpassed in the past, both of his company and of some other company whose knowledge he has had of the history of uncertainty overcome.

Thus, innovation ecosystem leaders can only decide which path to follow in the face of current uncertainty if they have some plausible past history of uncertainty surpassed similar to what they are experiencing. Therefore, the approach addressed is mainly based on the construction of narratives and stories of uncertainties overcome in the ecosystem of innovation, these narratives and histories shape our understanding of events (Weick et al., 2005).

Proposition 2: The retrospective stories of overcoming uncertainties shape the understandings of leaders and influence the present and future decisions of the innovation ecosystem.

5.3 Social Sensemaking and Overcome Uncertainty Stories

Leaders use stories from past experiences to substantiate their problems (Vough & Caza, 2017), these stories are disseminated in the innovation ecosystem through conferences, lectures, parties, meetings, classes, courses or even brainstorming. Yet the stories will only go forward in the innovation ecosystem if the speaker thinks it is plausible.

In social events, leaders often discuss the major changes of the company, and listen to the challenges of their partners and friends, through such conversations, create meaning and use new structures to understand events (Wrzesniewski, Dutton, & Debebe, 2003). In this sense, socially shared conversations in the innovation ecosystem can validate ongoing decisions presenting plausible alternatives to solve uncertainties.

Thus, the way innovation ecosystem leaders decide on the solution to a current uncertainty is shaped by stories of past experiences from other innovation ecosystem links. Although the history of uncertainty surpassed by another company may initially seem irrelevant, if leaders face similar uncertainty this story will have a greater significance (Vough & Caza, 2017).

It will also have a positive impact if the history of unsuccessful uncertainty has a successful end because it will increase the leader's optimism with the ongoing uncertainty and increase the chances of him taking a creative and efficient approach. On the other hand, if the story has a damaging ending, the leaders have become pessimistic with the probability of positively overcoming the current uncertainty. Thus, it would be ideal for leaders to have a repertoire of stories that include various strategies, so they are more likely to overcome current uncertainty positively.

Proposition 3: The construction and sharing of the stories of uncertainties overcome in the innovation ecosystem is a social phenomenon and the larger the repertoire of these stories, the greater the probability of positively overcoming uncertainty.

5.4 Enactive of Sensible Environments and Overcome Uncertainty Stories

Entrepreneurs in the innovation ecosystem exchange stories of past experiences with other entrepreneurs at social events. These stories serve as triggers when a similar uncertainty arises because the entrepreneur will remember the story and the outcome and from it will map the current environment identifying similarities and differences in the history of overcome uncertainty shared socially, from these past experiences the entrepreneur will draw a new action plan.

Therefore, the links of the innovation ecosystem usually produce part of the environment they face, because the chosen alternative to solve an uncertainty can change the processes of the company or even the type of business, often influencing the construction and modification of the organizational identity. So two important questions involve the construction of meaning: (1) What is happening here? and (2) What do I do next? The first question is to map the environment and identify the most advantageous solutions, the second question is about action. The action is treated as a cycle and not as a linear sequence (Weick et al., 2005).

In decision making, leaders outline an action plan for the next steps to be taken in the company. Therefore, the stories of uncertainties overcome are relevant to the company's action plan and to the innovation ecosystem. While they are not able to predict exactly what can happen when facing uncertainty, leaders of the innovation ecosystem, if they have a plausible history of uncertainty overcome, will follow in the footsteps of the leader who has positively overcome uncertainty. Thus, action is part of the creation of sense of stories transforming it into something objective and concrete, which can be executed.

Proposition 4: The links of the innovation ecosystem, share stories of overcome uncertainties, create a sense of the situation, define the current business environment, and outline an action plan for the company to follow in the future.

5.5 Ongoing Sensemaking and Overcome Uncertainty Stories

The process of Sensemaking in the stories of overcome uncertainties can have interruptions or gaps difficult to fill, which makes it difficult to close the story and consequently share this history in the ecosystem of innovation. However, this interruption is a positive experience because, in an attempt to end the history of uncertainty overcome, leaders end up with several possible versions. And this facilitates future plans of company actions.

Conversations in social environments, both inside and outside the company, help the entrepreneur to make sense of the uncertainty overcome and build the history of past experience. As well as share some of the experience and frustration with other entrepreneurs who may use these experiences in the future to manage their uncertainties. In this sense, Sensemaking is a cyclical process, whose communication is fundamental to its progress (Weick et al., 2005).

Proposition 5: Sensemaking of the stories of uncertainties overcome in the innovation ecosystem is a cyclical process and advances with the sharing of understanding of the links of the innovation ecosystem.

5.6 Extracted Cues and Uncertainty Overcome Stories

The stories of overcome uncertainties socially shared in the ecosystem of innovation are essential for decision making, but when applying the process of Sensemaking it is fundamental not to look at the act of deciding, but rather the circumstance or context that resulted in the action. These understandings will lead entrepreneurs to ask "how" the situation occurred instead of "why" a decision was made (Weick et al., 2005). This process of making sense helps to identify tips and standards that help determine where people are directing their efforts and where the suggestions come from.

These tips from unanswered uncertainties will help innovation ecosystem leaders make decisions about uncertainties in the present moment. Thus entrepreneurs in developing their strategic plans for solving uncertainties can search for stories of overcome uncertainties that have been shared socially, from these stories map the current environment and outline an efficient plan of action concentrating their efforts on positive results.

Proposition 6: The context of the innovation ecosystem provides clues in the stories of uncertainties overcome so that leaders can focus their efforts.

5.7 Grounded in Identity Construction and Overcome Uncertainties Stories in the Innovation Ecosystem

Entrepreneurs of the innovation ecosystem face uncertainties at all times and can only understand what has hit them if they stop to think and interpret events and their context. In order to do this, they need to look back at past events to build a story with as much data as possible from the detection of uncertainty to the present moment.

Stories of uncertainties overcome may have a positive or negative outcome, both of which are important for decision-making. These past experience stories provide clues to what the entrepreneur should or should not do in future decisions. And the way the entrepreneur chooses to solve an uncertainty influences the company's administrative and cultural processes, as well as organizational identity.

By organizational identity we define as a set of factors that are built and shaped by the founders and employees of a company, covering lasting and distinctive aspects of the company that are shared internally and externally through culture, mission and values.

These stories and the way in which a link is chosen to solve uncertainty can also influence other companies interconnected in the innovation ecosystem. So these stories of overcome socially shared uncertainties can change the identity of a focal link or the entire ecosystem of innovation.

In Figure 4 it is possible to identify that the retrospective histories of overcome uncertainties influence the present decision process of the innovation ecosystem and consequently influences and shapes prospectively future decisions. In this cyclical process of creating meaning can change the identity of the company and the ecosystem of innovation.

The construction of identity treated in Sensemaking is influenced by the lens of the leader who listens and interprets the story according to his past experiences, so an interpretive bias can occur and the same stories can be shared and understood in different ways in the same ecosystem of innovation .

Proposition 7: Retrospective stories of overcome uncertainties shape and create the identity of the links of the innovation ecosystem.

6. Findings

Figure 3 illustrates the framework created in this article. The retrospective nature of Sensemaking is represented in the first column of Figure 3, the second column of Figure 3 represents the union of the process of Sensemaking with the stories of overcome uncertainties followed by the due propositions raised in the framework. The third column of Figure 3 represents the construction of identity in the innovation ecosystem from the experimentation of the stories of overcome uncertainties. The fourth column of Figure 3 illustrates the retrospective nature of Sensemaking, which, from lived histories, achieves a strategic plan for the future, and the last column brings the results of framework, which argues that from the strategic plan the leaders they may choose to proceed or return and that Sensemaking is a cyclical process. Being thus the basis of it are the retrospective histories shared in the innovation ecosystem.

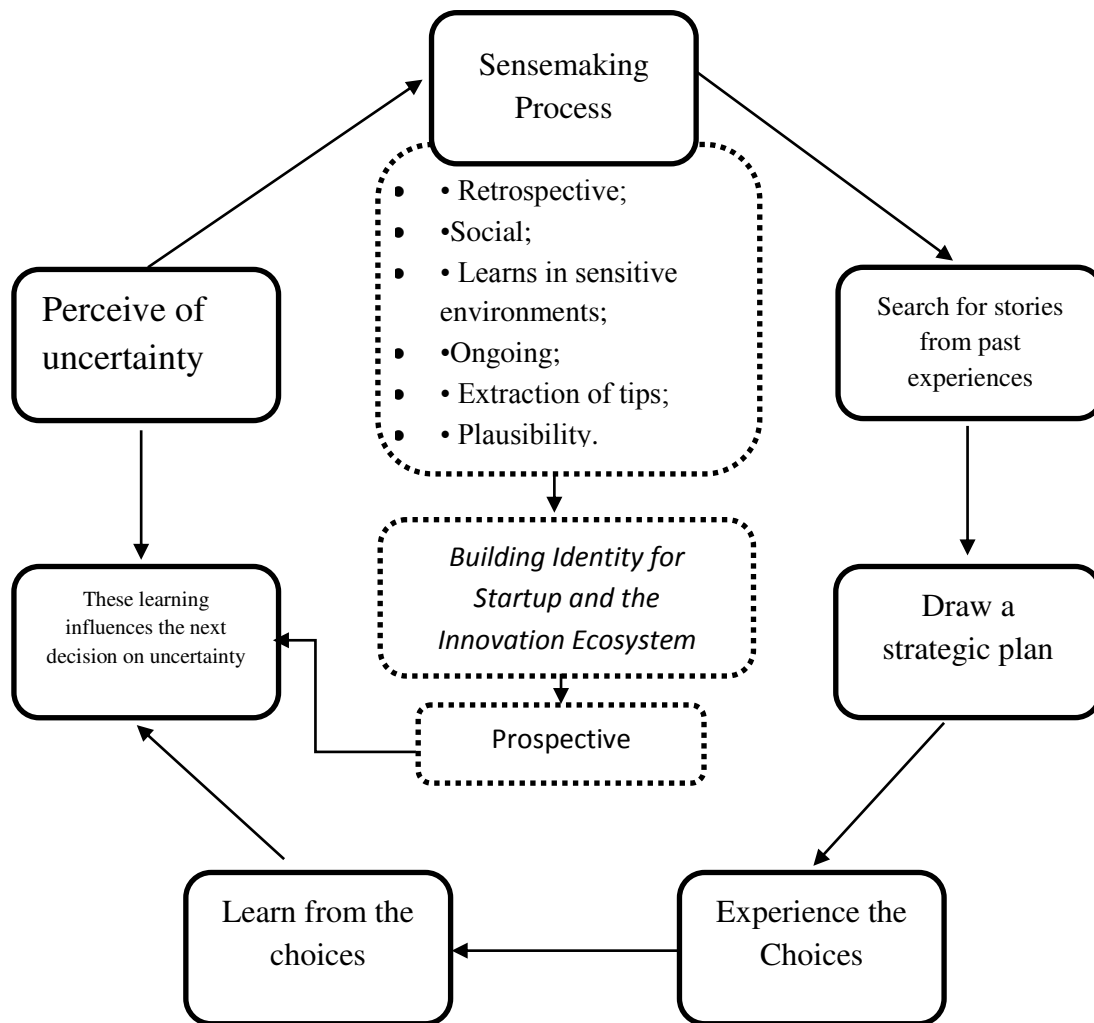


Figure 3: The development and results of the Overcome Uncertainty Stories in the Innovation Ecosystem
Source: Authors (2018).

7. Conclusions

The theory of Sensemaking supports the uncertainties management and we prove this by uniting the main characteristics proposed by Weick (1995) and Weick, Sutcliffe, and Obstfeld (2005) with the stories of uncertainties overcome in the innovation ecosystem. Future work can empirically test this theory through case studies and describing a more practical way managers can use this approach to create analytical meaning of uncertainties and thus manage them efficiently through strategic planning, even though uncertainties cannot be measured by means of probability, they can be planned deeply and their comprehension makes easier the intuitive decision-making of the quotidian.

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