

# INTRODUCTION

This chapter contains the following sections: Research focus, Innovation and its challenges, Research approach, what this book is about and the outline of the document which concludes the section.

There is a vast amount of literature regarding the concept of innovation. The successful launch of innovation appears as a determinant for a firm to achieve high profit margins, and to gain or maintain competitive advantage (e.g., Rosted, 2005). Factors such as price competition, research, new technology and newly discovered user needs all relate to successful innovations (Rosted, 2005). Gopalakrishnan and Bierly (2001) reveal the causal relationship between organizational performance and innovation and, in line with Leifer et al. (2000), argue that innovations have the potential for “unprecedented performance” (p. 102). While innovation can lead to performance, the unknowns and difficulties of innovation impede a firm's ability to achieve it and affect its business performance (Leifer et al., 2000). The reason behind this is that innovations are often complex (Leifer et al., 2000; Morone, 1993). This confuses and unsettles firms which, in many cases, are confronted with uncertainty and evaluate possible innovations using traditional methods and criteria which is, overall, a costly process (Leifer et al., 2000). The problem is that managers do not understand how to infuse their organizations with the innovative practices of agile startups (Leifer et al., 2000). Innovative companies are those whose corporate strategies, practices and philosophies are shaped by technological opportunities (Morone, 1993). While innovators may be unsure

about the performance, parameters, attributes, and features of new technologies, customers may not recognize an innovation's advantages or may lack confidence in the functionality of innovative devices. Potential customers may feel overwhelmed because innovations have no established place in their preferences, even if they claim to deliver improved quality or multiple applications of innovation. Maintaining a technological advantage thus depends on how well a firm can incorporate the customers' perspectives into its innovation development process (Zhou et al., 2005; Dutta et al., 1999).

To enhance the success of an innovation, Von Hippel (1988) suggests focusing on customer involvement. Alongside this, the literature (Kanter, 1997; McQuarrie, 1993; Souder et al., 1997) shows that acquiring customer knowledge improves or adjusts a firm's own technological knowledge, and that customer (Tajeddini, Trueman & Larsen, 2006; Herrmann, Gassmann & Eisert, 2007) and employee involvement (Ordanini & Parasuraman, 2011; Engen & Holen, 2014) improves the development of innovations.

Lynn et al. (1996) argue that "conventional market analysis" is not sufficient for the development of innovations, because there is simply no information available on the market. This is especially noticeable in the case of radical innovations, as they require a new technology or a new market strategy. Therefore, the information needs of innovators cannot be found in the market, because they cannot be expressed by customers. This missing information is referred to in the literature as an "information defect" (Spender, 1993; Mullins & Sutherland, 1998), which generates unknowns and difficulties for developing innovations.

Customer orientation is a group of actions taken by a business to make the needs and requirements of the customer their main priority and assign its sales department and its employees to this purpose (Racela, 2014). As opposed to the concept of customer orientation, customer involvement which refers to interacting with the customer to a greater extent. Customer involvement is a direct communication with customers that allows observing the problems encountered by customers when using products, services or technologies (Leonard & Rayport, 1997).

Customer collaboration is the process of creating new products and services with the support of the customers (Greer & Lei, 2012). The study chooses the term customer involvement to describe the interaction with customers. When customer involvement is set in an innovation context, it is similar to customer collaboration as defined by Greer and Lei (2012). As the topic of the study is centered on innovation, both concepts can be included.

If employees are involved in the innovation process, this can result in its improvement (Ordanini & Parasuraman, 2011). The possibility of employee idea collaboration is related, to a certain extent, to innovation (Engen & Holen, 2014). Some companies empower their employees to be product champions and create promising and complex new products and services (Howell & Higgins, 1990). The group of employees delegated to researching innovation must accumulate knowledge in order to understand the target phenomenon well enough to articulate and codify it (Zollo & Winter, 2002).

In order to surpass the information defect, the company must obtain the necessary missing information. An information acquisition process can do that. The information should be collected from customers with the help of employees. The approach to include customers is customer involvement that allows direct interaction with them. The skill of the employees determines the quality of information that is obtained. The customers and employees have an approximately equal contribution to the information acquisition process.

The major focus of this book is on the information acquisition process that supports the development of technological innovations. The next section will discuss the research area of interest.

### 1. RESEARCH FOCUS

Innovation can be examined from an innovation as output or the innovation process perspective. Innovation as an output is based on the capabilities and factors that influence the output of the company. Relevant capabilities can help a company launch a new product to market (Zander & Kogut, 1995). The capabilities can also refer to the efficiency and quality improvements

that help to ensure that products respond to customer needs, while reducing development costs (Nair, 2006). Seeing innovation as an output has the drawback that it focuses on identifying antecedents of factors that allow a company to innovate. The factors or inputs that influence innovation are not outlined extensively, as firms with similar inputs can produce significantly different outputs, depending on how they are managed or organized.

Innovation as output has some drawbacks, as it is focused on identifying antecedents or factors that determine a company to excel at innovation. In this way, there is no focus on the internal processes of the company, as innovation is simply an independent variable, determined by a number of factors. Even if these factors come from the company, this remains a linear causality linkage, whereby any company that has these factors is in a position to innovate, which does not conform to reality. Companies with similar inputs can produce significantly different outputs, depending on how they are organized or managed.

Considering innovation as output also has the drawback that is a results-oriented approach. Studies that examine innovation will use documented innovation cases in specific companies but other companies which have the potential to innovate will be ignored. From a certain viewpoint, this is excusable, because there are many methodological difficulties when studying companies with potential to obtain innovative products. One is the size argument, as a great number of innovative companies have to be included in the research. Another is the time argument, as some companies can take up to a decade before obtaining an innovative product.

The innovation as output perspective is related to variance theory which is a linear approach. A significant drawback is that variance theory does not handle nonlinear dynamics well, along with the complexities of innovation. The results are also dependent on the context from where the data were initially collected. Because of the mentioned drawbacks, I thus chose to concentrate on innovation as a process. The process perspective deals with the emergence, development and change of an innovation carried out inside the company. Innovation as a process can

explain the mechanism behind innovation, considering all the stages, dynamics and actors involved.

Process theory has the advantage of considering the order in which events unfold and the influence of groups of events and contexts (Poole et al., 2000). In process theory, process means a sequence of events that is indicative of the evolution of the considered subjects (Van de Ven, 1992). Based on the chosen approach, the events can be supported by a narrative which can offer a more thorough understanding of the subject (Garud et al., 2014). The processual interpretation of innovation was considered to be a suitable approach for the study because of these advantages. Of all the studies that consider innovation as a process, none were found that identified a clear process for innovation development and management that took into consideration information acquisition (Gupta et al., 2007).

Process means a sequence of events that is indicative of the evolution of the considered subjects (Van de Ven, 1992). The present book uses the same definition for process. It considers the internal processes of innovation development of the company. The innovation cycle is enabled by resource investments and the organizational structure of the company and unfolds in a setting that is shaped by internal focus and institutional rules (Van de Ven et al., 2000). A process theory uses the same definition for process to reach the precision to tell managers exactly what to do, but it can produce some principles to explain a broad class of paths and sequences that are useful to manage innovation (Van de Ven et al., 2000).

The focus area of interest is to identify the mechanism of how innovation development works at the activity level, which is the operational level where information from customers can be obtained. The purpose of the study is to routinize part of the innovation process that corresponds to information collection and determines the activities conducive to this purpose. The advantage of routinizing innovation is that companies already have routines in place to carry out operational activities, so it can be shown that performing the routines leads to their change and clears a path toward innovation. The study does not attempt to routinize the entire innovation process because that would be a simplistic

approach to an activity that requires collaboration between customers and producers, cooperation between departments and creativity. Routines are important as they show how the first part of the innovation process is organized. The seven routines or iterative activities identified in this study are: brainstorming, structuring problem, collecting data, reflecting information, exchanging knowledge, filtering knowledge and feedback.

Knowledge is central to successful innovation development (Darroch & McNaughton, 2002). Knowledge management has been recently linked with creativity, interpreted as a capability that results in new knowledge and can support the innovation process (Kazanjian & Drazin, 2012). Creative tasks encourage cooperation and require knowledge to be shared (Kazanjian, Drazin & Glynn, 2002). Although knowledge is important for the creation of innovation, it is not the first step. The initial step of the innovation process is the collection of information through various activities of the company. The activities illustrate that there are multiple ways to collect information and several routines accomplish that.

A number of other approaches can be identified that describe how knowledge can influence innovation. One is the inbound innovation approach, through which a company increases its knowledge base by incorporating outside knowledge through external relationships (Li-Ying, 2016). It has also been documented how this inbound open innovation is a driver for different typologies of environmental innovation, such as compliance versus voluntary innovation and market versus production innovations (Li-Ying, Mothe & Nguyen-Thi, 2018). This approach considers that the possibilities to innovate are placed outside the company's boundaries, as they search for new knowledge to combine with their existing technologies.

This is certainly a valid approach that is supported by a considerable stream of literature; nevertheless, this book considers innovation as something that happens inside company boundaries. The company can collect data and information from the outside, but the main aspect is to identify how a company obtains knowledge internally.

Inbound innovation is defined as “a process of acquiring or sourcing, such that the firm discovers, acquires and uses information or resources developed by external partners” (Mothe, Nguyen-Thi & Triguero, 2018). It can be classified in three separate modes of openness: acquiring, sharing and sourcing. The influence of the three categories on environmental product and process innovations has been investigated in the literature (Mothe, Nguyen-Thi & Triguero, 2018). Acquisition refers to purchasing technology or external R&D from the market, sharing consists of collaboration with other companies to gain skills or knowledge, and sourcing describes the extent to which companies can use external information sources or search for freely available external ideas or knowledge.

Innovation sourcing is the category that is the closest to this research, as customers are an important market source. It can be argued that sourcing is more related to obtaining information as opposed to knowledge, because of its non-pecuniary nature. This is different to simply purchasing knowledge, such as a new technology or contacting another company to conduct R&D. The customers also contribute with information as opposed to knowledge, as their feedback has a low degree of complexity and it has to be integrated by the company in order for it to be usable.

Data are collections of symbols and signs that are useful only when turned in a practical and applicable format (Rowley & Hartley, 2006). Information is the resolution of uncertainty and states what an entity is, the nature of that entity as well as the essentiality of its properties (Bateson, 1972). Knowledge is an intangible asset, has no boundaries, is context-specific and carries value only if used at the right time and place (Nonaka & Konno, 1998).

The study considers data, information and knowledge as separate concepts. Data simply describes the quantity or quality of an object or phenomenon. Information consists of organized and structured data that have been processed so it has relevance for a purpose (Rowley, 2007). Information becomes knowledge when it is connected to a specific human context (Alavi & Leidner, 1999). This research examines innovation starting with the collection of information and data and not knowledge

management. The concept of knowledge management is important and is included in this research but is an intermediate step in the innovation process.

Information can be converted to knowledge by the company by assigning it to a specific context and linking it with an organizational, administrative or economic purpose. Information has to be integrated by the company and also be of some use in order to be turned into knowledge (Hayes & Walsham, 2003). In the context of innovation, knowledge management becomes the mechanism through which valuable corporate assets are created and maintained (Booker et al., 2008). Because knowledge is connected to a specific context or human experience, it has greater applicability and is easier to put into practice.

The information acquisition process that supports innovation is designed in this study to have two important components: customer involvement and employee involvement. This classification is not exhaustive, and its reasoning is found in literature. A direct interaction with customers allows identifying unanticipated or latent needs by observing the problems encountered by customers when using existing products, services or technologies (Leonard & Rayport, 1997). Indeed, companies often involve customers in innovation development (Da Mota Pedrosa, 2012).

There are studies that state the importance of involving employees in the innovation process (Ordanini & Parasuraman, 2011). The employees that are likely to support innovation are those who interact directly with customers and know how the product and service offerings are perceived by the market. There are several ways to involve employees in the innovation process. Employee idea collaboration is related to innovation (Engen & Holen, 2014). There is also the model of Sundbo and Gallouj (2000), where innovation in services is accomplished by employees acting as corporate entrepreneurs with management supervision. The literature has examined how a skilled workforce supports innovation (Tellis, Prabhu & Chandy, 2009).

The next section will elaborate on the problems companies encounter when confronted with innovation, arguing that the information defect plays a major role for both the customer as well as the innovator.



## 2. INNOVATION AND ITS CHALLENGES

There is no innovation development model that starts from the information acquisition stage as most are centered on knowledge without detailing how it is transformed or obtained. There are studies, such as Lawer (2005), that examine how customer knowledge management influences new product development. If the innovation development process is examined from the information acquisition stage, there is the advantage of determining the activities of information collection that show how it is carried out and explain knowledge conversion.

The gap in the literature is that while there are plenty of studies that outline the benefits of involving the customer in innovation, there are only a few that state how this can be achieved, one of them being Greer and Lei (2012). Customer involvement can be simple, such as surveys or interviews, or more complex, such as including lead users with technical knowledge in product development. There is no statement of how simple activities of customer involvement can be routinized and contribute to the innovation process.

A wide variety of literature focuses on the importance of drawing in knowledge from customers, innovators and other stakeholders in order to increase the volume of depth of the input of innovation cycles (Sanchez & Mahoney, 1996; Goh, 2005). Product and organization design can benefit from customer involvement as it allows a new approach to knowledge management and organizational learning (Sanchez & Mahoney, 1996). Innovation management should introduce concepts on how to harness knowledge management practices for new product development processes (Goh, 2005). This study explains that customers, innovators and other stakeholders are sources of information, not knowledge, and this information first has to be collected, stored and organized in order to ascertain its relevance.

The Nonaka model of knowledge conversion is well established, and its acceptance of dynamism is very suitable in the context of innovation (Nonaka & Takeuchi, 1995). A model of innovation could use it as a reference but also state that there are multiple sources of information feeding into the innovation cycle. The second addition would be to recognize that these sources are

not only visited once but repeatedly through the development of innovation and this iterative process can be explained with activities.

Another model of knowledge conversion is represented by the continuum between tacit and explicit knowledge (Nonaka & von Krogh, 2009). Explicit knowledge is objective, rational and it does not depend on context, while tacit knowledge is subjective, experiential and depends on context. In this study, knowledge conversion refers to how information is adapted and interpreted in order to become knowledge and is concerned with the change from tacit to explicit knowledge only in the case of employees, to a lesser extent.

Tacit knowledge can be considered an important asset of the company as it takes a long time to collect it and cannot be easily converted into an explicit variant. Competitive advantage can be obtained from tacit knowledge which can be classified as: conscious, automatic and communal (Spender, 1993). The impressive returns of rapidly changing markets are counterbalanced by a significant level of risk. The involvement of prospective customers in new product development lowers this risk by uncovering consumer needs and market opportunities (Mullins & Sutherland, 1998).

Vaccaro, Veloso and Brusoni (2009) examine the organizational knowledge creation process in two virtual teams that are developing products. They use Nonaka's SECI (Socialization, Externalization, Combination, Internalization) model of knowledge creation to identify how virtual knowledge processes allow new ways of individual and organizational knowledge creation. Virtual technologies allow not only knowledge codification but also the transfer and creation of new knowledge. This study is also based on the Nonaka model; however, it simply considers it a starting point and then departs from it by including an information collection process and activities of customer and employee involvement.

There is also the question of whether knowledge influences innovation or innovation influences knowledge. It is true that knowledge influences innovation as recombining and extending existing knowledge allows companies to take advantage

of opportunities in new areas, often outside their industry (Kazanjian & Drazin, 2012). Customer knowledge management also leads to increased creation value and higher innovation capabilities (Lawer, 2005). The opposite is also true that innovation influences knowledge. Knowledge is not gleaned from the customers and other sources only once at the beginning of the process, as the innovation process becomes iterative and knowledge is reused (Majchrzak et al., 2003). In this way both assertions are true.

The literature has established that customer involvement supports innovation. Slater and Narver (2000) state that involving customers allows companies to identify latent needs and unserved markets and provides them with an incentive for learning and a market perspective on innovation. Coviello and Joseph (2012) argue that customer involvement has a positive contribution toward the new product development process. A growing number of studies agree that having a customer orientation supports innovation development with learning processes (Tajeddini et al., 2006; Herrman et al., 2007). A customer orientation has been proven to support performance and the level of innovativeness in each company (Tajeddini et al., 2006). The products that result from innovation can change the balance of power in existing markets and even create new markets (Herrman et al., 2007).

Customer involvement at the innovation development level can address the information defect. Because customers are unable to express their requirements clearly, it is difficult to obtain information about future innovations from common market data (Spender, 1993; Mullins & Sutherland, 1998). Knowing how to integrate customers into the innovation development process will allow a company to surpass the information defect by obtaining better information about latent needs, problems when using products and eventual opportunities.

Information acquisition can support customer involvement by making it possible to better communicate with them about their problems and opinions (Bilgram et al., 2008; Franke et al., 2006; von Hippel, 1988; Lilien et al., 2002). Integrating lead users is helpful for companies, as it reduces the risk of failure at the market

of innovative products (Bilgram et al., 2008). Lead user theory is confirmed by examining product modification and development by users and how they can be part of an innovation (Franke et al., 2006). The view that innovations are usually developed by product manufacturers has been challenged, as the innovation process is distributed across users, manufacturers and other actors (von Hippel, 1988). Including lead users in the development process allows the company to collect information about both needs and solutions for innovation (Lilien et al., 2002).

An additional problem occurs when customers are not automatically convinced about the merits of the new innovation. Innovations transcend buyers' routine-based decision making (Anderson & Narus, 2003), and customers are not automatically familiarized with the new characteristics related to aspects such as function, reliability and acceptance by the public. Customers lack a frame of reference for considering the superior characteristics of the product in question in their selection. To confront the information defect discussed, the literature suggests involving the customer in the development of innovations (Atuahene-Gima et al., 2005; Lukas & Ferrell, 2000; Herrmann et al., 2007; von Hippel, 2005). As a result of technological improvements, users can increasingly develop their own products and services. Innovation processes should be redesigned based on this and companies should seek out innovations developed by users (von Hippel, 2005).

Employees also have an important role to play in the development of innovations. They store, organize and interpret market data; therefore, this study is based on the proposition that without employee involvement the involvement of customers would be insignificant and not usable. Employees that have relevant skills can combine market information with technological information and build a path toward innovation.

There are departments other than R&D that can contribute to innovation, such as sales, accounting or customer support. Employees who are not usually responsible for identifying new solutions can be asked to state their opinion. A diverse base of employees working toward innovation makes it more likely to achieve it (Birkinshaw et al., 2011). There are also studies about

innovation in services, such as Sundbo and Gallouj (2015). In a number of innovation patterns employees are found to have a pivotal role. In knowledge intensive services, the main contributing factors of innovation are individual skills and competencies.

There is also the question about the best way to involve employees in the innovation process. One approach is that the organizational group that is assigned to innovation should be physically and culturally separated from the rest of the company, in order to ensure the best results (Benner & Tushman, 2003). An alternative way is to establish a separate organizational group and change the organizational structure in order to develop processes and tools that support more novel ideas (Kelley, 2009).

Routines are included in this study as they are supportive of innovation. A general definition of routines is that they are repetitive, recognizable patterns of interdependent actions, carried out by multiple actors (Feldman & Pentland, 2003). Another interpretation is that they are the best rules and procedures implemented by a company in a specific period and in a specific environment (Becker & Zirpoli, 2008). Setting up suitable routines will allow the company to be in a position to innovate, as all the operational activities will partly contribute toward this purpose (Edmondson et al., 2001). Managers are responsible to oversee the influence of routines on innovation. If they see that innovation is discouraged they can, to a certain extent, implement changes to support and promote it in the company.

A similar concept with routines consists of dynamic capabilities. These are a learned and stable pattern of collective activities that help to modify routines for improved effectiveness (Zollo & Winter, 2002). This study does not use the term dynamic capabilities as the term routine is considered to suffice. The reason being that routines are already a source of stability and change and an additional term to explain their evolution is not required, at least in this specific research project.

The potential of change is present, and this is made obvious by routines being the product of organizational learning (Argote, 1999). This process is meant to reduce variability, ensure standardization and prevent failure. Routines are a product of change and their flexibility or inflexibility in a specific period is

influenced by the business environment and if there is a reason for the company to update its policies and procedures (Pentland, 1995).

Feedback loops are included to illustrate the iterative and repetitive nature of routines. The information acquisition process consists in activities of customer and employee involvement that can be represented through feedback loops and are similar to routines. A number of individuals in an organization undertake repetitive assignments that they have to complete and which are not involved directly in long development processes, so feedback loops enable their contribution toward innovation.

Feedback is defined as the amount needed to fill a gap to a reference value (Ramaprasad, 1983). A feedback loop forms a closed sequence of action and information (Richardson & Pugh, 1981). Feedback loops are applied to management systems in order to better understand their behavior.

To home in on the problem of the information acquisition process that supports innovation at the feedback loop and activity level, this research raises the following research question:

*How does information acquisition support the innovation process?*

In order to answer this research question, it was broken down into two supporting sub-research questions:

*What are the routines associated with customer and employee involvement in the information acquisition process?*

*How is the information collected from customers and employees converted into knowledge?*

A research objective is to construct a model that is applicable for a number of industries, hence the reason for qualitative rather than quantitative data. There is no clear focus on one industry in particular, so there is no detailed technical examination. Another research objective is to find and illustrate the underlying principles of customer involvement, employee involvement and knowledge collection that can be applied to a wide range of companies. Every company has skilled individuals, but rather than the study being centered on how they work, it is based

on how their work is organized and on what they work toward. Customer involvement can identify a clear target that the company can put resources in to reaching. Once the target is identified, the company must rely on its employees to develop solutions that can attain it.

### 3. RESEARCH APPROACH

The research approach depends on the chosen subject to be examined and there is always more than one way of constructing a methodology to address the research questions at hand. The important element is to ensure that the approach ultimately taken is carefully justified and represents the best means of combining intellectual rigor with that of meeting the research objectives. In the case of this research project, to an extent, the research aims to guide the selection of the methodology. The overall aim of this project is to provide a model of innovation management that can be deployed in commercial organizations; a model that outlines general issues that will be adaptable enough to be used consistently over time in different settings.

This project deploys a qualitative data collection process. When constructing a model, it is often easy to be too descriptive, to simply provide a set of instructions that produce an output, but not to explain how and why those instructions do what they do, and why that is better than other options. It is not possible within the space of a single study to make such an attempt with the scientific method, so this project will use qualitative data that will illuminate and endow the model with explanatory power as well as practical value, not least because this assists with the academic quality of the research, in terms of being able to locate the model generated, here, among a wider canon of work on innovation and, therefore, to very carefully describe the unique contribution that this thesis will make.

Moreover, there are some questions with regard to the nature of the research environment that need to be addressed at this juncture. The literature review noted that one of the difficulties with innovation is that the objects of analysis are not necessarily clear; there is a substantial level of debate as to what the factors of innovation actually are. Therefore, this research methodology

needs to take a two-phase approach to developing the model of innovation that is one of the key research outputs.

The data collected are mostly qualitative because when studying innovation, the objects of analysis are not necessarily clear and quantifiable. For example, customer involvement cannot be quantified because the quality of knowledge obtained is more important than the number of individuals interviewed. Finding the right methods to involve customers will result in valuable knowledge that can be used to modify the processes and policies of the company. Qualitative data are important for this study in order to find the best way to illustrate the information acquisition process of customer involvement.

The following section discusses the scope of this book and the intended contribution to the scholarly literature in the field.

#### 4. CONTENT OF THE BOOK

The study examines the innovation process starting with information acquisition. It is agreed in the literature that knowledge supports innovation (Kazanjian & Drazin, 2012). Starting with information acquisition results in a longer process which can be studied in more detail and more extensively.

The research is not concerned only with a change in terminology by replacing knowledge with information and stating that a new model is obtained. Choosing the term information has a series of advantages. One is that it allows examining the activities of information acquisition that are identified with routines. Another is that a greater number of departments and individuals are included in the study as they are likely to contribute to the innovation process.

The innovation process examined in this study contains two segments. One starts with information collection and ends with converting it to knowledge. The other starts with knowledge and concludes with obtaining innovation. The first segment is composed of simple activities that are operational, most of which can be routinized. The second segment is composed of complex activities that are technical, creative or specialized and can be routinized to a lesser extent. The first segment is less examined



in the literature but is supportive of innovation. Innovation is not usually considered as something that can be routinized as it is a complex process. Performing a routine or following a set number of steps does not guarantee innovation. This study shows that at least part of the innovation process can be routinized, and this results in obtaining knowledge. The next part is combining and extending this knowledge in creative ways in order to achieve innovation. Not all companies can afford to involve the customer directly in their internal processes. The advantage is that even companies that only use simple activities to include the customer such as interviews and surveys can be in a position to innovate.

The problem of examining the innovation process starting with knowledge and not with information is that what it is based on is not clear. Companies can collect knowledge in several ways and from a lot of sources, but it is also a question of what activities are best for this purpose. By starting with information, the knowledge creation process can also be considered as companies are choosing what is relevant from what is not, what is useful from what is not and what is applicable from what is not. It is also shown that organizational responsibilities support creative ones that search for innovation. This is accomplished by collecting, organizing and sorting information so it can be converted to knowledge and can support innovation.

Extensive research supports customer involvement in the processes of innovation (Atuahene-Gima et al., 2005; Lukas & Ferrell, 2000; Herrmann et al., 2007). The contribution of this study is that it examines ways in which customers can be involved in order to obtain information from them and convert it to knowledge with the support of employees. Customers are usually involved early or late in the development process, rather than in between (Olson & Blake, 2001). Common activities of interaction include exchanging information, group problem solving and testing (Laage-Hellman et al., 2014). Involving customers and learning from them allows the company to obtain detailed information structures, causal linkages between different elements and capabilities for complex decision making (Cohen & Levinthal, 1990).

Employees can be involved in several ways in the innovation process. One is by composing an organizational group responsible for achieving innovation that is separate from the rest of the company (Benner & Tushman, 2003). Another approach is to change the organizational structure in order to develop processes and tools to support more novel ideas (Kelley, 2009). Having a base of employees actively contributing to innovation makes it more likely to achieve it and create value outside the usual areas (Birkinshaw et al., 2011). The capabilities and skills of the employees will determine the quality of customer involvement. Customers will then influence the amount and quality of information obtained by the company in order to achieve innovation.

This study analyzes and elaborates on innovations using case studies from information technology, biotechnology, the banking industry and expert interviews from the information technology, telecommunications and the chemical industries. It analyzes mechanisms that regulate customer involvement in order to enhance current understanding on innovations and to further help in ameliorating the information acquisition process. Its contribution to theory is in the form of feedback loop models as they apply to the non-linearity of innovation (Kline & Rosenberg, 1986). It contributes to the stream of innovation as a process, illustrating with feedback loops the routines of the information acquisition process at the activity or operational level explaining “how a sequence of events unfolds over time” (Van de Ven & Poole, 2005, p. 1382). Its contribution to practice consists of providing organizations with a framework for managing innovation development through customer involvement and employee involvement.

The practical advantages of the study are that it provides companies with a clear distinction between the stages of collecting information and helps managers to incrementally work and verify each stage, before continuing to the next. Thus, errors and redundant work can be avoided which, in turn, increases overall efficiency. The increase in efficiency, entailed by individual innovations, means that a firm can better allocate and manage its resources, such as labor, capital and infrastructure, and therefore, increase its capacity to develop further innovations.

This study uses feedback loops and considers them as an optimal way to explain the process of innovation, because they allow identification of the relations between steps while, at the same time, illustrating interdependencies and non-linear characteristics. The interaction between innovations and the market led to the idea of this study, to use feedback loops in order to explain the activities related to customer and employee involvement. This research contributes to the literature by studying the feedback loops and activities of agent involvement.

This study also focuses on the information acquisition process that supports knowledge management. Information is collected from customers, as they are the best source, and their feedback illustrates their preferences. The information acquisition process is examined in detail as customer involvement and employee involvement are classified into seven activities that have the objective of collecting information, structuring it or converting it to knowledge.

## 5. OUTLINE OF THE DOCUMENT

This study continues in the four remaining chapters. Chapter 1 elaborates and investigates the problem of the information acquisition process that supports innovation and establishes the foundations of the investigation. It provides the definition of innovation that will be used throughout the study. It examines innovation and routines in order to determine if there is a relation of causality and how it can be described in the most precise way. Chapter 1 reviews the literature in order to identify theories that function as the body of concepts to find answers for the development of innovation. Chapter 1 also reviews prior research and identifies gaps that must be filled, in order to answer this study's research question. At the end of Chapter 1, in Section 5, the conceptual framework presents the concepts this study will use in order to answer the research question. These are innovation, the information acquisition process, knowledge management, routines and feedback loops. The section links between concepts, states how these notions relate and the influences some have on others in order to create a model that will incorporate them in the correct way.

Chapter 2 presents briefly the study's methodology, research strategy, and research method. It explains why the investigation combines a case study approach with modeling causal loop diagrams. It describes data sources, collection and analysis. It establishes the validity of this research by demonstrating that its data is pertinent and its findings replicable.

Chapter 3 presents the findings regarding knowledge flows of how knowledge circulates through the company, the knowledge conversion, how information is transformed to knowledge and the innovation process model of how knowledge is transformed from invention through feedback loops to feed innovation with appropriate knowledge.

Chapter 4 discusses the study's qualitative results and shows that they answer the research questions raised. It discusses how these results affect theory-building in the relevant research area and translates its findings into strategic insights for decision-makers to put into practice.

The conclusion presents the contribution, the limitations and the directions for future research of this study.