ORGANIZATIONAL LEARNING, INNOVATION AND INTERNATIONALIZATION: A COMPLEX SYSTEM MODEL

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ABSTRACT

Research on organizational learning, innovation and internationalization has traditionally linked these concepts through linear causality, by considering any one of them as the cause of another, an approach that might be considered contradictory and static. In this paper, we aim to clarify these relationships and propose a dynamic theoretical model that has mutual causality at its core and is based on ideas originating in complexity theory. Our final model results from case studies of two clothing sector firms. We consider that the three concepts constitute a complex system and can adapt and transcend, as any alteration can take the system to the edge of chaos. Adaptability is fostered by concentration, improvement and discussion. Transcendence is fostered by attention, dialogue and inquiry. The different paces of our two case study companies led their systems to two different models: the incremental complex adaptive system model and the global complex generative system model. The incremental model is characterized by adaptive learning, incremental innovation and low internationalization; and the global system is characterized by generative learning, radical innovation and global internationalization. The paper ends with an exploration of the academic and management implications of our model.

Keywords: organizational learning, innovation, internationalization, complexity.

INTRODUCTION

Organizational learning, innovation and internationalization are key ingredients for the knowledge-based economy in the age of globalization. We are leaving behind an industrial age based on the transformation of raw materials into finished goods to enter the age of the creative knowledge-based society, in which organizations must continually break down mental and physical barriers in order to learn, innovate and internationalize. Organizational learning, innovation and internationalization imply novelty or new actions, views, activities or behaviors developed by organizations.

In recent years, research on organizational learning, innovation and internationalization has linked these three concepts through linear causality (e.g., Molero, 1998; Alegre and Chiva, 2008), where one concept causes another, but the latter has no effect on the former. In so doing, authors are taking a deterministic world-view in which the universe is no more than a chain of events following one after another according to the law of cause and effect. Furthermore, and given that some papers conclude that one concept affects another, and other papers find the opposite, this body of research could be considered contradictory or inconsistent. It may also be regarded as static because it does not thoroughly explore the evolution of these relationships. Therefore, a new approach is required to clarify and understand the dynamics of these relationships.

As Aristotle (350 BC) suggested, things can be causes of one another, reciprocally causing each other, which is known as reciprocal, mutual or circular causality, a relation of mutual dependence, action, or influence of cause and effect. Maruyama (1963) considers mutual causal systems to be those whose elements influence each other, either

simultaneously or alternatingly. Consequently, these concepts may require us to move beyond linear causality, reductionism and determinism, to adopt a new, more complex and holistic paradigm. In sum, a paradigm shift, from lines to circles. This new paradigm is based on a world-view characterized by certain epistemological and ontological beliefs such as holism and mutual causality (Simon, 1996; Tsoukas, 1998; Anderson, 1999; Dent and Powley, 2004). Tsoukas (1998: 293) justifies the appearance of a new scientific approach, namely complexity theory, as follows: "If nature turns out to be much less deterministic than we hitherto thought…then perhaps our hitherto mechanistic approach to understanding the messiness we normally associate with the social world may need revising."

Within this new and complex paradigm, we suggest that the concept of complex systems, an essential topic within this literature (Simon, 1996), may be a useful starting point for understanding the way organizational learning, innovation and internationalization interact and evolve, since it stresses the importance of mutual causality and interconnections.

Thus, complex systems might help us to frame the relationships among the three concepts (Miles and Huberman, 1994). In so doing, we will follow a metaphorical approach (Tsoukas 1998; Houchin and MacLean 2005), which emphasizes the behavior or characteristics of complex systems. We will therefore consider that organizational learning, innovation and internationalization constitute a complex system. Complex systems are made up of heterogeneous elements that interrelate with one another and with their surroundings (Simon, 1996; Anderson, 1999). Their complexity resides in their diversity, as they are made up of several interconnected elements. Chiva et al.

(2010) distinguish between complex adaptive systems and complex generative systems. Complex adaptive systems learn rapidly from experience, adapting their behavior to prevailing circumstances (Anderson, 1999; Houchin and MacLean, 2005). Adaptability is a system's capacity to adjust to changes in the environment without endangering its core organizational features. In contrast, complex generative systems can undergo changes that involve modifying these core organizational traits (Jantsch, 1980), a process that leads to the creation of a new reality.

The purpose of this paper is to analyze, through case study research, how these three concepts relate to each other and evolve, and to present a conceptual framework that allows us to appreciate these interactions. The goal of studying mutual causality is not to find out where everything started, but how these relationships work and develop. Ideas from complex adaptive and generative systems might further our understanding of them.

The basic contentions of this paper are that the three concepts constitute a complex system interrelating with one another and with their surroundings; the system evolves when any of the concepts reaches the edge of chaos, which acts as a catalyst for the complex system. There are two main directions in which the system can evolve once the edge of chaos is attained: adaptability or transcendence. The former is fostered by concentration, discussion and an attitude of improvement within the organization, which brings about adaptive learning, incremental innovation and low internationalization. The latter is fostered by attention, dialogue and an attitude of inquiry within the organization, which brings about generative learning, radical innovation and global or high internationalization.

In the sections that follow, we begin with a brief conceptualization of the existing linear causality literature on the subjects and some notions on complex adaptive and generative systems. We then present a preliminary model based on complex systems. This is followed by our analysis of two Spanish clothing industry case studies, and an introduction to our model. Finally we discuss the implications of our research.

THEORETICAL BACKGROUND

Organizational Learning, Innovation and Internationalization: a brief conceptualization

Organizational learning has for some time been one of the most thoroughly explored concepts in the academic and business worlds (Bapuji and Crossan, 2004; Easterby-Smith et al., 2000). In spite of its complexity, reflected in the numerous perspectives proposed (Chiva and Alegre, 2005), organizational learning can be defined as the process through which organizations change or modify their mental models, rules, processes or knowledge, maintaining or improving their performance (Argyris and Schon, 1978; Senge, 1990; Brown and Duguid, 1991). Organizational learning is, then, a process that develops a new way of seeing things or understanding them within organizations, which implies new organizational knowledge. According to the literature, organizational learning can be fostered through several organizational and managerial factors like experimentation, risk taking, dialogue, interaction with the external environment and participation (Chiva and Alegre, 2009).

Innovation is a core issue in management studies. Since Schumpeter's (1942) seminal approach to innovation as a process of creative destruction, there has been a steady interest in innovation activities and innovation types. Urabe (1988) defines innovation as the generation of a new idea and its implementation in a new product, service or process. The Oslo Manual (OECD, 2005) identifies four widely accepted types of innovations: product, process, marketing and organizational innovation. Product innovation is defined as "the introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses"; process innovation as "the implementation of a new or significantly improved production or delivery method", marketing innovation as "the implementation of a new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing", and organizational innovation as "the implementation of a new organizational method in the firm's business practices, workplace organization or external relations". These four types of innovation could have different degrees of novelty, and therefore could be incremental or radical, that is, based on exploitative or explorative learning (Jansen et al., 2006). Pavitt (1991) describes radical innovations as revolutionary or discontinuous changes, while incremental innovations are conventional or simple extensions in a line of historical improvements. Most of literature (eg. Dewar and Dutton, 1986) considers that technology is essential in radical innovations. Dewar and Dutton (1986) believe that radical innovations are fundamental changes that represent revolutionary changes in technology. However, Verganti (2008) introduced another dimension, other than technology: meaning. He thinks that some innovations might represent a fundamental change in meaning and not in technology. These are radical design-driven innovations, which are radical innovations of a product's meaning. Radical design-driven innovation

is defined by Verganti (2003) as an innovation where novelty of meaning and design language is significant and prevalent compared with novelty of functionality and technology.

In international business research, internationalization has been the key issue and the subject of many studies. At times, it has been defined as the crossing of national boundaries in the process of growth; there are however, significant differences in domestic growth and internationalization (Buckley, 1993; Buckley and Casson, 1998). Recent studies advocate placing knowledge acquisition and exploitation at the heart of firms' internationalization strategies (Meyer et al., 2009; Liu et al., 2010 and Ghauri and Park, 2012). The increasing engagement of firms in international activities is now one of the most visible responses to the constantly changing dynamics of the global environment. Whether or not a firm wants to participate directly in international activities, today most business activities are global in scope.

In contrast to the one-way approach of the traditional literature, we now posit a reciprocal interaction between the three constructs of our model.

Reciprocal interactions between Organizational Learning and Innovation

Organizational learning has been identified as a key factor for achieving competitive advantage in dynamic and turbulent markets (Slater and Narver, 1995; Hult, 1998). Previous research has linked organizational learning to important competitive issues such as innovation (McKee, 1992; Hurley and Hult, 1998) and company performance (Calantone et al., 2002; Hult et al., 2004).

Furthermore, literature on innovation has stressed the importance of knowledge in developing processes. Innovation is defined by Afuah (1998) as new knowledge incorporated into products, processes, and services. In fact, a great deal of research has considered new knowledge as the basis for innovation (eg. Nonaka and Takeuchi, 1995; Alegre and Chiva, 2008), understanding innovation as an individual and collective learning process that aims to seek new ways of solving problems. Innovation seems to depend on the company's capability to learn, through which new knowledge is developed, distributed and used.

On the other hand, innovation can also be viewed as a catalyst of new knowledge, since the very process of and the feedback from successful or unsuccessful consequences can lead to a new vision of the market, the product etc. (Hurley and Hult, 1998). The innovation process implies improving and inquiring about the process itself and the potential innovation output, which means adaptive and generative learning, or single- and double-loop learning (Argyris and Schon, 1978). One of the first stages in the innovation process is the generation of an idea or concept (Perks et al., 2005), which requires searching for opportunities, knowledge and brainstorming, and which can be considered as a way of social learning (Brown and Duguid, 1991), where different actors participate, interrelate and finally learn. In sum, innovation can enhance learning within organizations.

Reciprocal interactions between Innovation and Internationalization

Generally, the literature claims a positive relationship between innovation and internationalization (eg. Molero, 1998; Pla-Barber and Alegre, 2007) mainly because innovation confers market power and, as a consequence, facilitates internationalization (Roper and Love 2002). Innovative firms obtain some competitive advantages that give them the chance to compete actively in different markets (Lopez and García, 2005; Filipescu et al., 2009).

The innovation management literature generally predicts that innovative firms will tend to enter foreign markets in order to increase sales volume and spread the fixed costs of innovation over a larger number of units (Tidd et al., 1997; Rogers, 2004). Apart from some exceptions (e.g. Lefebvre et al., 1998), previous research is quite consistent in supporting the idea that innovation encourages internationalization.

Hitt et al. (1994) state that internationalization not only allows a firm to enrich its sources of knowledge, but that it also provides the opportunity to capture ideas from a greater number of new and different markets, as well as from a wide range of cultural perspectives, thus facilitating innovation. Furthermore, Kotabe et al. (2002) state that internationalization can reduce costs associated with innovation. Internationalization can also improve the ability to innovate by allowing firms to hire better technologists and access skilled technical expertise (Cheng and Bolon, 1993, Kafouros et al., 2008). On the other hand, being more international allows a firm to obtain greater returns from innovation by utilizing many markets (Hitt et al., 1997; Kafouros et al., 2008).

Reciprocal interactions between Organizational Learning and Internationalization

Previous research has linked organizational learning to market orientation (Baker and Sinkula, 1999; Slater and Narver, 1995), which has traditionally been related to internationalization (Leelapanyalert and Ghauri 2007).

Internationalization is considered by several authors (Bilkey and Tesar, 1977; Prashantam, 2005) as a kind of innovation, and therefore knowledge also plays a vital role. In fact, Prashantam (2005) states that knowledge is at the core of received wisdom on internationalization, which is consistent with the notion that internationalization represents an innovation by the firm. Learning might also be understood as an input of the internationalization process (Petersen et al., 2008). This is supported by the internationalization process view (Johanson and Vahlne, 1977; 1990) and the need to close perceived gaps in knowledge about foreign markets (Petersen et al., 2008). From this perspective, internationalization is viewed as a learning and knowledge accumulation process (Ling-Yee 2004): Learning alters the way in which firms see and interpret the world. According to De Clercq et al. (2005), the more knowledge a firm has gained through intensive learning efforts, the more willing it will be to utilize and exploit this knowledge through subsequent international activity.

Much research has considered that internationalization provides organizations with different experiences that enable them to learn or develop new knowledge (Sullivan, 1994; Hitt et al., 1997; Gomes and Ramaswamy, 1999; Forsgren, 2002). In fact, some of these papers have also considered that internationalization creates new knowledge, which encourages them to innovate (Wagner, 1995; Pittiglio et al., 2009). Pittiglio et al. (2009) hold that firms active in international markets generate more knowledge than their counterparts operating only in the national market, because the former learn more

from external sources. Criscuolo et al. (2005) and Wagner (2001) demonstrate that international firms innovate more thanks to access to a greater flow of ideas from external sources.

A preliminary complex system model: complex adaptive and generative systems

According to Tsoukas (1998, 293), the sciences have historically set the tone in intellectual inquiry. Furthermore, there seems to be a fundamental human urge to want to understand both nature and society as a unified entity. The new scientific approach known as Complexity theory, which mainly focuses on complex systems, has witnessed recurrent bursts of interest since the last century (Simon, 1996). Indeed, an increasing number of academics have started to use complexity theory to enhance their understanding of organizations (Anderson, 1999; Dougherty and Dunne, 2011).

Based on the interdependencies and interactions suggested by the existing literature, we posit that mutual or circular causality might explain the relationship between organizational learning, innovation and internationalization. In our research, we consider that the three concepts we analyze in this paper constitute a complex system, as they are made up of heterogeneous elements: organizational learning, innovation and internationalization, which seem to interrelate with one another and with their surroundings. These concepts or system elements appear to be partially connected to one another, so the behavior of any one of them is affected by the behavior of the other two.

In order to better understand this complex system we propose a framework based on the tenets of two distinct types of complex systems: complex adaptive systems (Holland, 1995; Anderson, 1999; Stacey, 1996) and complex generative systems (Chiva et al., 2010). We will use this framework to determine the case study design.

Complex adaptive systems are made up of heterogeneous elements that interrelate with each other and with their surroundings, and are unlimited in their capacity to adapt their behavior through experience (Dooley et al., 2003). Adaptability is a system's capacity to adjust to changes in the environment without endangering its essential organizational features. According to Chiva et al. (2010), complex adaptive systems are characterized and fostered by improvement, concentration and discussion. Improvement can be defined as the refinement of existing competences, technologies and paradigms without necessarily examining or challenging underlying beliefs and assumptions. Concentration is a process of forcing the mind to narrow down to a point, to focus on certain aspects, and avoid seeing the whole picture. Discussion is one of the two types of conversation (Isaacs, 1993; Bohm, 1980), the other being dialogue. Discussion implies a dialectic conversation or the exchange of arguments and counter-arguments, where there is no collective inquiry.

On the other hand, complex generative systems (Chiva et al., 2010) are able to transcend (Jantsch, 1980), which means changing their mental models, knowledge or organization. According to Bohm (1980) and Bohm and Peat (2000), transcendence implies the possibility of transcending the essential organization, knowledge, or mode of thinking. According to Chiva et al. (2010) complex generative systems are facilitated and characterized by attention, dialogue and inquiry. Attention is a state in which the

mind is open, without a focus, so it implies trying to be aware of the whole picture. Attention seems to be a prerequisite of mindfulness (Langer, 1989). Dialogue is defined by Isaacs (1993) as a sustained collective inquiry into the processes, assumptions, and certainties that make up everyday experience. Inquiry or questioning implies suspending knowledge, or reconceptualizing the elements in a novel, generative way, which is also very close to Langer's (1989) mindfulness.

Complex systems, both adaptive and generative, adapt and transcend, respectively, when they find themselves at the 'edge of chaos' or 'limited instability' (Anderson, 1999; Stacey, 1996; Kauffman, 1993), entailed by any unstable, different or shocking situation or decision. These systems are able to develop three types of behavior: stable, or controlled by negative feedback; unstable, or controlled by positive feedback; and limited instability or tension between various forces, placing it at the edge of chaos. At the edge of chaos, the system is very complex, and equilibrium between stability and chaos is produced, combining both negative and positive feedback (Stacey 1996). In fact, Maruyama (1963) considers there are two types of mutual causal systems: the deviation-counteracting system and the deviation-amplifying system, based on Wiener's (1948) negative and positive feedback, respectively. When a system responds to a perturbation in a way that reduces its effect, it is said to exhibit negative feedback; a system exhibiting positive feedback, in response to perturbation, acts to increase the magnitude of the perturbation. Indeed, according to Maruyama (1963), mutual causal systems can contain deviation-counteracting and amplifying loops (negative and positive feedbacks). In this case, and following complexity ideas, the edge of chaos might be reached.

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In sum, and based on the above review, we offer a model in Figure 1 that synthesizes ideas from complex adaptive and generative systems in relation to our complex system.

Insert Figure 1 about here

METHODS

Research setting

Given our research purposes, qualitative methodology seems the most appropriate way (Lee et al., 1999) to analyze how organizational learning, innovation and internationalization relate to each other. According to these authors, qualitative research is well suited for the purposes of description, interpretation and explanation, in particular because it can effectively address questions such as "what is occurring?" and "how is it occurring?" (Lee et al., 1999: 164).

In this study, we conducted two case studies. Case study research enhances understanding through theory development (Lee et al., 1999), which is what we aim to do with regard to the relationships among the three concepts. Furthermore, multiple case studies allow us to obtain detailed descriptions of processes when holistic perspectives are required (Gummesson, 2000; Lincoln and Guba, 2000).

Case Selection

In order to analyze the three concepts in organizations we selected two different Spanish clothing companies. The focus on a single industry enables to hold industry effects constant. We chose this sector because it is dynamic, innovative and fairly internationally oriented, so we would expect to find organizations that learn, innovate and are internationalized. The clothing sector is an important sector in Spain, with 103.690 employees accounts for 6% of those employed in the industrial sector and for 5,9% of the industrial exports in 2011(Cityc, 2012).

Taking into account the theoretical sampling in case study selection, we considered several factors in selecting the cases. We considered that both companies should have an international view, and be interested in innovation. However, we also wanted two different companies in terms of degree of internationalization, innovation approach (process vs. product design), growth evolution, and even market strategy. Finally, a final and practical factor was access to informants. We deliberately selected two Spanish companies from the clothing industry because of their major contrasting outcomes in innovation and internationalization (Yin, 1989; Ghauri and Grønhaug, 2005): Marie Claire S.A. and Mango S.A. (Table 1)

Insert Table 1 about here

Data Collection

We gathered data for this study from both interviews and documents. Data was collected through semi-structured, in-depth interviews with managers, with at least two

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years' experience in the company, from both companies. These interviews were carried out in two phases: at the end of 2009, and at the beginning of 2011 (see table 1 for a detailed description). Although the same interview questions were asked in all cases (see Interview Questions in Appendix), we selected informants that could thoroughly describe at least one of the concepts analyzed and then relate it to the other two. Each interview was recorded and fully transcribed. Interview questions were based on a literature review of the three concepts and on the preliminary model. Consequently, some questions on how one concept affected another, or how changes started were also introduced. However, as questions were open, respondents used them to tell stories and recount situations about the company. We also analyzed documents, mainly company descriptions in newspapers, magazines, websites and reports, to enable data triangulation (Ghauri, 2004). Data triangulation or the collection of different kind of data through different methods helped us to confirm and check ideas, and to validate data. All interviews were conducted jointly by the first and third authors. Data analysis was also carried out by the same authors together to ensure the coding was convergent.

Data Analysis

As our research aims to develop theory, we adopted the pattern-matching technique (Yin, 1993; Lee et al., 1999; Ghauri, 2004), a technique in which patterns observed in data are matched with patterns derived from extant theory. In our research, we used a preliminary model on which to base our inquiry. We generated an initial list of coding categories from the model or theory, and then we modified or developed the model or theory over the course of the analysis as new categories emerged inductively (Miles and Huberman, 1994). Based on Miles and Huberman (1994), data was coded with

descriptive codes at two levels. First, several master codes were used to represent broad conceptual categories: mutual causal complex system, edge of chaos, complex adaptive systems and complex generative systems. Then subcodes or subcategories were used to denote subsets of the master codes (e.g. incremental learning, radical innovation etc.). We compared the categories of the two cases and finally, proposed relationships that refined the previous theoretical model.

Several forms of triangulation helped us to achieve validity. We triangulated data from interviews and documents; we triangulated between methods, pattern matching and grounded theory; we achieved researchers' triangulation, as the second author also participated in the analysis of the data; we triangulated with informants, as three experts in the field from each company explained their view.

RESULTS

Although pattern matching was strictly followed, because of space limitations, we report only the final revision of the model. Table 2 shows a descriptive summary of both companies in terms of organizational learning, innovation and internationalization.

Insert Table 2 about here

Marie Claire S.A.

Marie Claire S.A. was set up in 1907 to manufacture and market stockings and tights. In 1975, after several decades of successful activity, the company decided to diversify into

the sock business. Following a vertical integration strategy, in 1985 the firm started weaving its own textiles and producing synthetic garments, and today it also produces pajamas, linen and lingerie.

Marie Claire S.A. markets its products through its own brands: Marie Claire, Kler Cherie and One. However, they also produce generic brands for supermarkets and large retailers in Spain, Holland, Belgium, France, United Kingdom, Portugal and Greece. Over time, Marie Claire has become the largest supplier of generic brand stockings, tights and socks in the Spanish market, and also supplies some of Spain's leading brands such as Agatha Ruiz de la Prada or Kukuxumusu.

Marie Claire is currently large both in Spain and abroad, exporting to nearly 40 countries; it has 850 employees and its revenues reached €90 million in 2009. Its headquarters is in Castellón (Valencian Community, Spain), where it has two factories. Its logistics department allows the company to supply the south of Europe. Marie Claire also has a branch in London from which distribution to the north of Europe is managed, the United Kingdom being considered a strategic market. The London branch also plays an important role in generating new ideas for products. The following quote provides some evidence:

> London is essential for us for several reasons. The most important one is to be closer to our clients from the north, especially those from UK. I think they want us to be there. That also helps us pick up good ideas about what that market requires (Product Innovation Manager).

According to the informants, innovation focuses mainly on the company's core products: stockings, tights and socks. The Product Innovation Manager stated:

> We try either to apply innovations we see in the market (incremental innovation), or to develop new products based on technological improvements (Marie Claire sometimes takes technologies from other sectors, developing new technologies and products in the clothing industry: radical innovation), like ladder-resistant tights or odor-free socks …. Although we invest time and money in these innovations, most of our new products are not really innovative; they are improvements of what others have accomplished. (Product Innovation Manager)

These radical innovations represent only 1% of all the company's stockings, tights and sock lines. Most innovations are incremental, arising from adapting, learning or improving what is already on the market. New ideas originate from suppliers, salespeople and production, as well as from the English subsidiary. However, most of them come from the Innovation Department, which works continuously on new concepts and technologies. One of the interviewees from the Innovation Department stated:

> People talk a lot about the ideas that come from salespeople, especially from London, although people from our department are always thinking about new products; in my opinion most ideas come from us. We are always thinking of new products, of how we can improve what is in the market (Design Manager).

Knowledge management is, thus, essential in this area. According to the interviewees, working closely with suppliers is also very important for innovation. Marie Claire, however, is not an innovative company where everyone participates, teamwork is ubiquitous and experimentation is actively promoted. This is only the case in the Innovation Department, which in spite of a strong emphasis on experimentation, also stresses that mistakes are not acceptable. Risk perception seems to be all pervasive.

The worst thing about trying to innovate is that when you make a mistake, they (managers) always remind you of it. On the other hand, team work is not very creative, as managers always take decisions on their own. So you can make suggestions, but at the end of the day others take decisions and if you insist and it doesn't work, you are going to be in trouble. I don't feel I can inquire or suggest anything (Member of Innovation Department).

We (the human resource department) know that people are afraid of making mistakes, and that's not good for experimentation. Risk taking is essential if you want to innovate or internationalize. Actually, they always remind everyone that something didn't work, so they are not going to try it anymore… (Human Resource Management Department Member)

The result is that only a few new products are developed every year and radical innovations are only supported when there is a clear indication that they will be successful.

Truly new products are taken on board only when it is clearly obvious that customers will accept the new product. We cannot take any risks; innovations always have to be successful. Innovations make us learn and probably allow us to internationalize (Product Innovation Manager).

Innovative products are marketed firstly in Spain through the company brands (Kler etc.), and only then are they made available to customers abroad, the department stores. If foreign clients express an interest, Marie Claire develops products for their generic brands. When asked why they do not try to market their new products in all these countries through their own brands, a Sales manager answered:

It is very difficult to develop a well-known brand and to be successful with it internationally (Manager of the Logistic Department)….. In fact, we also thought of retailing, rather than just

wholesaling, but again it was too risky or we did not feel confident enough to tackle it (Sales Manager).

The company therefore seems to lack confidence in its competitive chances abroad or in any other kind of project. They seem to be quite conservative, or prefer to focus on their present capabilities. The internationalization manager told us:

> We use the international market to increase sales volume and spread the fixed costs of innovations. However, internationalization has always been pending issue in this company; and this is mainly because it is simply used to increase our sales a little bit …. (International Sales Manager)

They began exporting fifteen years ago, through agents and direct sales to customers as their main entry routes, and started importing merely seven years ago. Currently, 30% of their revenues come from abroad, which makes Marie Claire a partially internationalized company. According to the Internationalization Manager, the London office is the only visible sign of the company's international drive. A few years ago they had to close two offices in Holland and Poland, a failure that might have put a halt to the company's overseas expansion.

Marie Claire's investment in Polish and Dutch subsidiaries represented an initial boost that entailed a complex and difficult situation for the organization. According to the respondents, this situation affected their innovation and learning, as new products were developed in order to tackle these new markets and the organization learnt from this experience, which in turn improved their exports in these countries. This alteration developed a process that increased the system's complexity and adapted the system to the new situation. However, the system adapted to the new situation but did not

endanger its core organizational features; and this was probably not what Marie Claire expected. Some respondents anticipated a different outcome:

> I personally thought we were going to become a really internationalized company, selling everywhere, and even retailing. But I don't know why this didn't happen (Member of Innovation Department).

Finally, therefore, Marie Claire realized that it was not worth keeping its subsidiaries in these countries, because new ideas and innovation aimed at these markets did not have the expected impact or success, and managers felt that remaining there did not allow them to learn enough about the markets to sustain the investment. Indeed, they probably wanted Marie Claire to shift toward a new more global and innovative oriented organization. In these terms, one of the Innovation department members suggests:

> Maybe we should have tried to propose truly new products; we should have taken more risks. We didn't analyze other possibilities or options to be competitive. We concentrated on what we were already doing. It is true that it is not worth being there just to market products that are very similar to our competitors' (Member of Innovation Department).

The investment in Polish and Dutch subsidiaries might be considered as an edge of chaos situation: stability was avoided and that change produced positive feedback that brought the company to a renewed situation. However, their focus or concentration on their present activities and lack of inquiry and real dialogue prevented them from attaining a really new approach. Marie Claire simply adapted to the new situation and then returned to stability.

In sum, Marie Claire is characterized by a focus on incremental innovation and adaptive learning, some bad experiences abroad, lack of confidence in the potential of their brand and products in the international market, a focus on the local market and brand, and use of the international market to recover investments in innovation. They lack an inquiry approach and tend to concentrate on their usual activities. Thus, incremental innovation, adaptive learning and low degree of internationalization go hand in hand in this case (Figure 2).

Insert Figure 2 about here

Mango S.A.

Mango S.A. is a Spanish clothing company that designs and markets clothes and accessories for women, with distribution through its own chain of retail stores Mango/MNG. Mango's target customers are young, modern, urban, sophisticated, professional and independent women; the company follows trends and offers mid- to high-quality products at affordable prices. According to their respondents, their products are exclusive, with few items for each product type, and heavy investment in design and quality.

Mango outsources the manufacturing process; over 75% of its products are subcontracted in Asia and North Africa, with 60% being supplied by 50 Chinese companies with which the firm has a close relationship. Internationalization allows

Mango to tap a vast array of markets and to purchase the best materials and R&D inputs at the best prices.

> Being fully internationalized has allowed us not only to sell everywhere but to obtain the best materials, people, and ideas that are spread out everywhere (Member of the Sales Department)

Mango S.A. currently employs 6,500 people and boasts over €1 billon in annual revenues, of which 75% are generated abroad. It is present in approximately 90 countries through over a thousand stores, 70% of which are franchises. Franchises are the chosen strategy in countries in which cultural and administrative features are very different to those in Spain, and where it is therefore preferable to have retail managed by local people. Product design, management and distribution are carried out from the head office in Barcelona. However, there are also offices in China and the US, which contributes to the company's learning process. They state:

> Internationalization is essential for innovation; I think because we are a global company many more ideas appear, coming from everywhere. I guess our innovative products also allowed us to go global (…) In fact, I think everything is connected. (Innovation Department Member)

Mango was created in 1984 when it opened its first store in Barcelona. A year later it had opened five more stores in the same city and started expanding in Spain. In 1992 the company opened two stores in Portugal, signaling the beginning of its international venture. Mango is now the second Spanish clothing exporter after Inditex.

Two distinct periods emerge from an analysis of the company's history. The first period spanned 1984 to 1995, when Mango was steadily obtaining more business knowledge,

consolidating its product and point-of-sale concepts and implementing its just-in-time supply strategy. The second, from 1996 to the present, has seen a reinforcement of human values, increased investment in logistics through information and technology, design-driven innovation (Verganti, 2003, 2008), the opening of large retail stores and the globalization of the organization. The company's competitive advantage, which has facilitated its internationalization, derives mainly from the intense use of information and communication technologies in the management and distribution of products. According to one of its sales managers:

> The rapid growth of the company has been possible thanks to the internet and new technologies. (…) It is difficult to explain how everything started or how we became global, but new technologies and the general approach of the company—open minded, ambitious, always questioning—was important (Sales Manager)

Mango's increasing investment in logistics through information and technology and in original and design-driven innovation affected internationalization, as the company became global, and learning. The company learnt from those new challenges in innovation and internationalization and developed a generative learning policy. Obviously, learning, in turn, also affected innovation and internationalization. In sum, their investment in information technology and design-driven innovation was the initial boost that drove the company to a certain edge of chaos situation:

> I think that information technologies helped us to be closely connected, to have information from everywhere, to think of the world as one market, which gave us a feeling of vertigo… (…) Besides that, design-driven innovation then started to become essential for the company, and we were aware of the risks we were taking… (Member of Innovation Management Department)

Mango is where it is today because of its new approach in logistics and design-driven innovation, which, when added to our risky and ground-breaking view of learning and innovating, triggered a shift in the company. I think it brought about an organizational innovation (Member of Design Department).

In Mango S.A. the edge of chaos led to a process of transcendence and implied a sort of organizational innovation, involving new ways of learning, innovating and internationalizing. Attention to anything happening in the world was promoted by new technologies and the focus on design-driven innovation. The company had to look at new tendencies and approaches in clothing and other sectors. Inquiry and questioning was also encouraged, which developed a creative environment where learning, innovation and internationalization took on a new role. This organizational innovation brought product innovation, new markets, and a more generative learning approach.

According to the interviewees, Mango's main asset is its employees, who are young, motivated, flexible, enthusiastic and creative, and sustain the company's values: humility, harmony and affection. People from 36 nationalities work in its head office. Mango S.A. is a participative company that fosters creativity and experimentation throughout the business. The following comments are representative:

No one is always right; in a company with a focus on creativity and high technology, tyranny does not work. I think people are encouraged to inquire and question everything; otherwise we wouldn't have such ideas and suggestions (Human Resource Manager).

We love people to participate and come up with suggestions; obviously one makes mistakes when experimenting. People are essential in this company (Innovation Department Member).

> Team work is very important for us. What I really like about our way of team working is that we always come up with new ideas. I guess people diversity and a very creative atmosphere is essential (Innovation Department Member).

Mango internationalized gradually by opening stores in neighboring countries such as Portugal and France. However, Mango was to become a born-again firm (Bell et al. 2003; Svejenova et al. 2007) when in 1996 it expanded internationally, reaching the point at which it had more stores and generated more income abroad than in Spain. Thereafter, Mango expanded into 22 countries over a 4-year period.

In order to design and market without manufacturing, Mango developed an innovative organizational model based on a network connecting suppliers, manufacturers, logistic companies and points of sale that allowed any store anywhere in the world to receive the products its customers demanded at any time. Building and maintaining this network involves a significant and constant investment in high technology. Consequently, Mango's managers consider knowledge to be a productive and strategic factor that allows them to differentiate and develop a competitive advantage.

In a nutshell, Mango has never stopped learning. The company started out as wholesalers, then moved into retail, and afterwards decided to franchise and expand through technology, solid products, and a strong brand. The company's managers feel confident about their products and their potential worldwide. In that sense, they affirm:

> We consider we have the right products that match our customers' demands; our quality is high because design is essential in this company (Innovation Department Member).

Yes, learning has been and continues to be essential for us. One can't really face the global market without continually learning (International Sales Manager)

Innovation has been essential all along, with a strong focus on design and technological innovation. Because Mango's products are considered to be exclusive and unique, design plays an essential role. Up to 80% of its products are universal, with a mere 20% adapted to suit specific country conditions. The collection is designed in a 10,000 m^2 building known as 'El Hangar', which the company claims is the biggest design centre in Europe, with 550 people working annually on 8,000 items. On the other hand, expansion would not have been possible without information and communication technology. It is thus clear that in this case organizational learning, innovation and internationalization go hand in hand. Thus, it appears that original or radical innovation is associated with high degrees of learning and internationalization (Figure 3).

Insert Figure 3 about here

The incremental complex adaptive and the global complex generative system models

As the case studies suggest, organizational learning, innovation and internationalization are fully interlinked (Table 3). Furthermore, in both case studies, new conditions or decisions in some of the elements initiated positive feedback, leading to an edge of chaos situation that unleashed a process of adaptability or transcendence. Although either adaptability or transcendence might occur at the edge of chaos, the system will evolve in one or another direction depending on particular features assumed by the processes involved. Chiva et al. (2010) suggested some of these features: improvement,

concentration and discussion for adaptability; and inquiry, attention and dialogue for transcendence (Table 4). Marie Claire and Mango seem to follow these characteristics, respectively.

Insert Table 3 about here

Insert Table 4 about here

Additionally, the two organizations, adapting or transcending, develop different types or degrees of learning, innovation and internationalization. We draw on these to propose two models, one incremental and the other global.

The incremental model, followed by Marie Claire, is characterized by adaptive learning, incremental innovation and low levels of internationalization. The global model, followed by Mango, is characterized by generative learning, radical innovation and a high degree of internationalization. These models are therefore theoretically grounded in the dichotomy of adaptive and generative learning (e.g., Fiol and Lyles, 1985; Senge, 1990), incremental and radical innovation (e.g., Tushman and Anderson, 1986; Henderson and Clark, 1990) and degree of internationalization (Sullivan 1994): low and high degree of internationalization or global firms (e.g., Bell et al., 2003; Chetty and Campbell-Hunt, 2004), regardless of whether high internationalization or globalization has been attained gradually or from inception (born-global).

The following propositions summarize the relationships discussed above:

Proposition 1: Organizational learning, innovation and internationalization constitute a complex system.

Proposition 2: Organizational learning, innovation and internationalization can remain stable, adapt or transcend. Adaptability and transcendence will take place when the system is brought to the edge of chaos by any alteration in the system.

Proposition 3: Attention, inquiry and dialogue take the system to transcendence; whereas concentration, improvement and discussion take the system to adaptability.

Proposition 4: Adaptive learning, incremental innovation and a low degree of internationalization are related to one another, constituting an Incremental Complex Adaptive System.

Proposition 5: Generative learning, radical innovation and global internationalization are related to one another, constituting a Global Complex Generative System.

Figure 4 incorporates the five propositions and presents the final model.

Insert Figure 4 about here

Discussion

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Organizational learning, innovation and internationalization are becoming increasingly important for organizations today. Organizations around us are required to break down their mental and physical barriers in order to learn, innovate and internationalize. Continuous learning, new mental models, new products, new processes, new markets and globalization are essential issues within these concepts. Thus, organizational learning, innovation and internationalization are key elements of the dynamics of organizations as they imply newness or novelty.

The literature on organizational learning, innovation and internationalization has traditionally linked these concepts through linear causality, by considering any one of them as the cause of another. Due to the linear causality approach, the literature on the relationships between these three concepts is rather inconsistent because some papers conclude that one concept affects another, while other papers find the opposite. Furthermore, the linear causality approach is somewhat static, which impedes our understanding of the dynamics of those relationships (e.g., Hitt et al., 1994; Molero, 1998; Leelapanyalert and Ghauri, 2007).

Linear causality is the relationship between one concept (the cause) and another (the effect), where the latter is a consequence of the former. A therefore causes B, but B has no effect on A. Tsoukas (1998: 291) states that this traditional, Newtonian or mechanistic approach is gradually receding in favor of complex, holistic or emergent approaches, characterized by the ability to notice instability, disorder, novelty, emergence, and stressing mutual, reciprocal or circular causality. Terms like globalization, innovation, creativity or learning tend to focus on interconnectivity and holism, which are clearly related to the new complexity theory. In this paper, we have

used complexity theory to frame our understanding of the way organizational learning, innovation and internationalization relate to one another and evolve. On this basis, we carried out two case studies in the Spanish clothing industry.

The results of the qualitative research presented in this paper have important implications for the literature on the relationships between these concepts by providing a more interrelational, complex, dynamic and circular picture of them.

Firstly, the model presented illustrates the application of ideas stemming from complexity theory to the organizational and managerial field. In fact, we propose that they constitute a complex system, as they interrelate with one another and with their surroundings (proposition 1).

Secondly, organizational learning, innovation and internationalization can remain stable, adapt or transcend. Any alteration in any of these concepts can take the system to the edge of chaos or limited instability, and then the system might adapt or transcend (proposition 2). The edge of chaos is attained by alterations, modifications or situations that make the system unstable. The case studies showed two edge of chaos situations.

Thirdly, adaptability is encouraged by concentration, discussion and improvement; and transcendence is fostered through attention, dialogue and inquiry (proposition 3). Marie Claire followed a pace of adaptability, while Mango took one of transcendence. Our case studies show how the different paces brought the systems to two different models: the incremental complex adaptive system model and the global complex generative system model.

Fourthly, the circular relationships among the three aspects contribute to the literature on each of them in the way they interact with each other. In fact, we associate certain types of learning with other types of innovation and internationalization. When organizations undergo adaptive learning they tend to adopt incremental innovation and low internationalization strategies (proposition 4). Conversely, when organizations take the generative learning route, they tend to experience radical innovation and global internationalization (proposition 5). In sum, the model depicted in figure 4 shows a dynamic approach to the relationships among these three concepts. Consequently, our model contributes to the literature on the relationships between these concepts (e.g., Tidd et al., 1997; Leelapanyalert and Ghauri, 2007; Kafouros et al., 2008; Alegre and Chiva, 2008) by providing a more complex and dynamic representation of them.

This paper has also implications for practitioners. Firstly, managers should understand their organizations within a holistic framework that constantly links the three concepts. Secondly, changes resulting from organizational decisions taken by managers in any one of these areas may have important implications for the others, bringing the system to the edge of chaos and triggering adaptability or transcendence. Thirdly, adaptability and transcendence can be fostered through several organizational characteristics: concentration, improvement and discussion, or attention, inquiry and dialogue respectively. Hence, these characteristics can bring about globalization or low internationalization, incremental or radical learning, and adaptive or generative learning.

Future research in this field should explore the application of these ideas through case studies in other countries and industries, and might include some additional elements in

the model, such as dynamic capabilities. Further qualitative research might also investigate the moderating effects of variables upon the relationship between the other two. For example, internationalization may have an effect on the relationship between learning and innovation. Future research could also explore the extent to which factors such as company size, organizational culture, or industrial characteristics, affect these relationships.

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APPENDIX

Interview Questions

Innovation

1. Can you describe your innovation strategy and objectives?

2. What are your innovation capabilities? Explain and give examples.

3. How do you organize innovation? Please describe your organizational chart.

4. How do you innovate? What is your innovation process?

5. Do you subcontract innovation activities? Explain.

6. Explain your gradual and radical innovation.

7. Can you describe the obstacles to and enablers of your innovation?

8. Can you assess your innovation outcomes?

9. How do you think innovation affects other aspects within the company? How do you think innovation has affected internationalization? And organizational learning?

Organizational learning

10. How much experimentation is there in your company? Explain and give examples.

11. Do you think that people within your company take risks? Explain and give examples.

12. Do you interact with other organizations and institutions? Which ones? What does this interaction consist of?

13. Explain the degree of communication within the organization. Give examples. Do you think there is a high level of dialogue? Why? Is there much teamwork? When?

14. Do you think there is a high level of participation? Give examples.

15. Can you describe any learning processes within the organization?

16. Can you provide any examples of adaptive learning? And generative learning? Which of the two is more common? Why?

17. What conditions do you think facilitate adaptive and generative learning within your company?

18. Can you describe your human resources management strategies? Do you promote learning? Could you describe your Human Resource Management System?

19. How do you think organizational learning affects other aspects within your organization? And innovation? And internationalization?

Internationalization

20. What is your internationalization strategy? Please describe and give examples.

21. What is your international experience (number of years exporting or operating internationally)?

22. Which are your target markets? Why?

23. What are your sales objectives abroad? Why?

24. How do you face and have you faced internationalization in terms of time patterns? Incrementally, going international after inception? Other? Why?

25. How do you face / have you faced internationalization (operation mode)? Explain.

    - export entry mode (indirect or agent, direct to the customer)
    - contractual long-term entry mode, transfer of technology, knowledge and skills (franchising, licensing, strategic alliances, subcontracting)
    - investment entry mode: plants, joint ventures, etc.

26. How does internationalization affect other aspects within your organization? And innovation? And organizational learning?

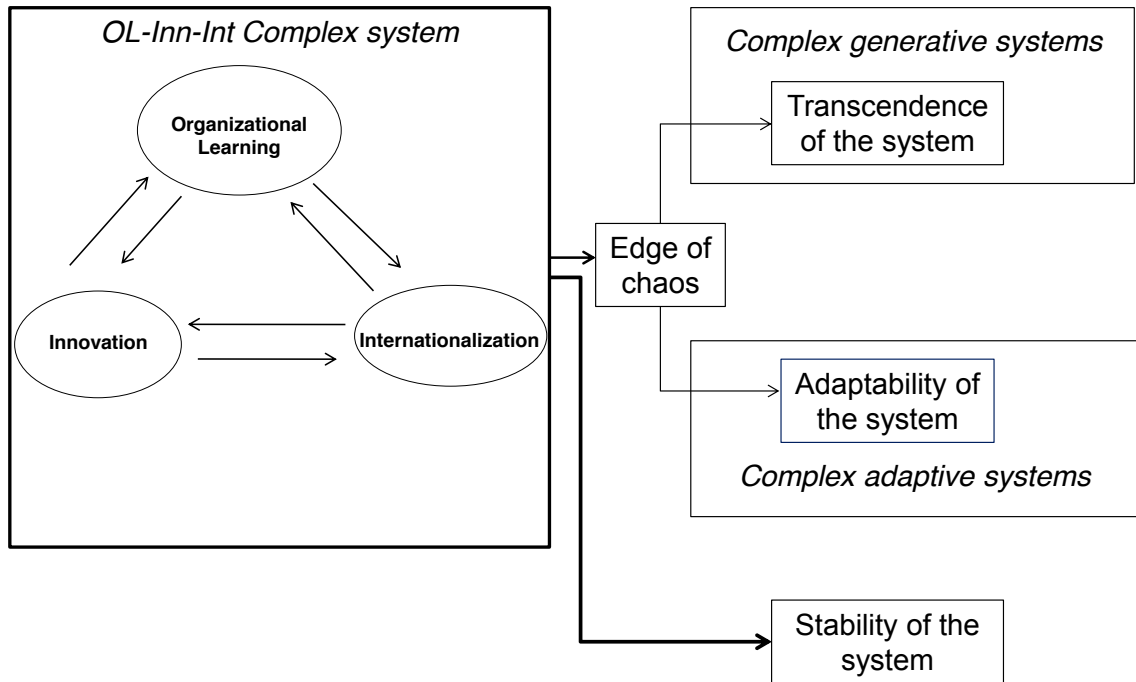Figure 1. The preliminary complex system model

Figure 2. The incremental complex adaptive system model
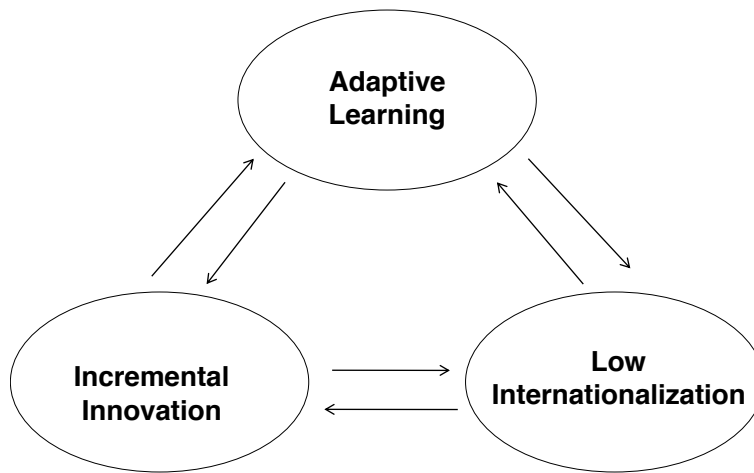
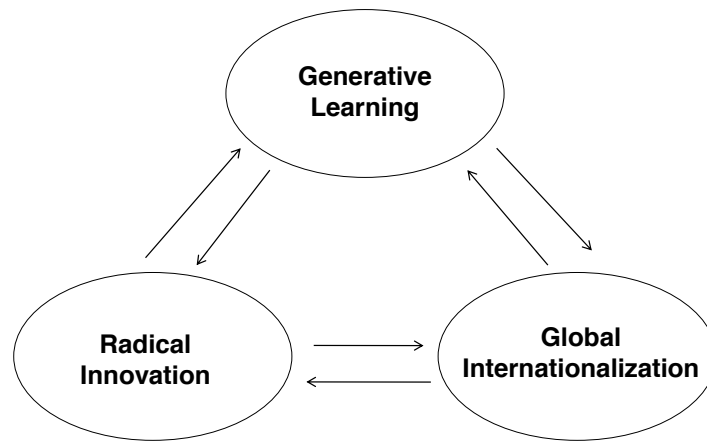Figure 3. The global complex generative system model

Figure 4. The complex system model of Organizational learning, Innovation and
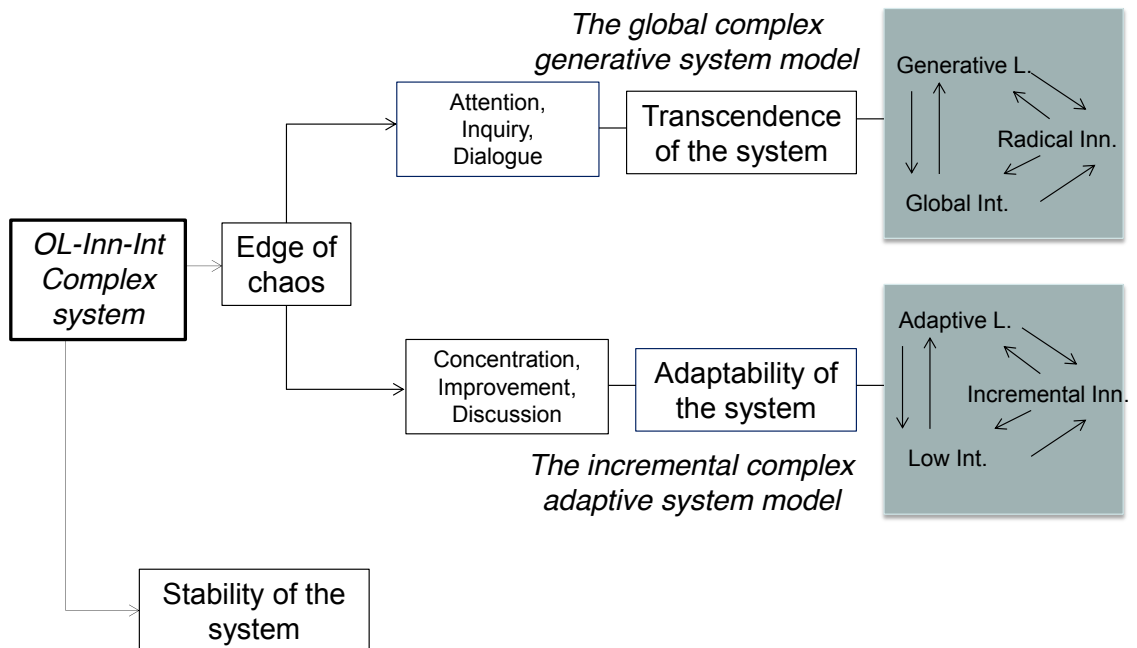
Internationalization

Table 1: Selected Case Studies and Interviews

	Marie Claire S.A.	Mango S.A.
Employees	850	6500
HQ	Valencian Community	Catalonia
Foundation	1907	1984
Internationalization	30% of revenues come from abroad; exports to 40 countries	75% of revenues come from abroad; exports to 90 countries
Innovation	Innovation is important; focus on product process	Tries to innovate with every product; focus on product design
Interviews end 2009	Three two-hour interviews	Three two-hour interviews
Interviews beginning 2011	Six two-hour interviews	Six two-hour interviews
Total interviews	Nine interviews: 3 experts on internationalization (sales, export and Logistics areas); 3 on innovation (Innovation and Design departments); and 3 on learning policies and human resource management.	Nine interviews: 3 experts on internationalization (sales, export and Logistics areas); 3 on innovation (Innovation and Design departments); and 3 on learning policies and human resource management.

Table 2. Organizational Learning, Innovation and Internationalization in Marie Claire S.A. and Mango S.A.

	Marie Claire S.A.	Mango S.A.
Organizational learning	Low degree of Organizational Learning Capability: low experimentation and risk taking; low degree of teamwork (except from Innovation Department); low participation.	High degree of organizational learning: experimentation, creativity, risk taking and participation.
Innovation	Innovations represent a low percentage of total products. Most innovations are incremental.	Innovation and design are essential for the organization. Design-driven innovation is vital to develop radical innovations or perceived totally new products.
Internationalization	Low internationalization. Incremental approach towards internationalization. The company mainly exports, but it has one subsidiary in London, which is considered to be strategic. It introduces its products first in the local market with the company's own brands and then to the international markets through generic brands.	Mango is now considered as a global company. It started gradually, but went global at a certain moment.

Table 3: A complex system: organizational learning, innovation and internationalization in Marie Claire S.A. and Mango S.A.

	Marie Claire S.A.	Mango S.A.
Organizational learning ↔ Innovation	We try to improve products, processes and ideas, but we avoid taking risks and experimenting. Innovation is difficult when we are afraid of mistakes (Human resources management department member) The innovation department is special in this company; innovating gives us lots of ideas. Most ideas come from us. (Innovation Department Member)	Creativity, humility, cultural diversity, experimentation and participation foster learning and bring about innovation and internationalization (Human resources management department member) When we design and innovate, new ideas appear and learning comes out. Everything is closely connected (Innovation Department member).
Innovation ↔ Internationalization	We need innovations to take to the UK, otherwise we would lose our clients there (International Sales Manager) Internationalization makes innovation profitable (Logistic Manager).	ICT and design-driven innovations are considered to be essential to develop globalization and learning (Innovation Manager) Innovations confer market power and allow us to internationalize (Sales Manager) Internationalization allows Mango to access many markets and to purchase the best materials and R&D inputs at the best prices (Sales Department member)
Organizational Learning ↔ Internationalization	When we have new ideas and innovations we sell them abroad (International sales member) The London subsidiary is considered to be strategic as important ideas come from there (Innovation Department Manager).	Creativity, humility, cultural diversity, experimentation and participation foster learning and bring about innovation and internationalization (Human resources management department member) Internationalization requires a multinational workforce, ideas from everywhere (Human Resource Department Member)
Edge of Chaos	Catalyst: Marie Claire's investment in Polish and Dutch subsidiaries. Facilitators for adaptability: concentration, discussion and improvement: focus always on their products and markets, team work is not very creative (discussion), no inquiry.	Catalyst: Mango's investment in IT and focus on design-driven innovation Facilitators for transcendence: attention, dialogue and inquiry: Open minded, ambitious, always questioning; dialogue: inquiry and teamwork; Attention to anything happening in the world, seeing the whole picture.

Table 4: Concentration/Attention, Discussion/Dialogue; Improvement/Inquiry in Marie Claire S.A. and Mango S.A.

Marie Claire S.A.	Mango S.A.
Concentration We didn't analyze other possibilities or options to be competitive. We concentrated on what we were already doing. (Member of Innovation Department). Generally speaking, we don't take many risks: we focus on what we are now and on what we can produce now (Head of Innovation Department)	**Attention** We search for open minded people, eager to find out what is happening everywhere and in respect to any sector (Human Resource Management Member). In Mango, attention to anything happening in the world was promoted by new technologies….(Member of Design Department).
Discussion …team work is not very creative, as managers always take decisions on their own (Member of Innovation Department). Meetings do not involve creative thinking; …and sometimes people confront and provoke conflicts in them (Human Resource Management Department Member).	**Dialogue** Team work is very important for us. What I really like about our way of team working is that we always come up with new ideas. I guess people diversity and a very creative atmosphere is essential (Innovation Department Member). Inquiry is promoted even collectively… (Human Resource Management Department Member)
Improvement Most of our new products are not really innovative; they are improvements of what others have accomplished. (Product Innovation Manager); I don't feel I can inquire or suggest anything (Member of Innovation Department).	**Inquiry** ….general approach of the company—… always questioning —was important (Sales Manager). I think people are encouraged to inquire and question everything; otherwise we wouldn't have such ideas and suggestions (Human Resource Manager).

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