

# Product design and innovation: manufacturing SMEs in Santiago de Chile

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## ABSTRACT

This descriptive review paper has been developed from an interdisciplinary approach. It focuses on the essence of the contribution and impact of design in permanent collaboration with economic science, both in its theoretical conception and application in the company. The authors whose works were revised for this paper declare design as a project activity from entrepreneurship, creativity, and innovation, essential for the change of the productive matrix, taking Chile as a study reference. It is concluded that design is a projective discipline that manages creative processes within the company to introduce concepts of innovation that directly affect the product, and from there develop strategic content in SMEs that facilitates the work of the entrepreneur in guiding added-value processes that generate opportunities for expansion and growth in the market.

*Keywords:* Design management, innovation, product, SMEs.

## INTRODUCTION

The transformation of the productive sector in Chile progressively began to develop with the redefinition of the State's participation as an investment agent, consultant, and questions about the economic regime. In this order of ideas, Chile historically established its strategies to allow the growth of its economy by considering the export of raw materials such as silver, flour, copper, and wheat and receiving manufactured goods. Technological development, infrastructure modernization, and openness to foreign trade emerged, resulting in an industry with an apparent stable development trend (Meller, 1996).

The process sought to boost the industrial sector through the accelerated growth of production capacity and the creation of new jobs to allow individuals to allocate part of their income to purchase manufactured products. This contributed to the strengthening of the structure around the mercantile system, the revival of the consumer market, and a new form of progress (Larraín et al., 2000).

Due to the growing trade in the last third of the nineteenth century, the integration of design as a discipline that promotes cross-cutting changes has allowed identifying a new and more demanding "user profile". This new profile focuses its preferences on attributes such as aesthetics, functionality, and appropriation of the object, ergo, the process of integration of value creation in the product. Besides, it is essential to clarify that his reasoning is consistent with the subjective theory of value. The same establishes that the processes of value generation in goods and services are not subject to an intrinsic constraint but to the individual and subjective appreciation of the person who fulfills the user's role.

Thus, trade liberalization in Chile represented a paradigm shift regarding governance guidelines that meant the introduction of protective frameworks for the local manufacturing industry, such as the 1928 customs tariff, state intervention in production through the purchase of shares of some local industries, and the advent of public corporations such as Sociedad de Fomento Fabril (SOFOFA) in 1883.

This process has been congruent with modernity, which established a development line that showed differences between past and present. This allowed interventionist and protectionist expressions of the past to be less visible. It shows that the present modernity shapes technological-industrial development as the first sign of innovation to form new identities and cultural traditions (Mosterin, 2009). The Company then appropriates them as a project of discovery immersed in an open and competitive environment. In Chile and Latin America, there are signs of a culture of premodernity, modernity, and postmodernity, stimulated by the flow of communications and computer media that have forced the construction of a specific definition in the company based not only on the territory but in international networks that have made SMEs a versatile construct in a global culture.

The article places design within the process of product innovation in Chile. It also identifies the scenarios of participation in the productive system that impact SMEs' identity and culture. Additionally, it describes the Chilean entrepreneur's vision of the opportunities to capture the value of a product that affects the user's perception and how it internalizes the productive matrix's innovation processes.

This paper was divided into five sections. The second section presents the case of small and medium-sized enterprises (SMEs) in Chile. Subsequently, the third section presents the role of design and its relationship with Chilean manufacturing SMEs. It also explains how the influence of globalization has shaped government-made decisions reflected in specific public policies. The fourth section has been designed to discuss the new forms of competitiveness and individuality in Chilean SMEs. This section discusses the timeframe of the rise of the need for innovation in Chile. Also, the guidelines for innovation in the Chilean SME are presented. Finally, the fifth section presents the conclusions of the document.

## 1. CHILEAN SMES: BUSINESS DEVELOPMENT AND GROWTH OPPORTUNITIES

In the SMEs' field, two objectives determine both: their day-to-day and their projection in the long term are relevant. In the first place, the search for economic benefits maintains the essential balances that make companies viable in the long term. Secondly, the optimization of resources is allocated to produce goods highly valued by users and have a convenient cost-benefit ratio (Ardichvili et al., 2003).

Likewise, for the entrepreneur, the achievement of productive and commercial conditions that generate a favorable scenario directly relates to the dimension of added value as an element that affects the user's preferences and increases the company's competitiveness and fidelity. Furthermore, Álvarez (2015) identifies that the entrepreneur's primary concern in Chile is centered on the commercial development of the product and labor capital financing.

Therefore, the Chilean entrepreneur's problem is also linked to the sales and costs of their products. Entrepreneurs have shown their preference for introducing quality as an added value element that determines the user's preference and loyalty. In this paper, the concept of

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strategy refers to the guidelines and improvement activities that organizations or entities use to differentiate themselves from their competitors and obtain productivity in the present and ensure their sustainability in the future. Therefore, the strategy is related to actions of survival and growth.

This scenario deduced that the Chilean entrepreneur understands and values innovation as an inherent change in the production structure. This allows accounting for the substantial transformations in the company, such as the renovation of machinery, incorporation of different technologies, and infrastructure changes, among other aspects.

At the same time, entrepreneurs are aware that they need something else that would differentiate them from the competition and that, additionally, is intimately related to the product either, by the same typology of objects through the years, or by the notable decrease of work orders (CORFO, 2007). For this reason, value generation is linked to user fidelity and product identity (Nickerson et al., 2007).

Entrepreneur's initiative of giving added value (understood as those perceptible physical attributes of the product. Therefore, the strategy is related to actions of survival and growth) materializes in the creation of products that meet specific functional, aesthetic, and usage requirements for the user, with minimal investment (Stam et al., 2006). Thus, the core of innovation of SMEs resides in the industrial manufacturing sector that seeks to perfect the product while increasing the users' acceptance responsible for determining the company's permanence in the market (Arroyave, 2012).

On the other hand, SMEs are one of the economic sectors that have been subject to special support programs by the Government (based on a mainstream approach in Chile to date, different stimulus mechanisms have been proposed or established to create and strengthen SMEs). One of them, called Statute SME (Law 20.416), introduced a particular device for Small Size Companies (EMT).

In recent years, a large volume of state resources has been invested, for example, in technical assistance and product development and innovation programs for SMEs (Dini & Stumpo, 2002).

Furthermore, since the 19th century, establishing protection groups that shielded sectors where state participation was encouraged to maintain high productivity has meant using mechanisms to boost the SME sector. However, it has also led to unions and association formation that ultimately raised pressure groups (Álvarez & Vergara, 2007).

The SMEs in Chile account for 17% of the sector's size distribution. A significant number since the impact on the economy generated by this type of business prevails in different economic sectors. There are around 157,779 SME companies registered in Chile. The 52% corresponds to 82,045 companies in the manufacturing sector. In medium-sized industries, only 5.7% of their sales are destined for exports. A number reduced to 1.2% in small industries makes them vulnerable to national economic cycles (Álvarez & Méndez, 2017, p. 35).

Also, observations on SMEs' evolution show a trend toward the disappearance of manufacturing companies in Chile. Disappearing companies have not been able to cope with globalization's effects nor adapt to the trends of change in the Chilean market, which is open to internationalization at a significant level (Olivares, 2005). This has been reflected in the exit rate of SMEs, although it was high during the "Depression" of the beginning of the eighties,

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reaching 40%, it was also considerably high in the period of more significant Chilean economic expansion, which was between the years 1986 and 1997 (Álvarez & Vergara, 2007).

Companies that operate against the flow of globalization are destined to leave the market. Much of these results are conditioned to companies' survival and growth (Gandoy et al., 2014). Thus, the probability of an SME surviving increases with its size and age, reflecting the level of knowledge acquired about market processes (Acedo & Florín, 2006). That is why in Chile, many emerging companies fail more than large companies and small surviving companies grow faster.

The Department of Economics of the University of Chile carried out a sales study in 2010, where it concluded that the SMEs' sales activity corresponds to the 8% of almost a third of the companies that comprise the economic sector (OCDE, 2010). Aside from the percentages within the business environment, SMEs are of fundamental importance to the trade-in Chile due to the growing number of retail companies. Design, from this approach, is immersed in a distribution and marketing chain that has created a new culture of more personalized consumption and a notable change in consumption habits. Thus, design has given importance to the necessary sales process such as communication, distribution, and presentation of a product to the market.

However, companies called "creative industries" appeared amidst the previously stated stage (it is understood as a creative industry a growing private sector in Chile that is born and nourished by the territory that sustains it, where those who work it often do so by vocation so that remuneration and sales do not necessarily reflect the real benefit that creative activities. These companies have spread virally throughout the territory and, spontaneously, have originated a new paradigm of knowledge generation and management. In this case, the design was used as a strategic tool for transmitting know-how during different phases of the production process, thus becoming an inherent strength in front of its competition.

The concept of design also facilitates the connection among companies of various kinds. Through additional activities such as advertising, design has been able to generate impact in the national market. This accelerated growth highlights the importance of design and new knowledge within production processes and incorporates collaborative networks.

In this sense, the SME design allows granting values, symbolism, and meaning to the product outside the manufacturing process by appropriating the space of contact between the product and the user to establish a new bonding experience. Thus, becoming a transmitter of values, history, signs, symbols, culture, and others. Therefore, according to Viladás (2010): "The practice of design is, therefore, one that allows creative and innovative response to processes that improve objects, signs, and environments that people use in their daily lives" (p. 26).

On the other hand, design and its strategic relation with SMEs generate substantial changes in education. Therefore, new methodologies that foster innovative techniques to reinvent the ecosystem of formal learning are needed to have more drastic transformations and generate knowledge environments.

These design techniques like Design Thinking, Design Council, Design Service, and Design Doing have become trends in education in Chile for the last five years; and little by little, private and government bodies have begun to adopt different forms to introduce to the design and the innovation with strategies like financing, contests, legal instruments, or others. Despite being criticized from a theoretical perspective that is not part of a mainstream vision

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of collective action management, "instruments" can be named, such as the One-Day Business Creation Law, Re-entrepreneurship Law, Bee Capital, SME, SME Purchase Day, Financial Sernac, R & D Law, among others. With this panorama, knowledge is rapidly disseminated, and new competencies are generated by intellectual capital. Since fostering innovation and design is a long-term process for showing results, it also requires a global perspective, commitment, and a common goal.

Then, the production process of a manufactured product and the opportunity cost of the materials and various processes corresponds to 95% of the cost of production in the SME. However, it affects projective terms, only 30% of its final price in the market. From this consideration, it is stated that the cost of designing a product corresponds to 5% of its production (Toril & De Pablo Valenciano, 2011).

Because of these percentages has been very difficult to survive for SMEs without pursuing change. SMEs managers are aware that experiential competencies over their productive and innovative skills are no longer stable growth and business sustainability sources. For this reason, SMEs exhibit a constant search for dynamics that increase their competitiveness, which brings with it the need for constant renewal of strategies to remain in the market (Hernández, Serna & Carrillo, 2011; Gandoy et al., 2014). Besides, most Chilean manufacturing companies construct competitive strategies to achieve cost leadership, and therefore their innovative efforts aim to reduce the use and cost of materials to optimize the production process.

Therefore, innovation in design means promoting business competitiveness by promoting research and product development, reinforcing cultural identity, and rapid response to needs. Thus, from action, design has had a dominant value in advanced economies. Designers increasingly sell a business vision, that is, "a way of structuring and managing the design process" (Pires & Machado, 2006, s. p.). It begins by evaluating processes as a strategic element for positioning and differentiation from the competition.

To boost design at the macro-level, it needs to be involved with public policies that strengthen the management of design, the market process, and the implementation of different types of innovation in SMEs. According to Manrique and Vargas (2017), "Design is the factor that generates competitive advantage" (p. 177). Therefore, in countries with big economies, the design represents a rising value and a strategic element that generates profit. Likewise, Finizio (2002) argues that design management is the same as managing the idea that is subject to macro-environments and micro-environments which necessarily relate to the sector to which it is described.

It can be concluded that encouraging design through "idea management" can be ideal for introducing innovation concepts. It is also a strategy that can be addressed in Chilean SMEs from a public policy perspective within developing the current national government's manufacturing sector.

## 2. DEVELOPMENT AND INDIVIDUALITY OF THE CHILEAN SME

Shackle (1996) establish and define the existence of identity towards the historical and strategic individuality. According to this concept, small and medium-sized companies seeking to change their narrative content towards a new proposal of a fully constituted, independent, and distinctive identity.

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Also, for Hall et al. (1996), identity is an abstract construct that results from the adaptation of the human being to society's accelerated changes. It requires the incorporation of desires, traditions, needs, and experiences. Revolving around the previously stated characteristics, a specific identity is modeled. Then, this influences the appearance of the strategies adopted by both companies and agents from civil society. From this argument, it can be established that aspects such as identity correspond to a cultural (and even linguistic) construction that evolves spontaneously, making itself visible in the products. This position is taken as relevant because the person who constitutes a company as a formal agent transforms its past, whether experiential, cultural, or social, and translates it into meaning on its own. Together with the modernity of the sector, it means forming various social codes inside a given environment (Rodríguez, 1994; Méndez, 2013).

For *design*, the logic of individuality is based on the personal creation of concepts through experiences and knowledge; in other words, a cause-and-effect relationship appears during decision-making. This, in the end, constructs the entrepreneur's profile, which gets reflected in the company's culture to form a collective identity (Viladás, 2010). At the corporate level, talking about organizational identity is related to collective identities that act simultaneously influenced by the company culture (Cantisano & Palací, 2005). They also outline different attitudes and behaviors that make each company a unique ecosystem inside the sector.

All the identities mentioned above allude to the essence of the company built cognitively within a changing environment, forming, and adapting to social, political, and economic tendencies, which forge the construction of a new strategic identity under a focus on individuality temporality (Grant et al. 2013).

Individuality makes the company build a strategic identity based on differentiation, which considers key factors in the design process. This logic of working from the identity allows acting in emotional aspects of the human being to lead the innovation process towards the ideation of products with more significant meaning for the company and the user (Viladás, 2010).

From the differentiation approach, entrepreneurs consider innovation as a precarious process of transformation. Once the risk in terms of cost, raw material, and time is understood, talking about innovation in SMEs generates insecurity (Álvarez, 2015).

A high innovation rate is currently given in programs that encourage new competencies from a Business Management perspective. However, the product's innovation level is still minimal and is evident in the low sales index.

However, the MESO (Mollenhauer & Hormazabal, 2012) system of Support to Value Creation in the Enterprise, developed in Chile, identified that within the country, academic, technical, and public interest in entrepreneurship emerged, describing it as an eminently creative phenomenon that allowed the renewal of the productive scheme in which it is admitted that the SMEs are the protagonists.

When referring to State-owned small and medium-sized enterprises, this method also identified that the problem with productivity in SMEs was due to its origin and to the MESO dimensions that were evidenced by the appearance of new attributes/languages around the product, such as identity, story, value, meaning and business model.

Therefore, according to Álvarez (2015), it is inferred that most of the versatility of the SMEs is linked to the technology used in the manufacturing process to increase the amount of

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production volumetrically over some time to satisfy a given demand. This constant and static innovation has aimed to maximize sales to respond to massive groups' single needs. Rampino (2011) mentions new terminologies linked to modern languages that describe the object with other variables of innovation as new technology in manufacturing executed not in the process but in the usability and experience, the user satisfaction that results from the birth of new demands, Technologies towards an existing product and user needs, turn out to be a lot of new manufacturing opportunities within the productive sector.

The diversity of new codes and languages for this product sector is incorporated at the same rate at which the flow of innovation enters the company. With the entrepreneur's approval and emotional security to develop, propositional and dominion attitudes are assumed (Álvarez, 2015). This is based on the entrepreneur's inherent advantages that allow him to recognize and obtain the same product's maximum value (Macmillan, 2007). The gear that combines components around the product has a relationship between raw materials, technologies, communication channels, processes, and human resources. For several years, it allowed them to approach users supported by the advantages of loyalty gained, seemingly solid and stable. The following questions arise: Does the SME need to innovate? Why is design obliged to account for the relational link of these new languages in manufacturing SMEs?

### 3.DEVELOPMENT AND INDIVIDUALITY OF THE CHILEAN SME DESIGN AND INNOVATION IN CHILEAN SMEs

To introduce innovative product changes, it is necessary to apply new knowledge developed within the company. When a process is established inside the company, it means, as Cachanosky (1994) explains, that the value of the product, which until today was conceived from a limited vision, and was immersed within a dichotomy between the correct understandings of the concepts: the value of use (value) and value of change (price). Also, a new dynamic is created that expands the entrepreneur's culture (described as *homo agens* or *agent discovering new opportunities through the market process*) in the management of new concepts. This translates into a product that has a new meaning for the company and the client (Kirzner, 1998a and 1998b).

The MINECOM in 2012 analyzes the opportunities to start a new business and innovate in Chile. This analysis presents relevant data on innovation policies promulgated at a national level. It also emphasizes that to reach a global connection, private productive agents must introduce design as part of their innovative activities (MINECOM, 2012). Besides, an interesting facet of the Seventh Survey of Innovation conducted by the Ministry of Economy of Chile shows that only design has a return on investment of 100% despite its low participation. This percentage indicates that design can be an essential asset for a company that wants to increase its profit margin.

Therefore, the National Government is aware that introducing its design is a new strategy to boost innovation and raise competitiveness at the local and national levels.

In manufacturing SMEs, it is essential to achieve a high degree of innovation in the product. To determine the level of innovation of the SME concerning its product, the Four types of results of the Design-driven Innovation Process proposed by Rampino (2011) are taken as essential characteristics that an innovative product must have. This allows us to have an idea of the level of innovation of Chilean SME's products.

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Chile has experienced a nonstop stream of innovation. Many private entities (institutes, companies, universities, NGOs, among others) and public (government agencies) are simultaneously organizing so the "paradigm" is assimilated by civil society. In this sense, there have been multiple studies to discuss what companies have made more significant contributions to Chile's innovation. It has been established that 19% have made "innovations" between 2009 and 2010. Of that percentage, 16% of SMEs innovate. This index for small businesses is no less. However, the acceptance of a high level of innovation lies in developing several types of innovation simultaneously. Besides, about 18,133 companies in Chile carry out technological innovation which represents 74%. Also, 47% made innovation in product and 56% in the process, where the low deficit in innovation is concentrated in marketing and in the product itself.

Also, it was established that large companies lead innovation in general. Conversely, small companies lead in process innovation linked to technological investment.

Most of this statistical data shows firms' quantitative reality describing innovative rate rather than skills and innovative capabilities. The data indicates that Chile's innovative ecosystem is in the exact synchrony guided by the social and political environment and goes through a transition guided by willpower rather than by necessity.

## CONCLUSIONS

Business competitiveness motivates SMEs to fulfill the needs of customers to face the global market's challenges. One possible scenario for innovation in the company is to interpret customer requirements and transform them into critical strategic content that would intervene in all phases of a product's development process.

Design and tools help the entrepreneur manipulate qualitative information to build formal aspects of the product. Also, it encourages the development of creative teams through co-working to generate collaborative design processes that create more open and dynamic communication spaces with the client. Thus, strengthening the perceived quality of the product from the conceptual phase of the process.

Openness to innovation opportunities is amplified as the company restructures its conception of innovation and incorporates new productivity improvement scenarios. In this sense, SMEs need to understand that technological innovation is not the only visible result of the competitive change. The empowerment of soft innovations allows for a more significant impact at the social level to transform consumer experience into satisfaction.

The practice of new types of innovation in the productive matrix leads to solutions that are not sensitive to risk factors and extends them to all design phases. This results in constructing a "know-how" capable of adapting to its organizational culture, promoting productivity, and enhancing human capabilities.

For SMEs, business opportunity and value capture have two possibilities. The first possibility is the innovation of the whole product system and the product portfolio's continuous renewal. Thus, becoming an independent and knowledge self-generating company. The other possibility is present in subsidy instruments for derivative projects in employment and productivity matters, where the State is a participant in the dynamics of innovation in the company.

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Finally, introducing innovation in SMEs implies understanding that these companies seek to maximize their income levels to increase their profitability. Therefore, it is concluded that design allows reducing investment costs for the company while presenting a proposal of generating a safer new product, which will increase the likelihood of the company to remain and compete in the local market.

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