

# Design Processes: From the Historical Perspective to the Application in Startups Companies

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## Abstract

This article addresses innovation, entrepreneurship and design management, aiming to investigate how it could contribute to the maintenance of the innovative character of startup companies. A brief survey was made on the importance of design in organizations. The timeline with the main developments from the 1950s to the present day, revealed that design has been strengthened as an entrepreneurial and strategic character. Subsequently, the Brazilian startup scenario was structured, analyzing the context in which they are inserted, as well as their management paradigms, which culminated in the search for information about design management and its role for the innovation of organizations. As a result, the theoretical studies allowed the elaboration of a model with five processes: Design for innovation strategies; Design for idea generation; Design for concept creation; Project to represent the company; and Design as an integrator.

## Keywords

Design process  
Startups  
Design management  
Innovation

## Introduction

It is interesting to observe the evolution of the field of design to the present day, to understand the importance that this area is associated with the innovation of organizations. Bonsiepe (2015) states that in recent decades, the concept of design has undergone significant changes. In defense of design as an innovation process, the author clarifies that the project is a “constitutive element for the general innovation process” and not a peripheral element. Technological innovation in design is approached in different ways.

The first, more generally, involves a system of guided basic research, process and product development that incorporate new technical, functional or aesthetic solutions, in addition to their introduction into the production system.

The second interpretation, more restricted, refers to the last phases, in which the application and technological revisions are present. As a technological activity, design should not be limited to the last stages of a product’s development, but should have a proximity to research to adapt new technologies to products or improve products already on the market.

Currently, the detachment from the classic view of design, for this contemporary perspective, design expands its field of action, reaching levels of management, not as a process, but in the broad sense, as a guide to the innovation management process of an organization.

In this sense, design is considered an important element in the universe of innovation and entrepreneurship, no longer restricted to the aesthetics of products, which even corresponds to an inadequate discourse for such importance and relevance, which the area finds itself, but focuses on an ideation process that aligns business needs, such as strategies, creativity, resources, with market demands and opportunities, to ensure user satisfaction as well as company profitability (Martins & Merino, 2011).

In the universe of startup companies, according to Martins & Merino (2011), support and the ability to compete are necessary, which increasingly depend on the innovation process. This condition becomes more complex, thanks to the incipience of a business model that remains innovative over time or that the idea in question originates a really new product or service.

The design management area presents itself as a recent, current and appropriate approach to make startup companies agile and scalable. It is being disseminated in the management universe of organizations as a way of involving the company’s people in search of creating an offer of really considerable value, as it helps to structure and design its environment to make it understandable.

The realization of the proposed research is justified primarily by the themes of design management, business innovation and entrepreneurship, whose dissemination in the academic environment is recent, since the presence of design as a participant element of business management and fostering innovation in companies is still configured as a still emerging issue in Brazil.

Startup companies around the world have been widely recognized for their high levels of technology, methodological design process and products and services considered innovative not only

at launch, but remain innovative in their existence. This is the case of companies, initially startups, today large companies, which were important for the recognition of the area as fundamental for innovation in organizations. Companies such as Google, Apple, Space X and Tesla are examples of solid organizations recognized as pioneers in design management and innovation.

The present article carried out an immersion in the triad — innovation, entrepreneurship and design management — and how this universe can be applied in startup companies, through a qualitative approach, so that they can maintain their innovative competence over time, through the processes of design. Therefore, it was necessary to deepen the bibliography that provide subsidies for the problem in question: How can design management processes contribute to promoting innovation in startup companies?

### **Timeline: The Importance of Design in Organizations**

The importance of understanding this evolution is fundamental for understanding the context of design today and its relationship with the practice of innovation in the business world. This brief timeline is described below:

- From the 1950s: When the attention of the industrial world was focused on productivity, rationalization, standardization, they were responsible for promoting a rupture between design and art and for inserting it definitively into the reality of companies, being crucial for series production and the launch of new and affordable products on the market. However, it was associated with the cosmetics of the products, being restricted to the form, the look, the decorative features and the design.
- From the 60s: The first methodologies in design, mainly after the books by Christopher Alexander (“Notes on the Synthesis of Form”) and Bruce Archer (“Methods for Designers”), who were responsible for working the problems of design in a procedural way (Martins & Merino, 2011). However, this period was also characterized by radical criticism of consumerism, due to the large scale of industrial production, including the first manifestations of an appeal to a new culture of products.
- From the 1970s: Reality in antagonistic situations in the world between developed countries, whose focus was the production of cutting-edge technology, and poor nations, ravaged by misery and great social differences. It was characterized by the search for a design identity, whose socioeconomic contrast was responsible for the harsh criticism of design, regarding the form and function of products (Bonsiepe, 2015).
- From the 1980s: Questions about the social relevance of design started to lose strength, giving way to a motto in which everything in the area, before anything else, should be fun (Design for fun). The design of furniture products and lamps gained prominence in the market, with really valuable pieces and the resumption of the discourse on style and form (Bonsiepe, 2015).

- From the 1990's: The environmental issue and the importance of sustainable development involve design as an important element. Design management as a decisive factor for companies, whose reflections on efficiency and competitiveness resumed the discourses on the procedural practice of design in organizations. The recognition of social and economic importance stands out, however, it presented low relevance to theoretical issues and academic production in this context. There is a popularization of the term "everything is design", but also the understanding that design manifests itself in the invention of new real-life practices. In fact, the conceptual direction of the period contemplates design as oriented to the future and is related to innovation, which presents itself through the concerns and problems of a community and establishes a non-resigned connection, resulting in an effective action, revealed in products or artifacts with purpose and value to the human being (Bonsiepe, 2015).
- From the 2000s: The beginning of the century represented a period of changes in the way companies are managed, especially with regard to issues related to innovation. Maximizing the productivity of reengineering processes is left out in the current discourse on innovation (Liedtka & Ogilvie, 2011). Several disruptive products were launched, among them the iPod stands out, which was not just another portable music player, but in the way the music industry marketed its records, the increase in immateriality between the user and the product, as well as in the process of creating a network to provide a customer experience (Brunner & Emery, 2009). This example represents one of the main characteristics of the beginning of the century, in which the transformations of society and technological advances, post-globalization challenges and opportunities, in addition to radical innovations, as well as a new reality for the roles of professions linked to innovation: Engineers passed to be trained also thinking about business, administrators are prepared to lead technological innovation and designers are responsible for the entire product life cycle (Martins & Merino, 2011). With this, a new reality of project: from the previous, divided and the current, integrated and multidisciplinary:

As the center of economic activity in the developing world has shifted inexorably from industrial production to knowledge creation and service delivery, innovation has become nothing less than a survival strategy. In addition, it is no longer limited to launching new physical products, but includes new types of processes, services, interactions, forms of entertainment and means of communication and collaboration (Brown, 2009, p.7).

In this context, design is no longer an element only consulted at the end of product development, it becomes a function that involves an entrepreneurial and strategic character, far beyond the tangible, increasingly associated with services and experiences.

## Startups: Concepts and Management Challenges

It is common for startup companies to associate with organizations that produce cutting-edge technology. Despite this conception, nowadays, its definition is much broader. The “boom” of companies of this size took place in the 1990s, thanks to the progress of Information Technology (ICT). This period, also characterized by globalization, the great territorial expansions of corporations around the world, as well as advances in bureaucratic hierarchies, from excessive organizational planning, which sought to mitigate business risks, startups gained strength navigating in the opposite direction of these organizations (Thiel, 2014).

Blank & Dorf (2012) state that a start-up company, linked to any type of business, that is not focused on the innovation of products or services and, therefore, exempted from the risks of uncertainties, are not startups. They operate based on the principle of interacting with other people, they are small in resources and motivated to build a different future, through new positions and ideas.

This new identity is due to the fact that very young companies reach the level of valuable, traditional organizations with a long time in the market. Previously, this lack of experience and wisdom would have kept most of these startups away from any possibility of success. This, however, no longer happens. One of the most important characteristics of these organizations is their rapid growth, in which the speed at which they stand out exceeds traditional, denser and slower organizations (Butler & Tischler, 2015).

It is important to note that, at the turn of the third millennium, still under the influence of the rapid evolution of ICT, many startup companies became known as “*dotcom*”. In general, they were ambitious and creative, offered high risks, differed from large corporations, for being unconventional, but used traditional management methods, as well as large companies. Despite the high values applied in investments, many of them lived intensely, however they died young (Butler & Tischler, 2015).

It is in this context that startups could no longer be defined by their cutting-edge technology, as well as their management methods following models that are applied in large organizations. In this sense, according to Butler & Tischler (2015), a startup is not the smaller version of large companies, nor even reduced models of small organizations. It can be defined as a temporary organization designed to pursue repeatable, scalable and profitable business models. Extending this definition, Ries (2011, p. 24) conceptualizes a startup as  
a company or a human institution that is built in the most diverse fields and that spontaneously arises in a condition of extreme uncertainty, has in its essence the innovation to create products and services which intend to revolutionize the market.

Nowadays, the consumer environment is characterized by its high competitiveness, startup companies play an important role. Young entrepreneurs willing to take risks, with disruptive ideas and a lot of creativity, create completely new businesses that help to reinvigorate a country's economy. However, it is clear that the fact that a startup has a revolutionary idea is not a guarantee of sustainable success. Generally, these companies seek financing for their projects to become scalable and profitable.

As the startup market is characterized by uncertainty and also because they are completely new companies, there is no long and stable operating history, since they do not have statistics or experience, which makes them companies with a high risk of mortality in the first years of activity. The great challenge for these companies is to remain essentially creative not only in terms of innovation in products or services, but also in the company's management mechanisms. It is with this thought in mind that other business functions also become as important as the development of new products or technologies. A startup should not be focused on the product only, but on its market, competitors, users, suppliers so that true opportunities for innovation can be identified. For this, it is important to have a long-term strategic vision, with goals and targets set so that entrepreneurs have an instrument to guide their actions.

### **Brazilian Startups: Context and Management Paradigms**

In developing countries, as the case of Brazil, the startups scenario is still nascent, but in fast growth. It is estimated that there are around 10,000 startups in the country, which in the year 2012 amounted to about R \$ 2 billion, which represents 0.4% of the Brazilian GDP (Nogueira & Oliveira, 2015). The state of São Paulo, followed by Minas Gerais and Rio de Janeiro, concentrates most of the country's startups.

From a financial volume point of view, the impact of these companies on the economy is still small, but these companies stand out by providing solutions that are not based on high technology but on social impact. In a study carried out by Dom Cabral Foundation in 2012, it was shown that the Brazilian entrepreneurs who had their companies discontinued hide behind a culture of intolerance to failure and leave that failure is a factor for the discouragement of entrepreneurship in Brazil. The non-acceptance to accept failure, besides being a cultural barrier to entrepreneurial development in the country, was responsible for a lack of knowledge regarding the causes of startup mortality in the country.

As a consequence of the entrepreneurial movement in Brazil, micro and small enterprises, which include start-up companies, have become important for the economy, since currently they constitute 98% of all the enterprises of the country represent 21% of GDP, besides 52% of regularized labor, becoming fundamental for the economic and social development of the country (Dornelas, 2016).

Another important issue is that startups are considered fragile companies in Brazil. One reason that leads to high failure rates can be justified by the lack of adherence of their products or services to the consumer market due to their limited ability to understand the environment in which they operate (Xavier & Cancellier, 2008). This reality reinforces the importance of the development of research oriented to better understand the context of startups. The concepts currently used to deal with management in these companies are scarce and require adaptations to a new entrepreneurial reality in Brazil.

## **Design Management: The Design Processes for Innovation**

Mozota (2003) points out that the area of design contributes to success of an economy, it is related to the improvement of product performance, which increases the competitiveness of a country, and that every innovation, both incremental and radical, requires the participation of design. According to the author, research shows the relationship between business performance and design management, whose results prove to be better, than traditional companies, based on sales growth and profit rate.

Mozota (2003) states that design management is the effective distribution by the role of a manager and the available design features the company to contribute to meeting your goals. Mozota (2003) defines design management from different perspectives: As an end, that is, design is placed at the service of corporate objectives and as a means, in a way that contributes to the solution of management problems. He also says that design management is an “asset management” that adds value and coordinates resources in a balanced way, as well as an “attitude management” that supports the decisions of a company that contributes to its strategic value. Still, according to the author, design management involves the contributions of design that helps a company to develop its strategy.

Walsh (1992) apud Mozota (2003) highlights four characteristics of design as a process in organizations:

- Creativity: The design process results in the creation of something that did not exist.
- Complexity: The design includes in the process a lot of variables and parameters to compose the decisions and the activities.
- Commitment: Considering the balance of many conflicting variables, such as price and cost or materials and durability, looks for the best options for the harmony of the result.
- Ability to Choice: It is characteristic of the design process where people make choices in the many possible solutions to a problem, from the color, as well as the ideal ergonomics.

Mozota (2003) points out that the designers' performance is prescriptive, since they recommend a world that could be futuristic. Still, according to the author, the design process is a process of identity as it defines a company, its customers and investors, in addition to differentiating the organization and is at the center of its success. Every design process ends with a possible result, be it a product, service, packaging, experience. Is multidisciplinary and iterative character, far beyond the visual results, since it integrates market research, marketing strategies, branding, and production planning, among others. Finally, the design process is a knowledge process, which applies creativity, technologies and production methods to meet the needs of users and stakeholders, fosters innovation and entrepreneurial spirit in organizations.

In this sense, design processes aim for a unique result, as long as there is a problem to be identified first and then solved. Once identified this question the design process follows logical steps, which are applied in each phase of the project through techniques and skills, which together result in the success of the process.

According to Mozota (2003), the creative process in design follows five stages, they are:

- **Investigation:** A potential opportunity or need is identified and ideas are generated to see if this issue expands the field of research, and to better understand the problem. Results in a briefing, which includes the description of the problem and the project goal.
- **Research:** It evaluates the opportunity and importance of the project to the company and questions the stakeholders to better understand the data collected. Important issues such as product positioning, for example, aspects of the competitive market environment and project context are inserted in the project documentation. Results in sketch a diagram of the project, a script or settings on the project.
- **Exploration:** After understanding the problem in its entirety, this is the stage where the creativity of those involved is used without limits to draw sketches or other elements of the different possible forms. The result can be presented in different forms and perspectives. The result of this step is the selection of guidelines with key stakeholders.
- **Development:** Time to represent the solutions chosen for the selection of possible options.
- **Realization:** Related to the documentation of execution of a plan that contemplates the necessary for the solution of the problem in question.
- **Evaluation:** The stage responsible for the technical control, to guarantee the conformity of the solution in question. Market assessment is also carried out to conform the solution with the brand, target market and market objectives, for example.

## **A Proposal of Design Processes for Innovation in Startups**

In this context, the theoretical studies addressed here represent an ecosystem that includes the disciplines of entrepreneurship, innovation and design, whose focus is the elaboration of a model that contemplates the understanding of the approaches presented through design processes, both to strengthen the design as a management tool as well as organize and present development activities to innovate through the design contribution.

### **Design for Innovation Strategies**

The first is about design for innovation strategies, it is seen as a creative management process and aligns with innovation, through product, service or experience strategies, according to the mission, vision and strategy of startups. Participates in the improvement of developing process of new products, the definition of product strategy and the quality of work teams. It adopts a user-centered perspective that encompasses both a market-oriented view as well as a process of internalizing the information that is collected, both the internal and external environment, as well as the consumer market for the analysis of potential opportunities.

## Design for Idea Generation

Another important factor in the management of innovation by design is the conscious and prospective research of the opportunities of the environment. The realization of an environment mapping, whose research encompasses many variables, such as cultural values, trend studies, evolutionary patterns contribute to the understanding of the problem and the search for solutions. Because of their observer profile and their questioning skills, through inquiries it is possible to generate ideas that can be integrated with the strategy to later become concrete. This process for innovation aimed at the management and selection of ideas is called design for generating ideas (Mozota, 2003).

## Design for Creating Concepts

The third process, design for concept creation, establishes the development of new concepts of products or services adapted to changing needs as a consequence of transformations of possible ideas innovations or unique experiences for the user. It is the stage of formulating unique values of the product or service that will be delivered to the customer (Mozota, 2003). In this process, the practices of co-design and co-creation are fundamentals, since through this practice uses a global network of resources to create unique experiences together with customers and integrated into the process, which are key components for the generation of value and innovation.

## Design for Company Representation

Another challenge for design management to foster innovation is the issue of design and company representation, since every product is a portrait of a company and the development process that created it. The way that work teams act, how decisions are made must all be coherent and related to their strategy. An organization that innovates through design must work with focus on the customer experience after consumption of the product / service. This process collects the market information to serve as input to the product life cycle improvements in an agile way (Mozota, 2003).

## Design as an Integrator

Finally, design as an integrator, contemplates the activities related to the identification and consideration of customer requirements in all company functions. In other words, it is the adaptation of the product to its environment to provoke a "customer enthusiasm" for this to perceive the quality of the product and the company through its innovation (Mozota, 2003). The success of innovation depends on the integration of many tools, this process aims to keep everything and everyone integrated, in order to maintain a cohesive corporate image (Martins & Merino, 2011).

## Final Considerations

Today's innovation is a critical need to maintain an organization's competitive capacity if it is introduced into a steady organization. This dynamic is fundamental for the construction of the central competence of a company and is related to the capacity to generate knowledge. The design is knowledge generator, so it is important the presence of this dimension in the innovation process of a company, continuously, in order to develop methods as well as flexibility in order to assimilate new knowledge in your development team, as results of application of the processes.

The literature review allowed the detailed study of the innovative entrepreneurship in startups, knowing the particularities and peculiarities of this type of business in Brazil. In this way, it was possible to emerge through research on the procedural practice of design, acting in the important dimensions of a startup. In summary, the five design processes are designed to act on:

- In creating the strategic plan of a startup, fundamental to the understanding of the opportunities in the market, the definitions and organizational goals and the definition of work teams.
- In the capacity to generate ideas, a process that encourages the whole company to propose new possibilities, opportunities, using creative processes to use in favor of their products, services and experiences.
- In creating concepts, the process aims to create new meanings, forms of use, payment models that stimulate the company to focus on radical innovations.
- In representation of the company, in short, is the way in which customers see the brand, the values, the products and services and perceive the corporate values at the moment of consumption.
- In the design integration to ensure a superior quality, consequently the success of innovation.

Finally, the processes presented here represent a compilation of recent theories that address design, entrepreneurship and innovation to contribute to a better performance of startups to generate products, services and innovative experiences. According Mozota (2003), successful companies see learning and improving their development processes as a part of business activity, whose goal is to continually learn how to do the activities the best way to more quickly and efficiently, resulting in a continuous capacity to produce competitive advantage.

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## References

- Blank, S. G., & Dorf, B. (2012). *The Startup Owner's Manual: The Step-by-Step Guide for Building a Great Company*. BookBaby.
- Bonsiepe, G. (2015). *Do material ao digital*. Blucher.
- Brown, T. (2009). *Change by design: how design thinking transforms organizations and inspires innovation*. Harper Business.
- Brunner, R., & Emery, S. (2009). *Design Matters: How great design will make people love your company*. Pearson Education.
- Butler, D., & Tischler, L. (2015). *Design to Grow: How Coca-Cola Learned to Combine Scale and Agility*. Simon & Schuster.
- Dornelas, J. (2016). *Empreendedorismo: Transformando ideias em negócios*. Empreende/Atlas.
- Liedtka, J., & Ogilvie, T. (2011). *Designing for Growth*. Columbia Business School.
- Martins, R. F., & Merino, A. D. (2011). *A gestão de Design como estratégia organizacional*. Rio Books.
- Mozota, B. B. (2003). *Design Management: Using Design to Build Brand Value and Corporate Innovation*. Allworth.
- Nogueira, V., & Oliveira, C. (2015). Causa da mortalidade das startups brasileiras: como aumentar as chances de sobrevivência no mercado. *Nova Lima, DOM*, 9(25), 26-33.
- Ries, E. (2011). *The lean startup: How today's entrepreneurs use continuous innovation to create radically successful businesses*. Crown Business.
- Thiel, P. (2014). *Zero to one: notes on startups, or how to build the future*. Crown Business.
- Trias de Bes, F., & Kotler, P. (2011). *Winning at Innovation: The A to F Model*. Palgrave Macmillan.
- Xavier, W. G., Cancellier, E. L. P. (2008). Atividades de monitoramento em empresas de startup. *Análise*, 19(2), 107-119.
- Walsh, K. (1992). *The Representation of the Past: Museums and Heritage in the Post-Modern World*. Routledge.

