Masters in Management Program

THE MIXED IMPACT OF DESIGN THINKING ON BUSINESS COLLABORATIONS

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ABSTRACT

The present work project investigates the implications of design thinking on an inter-business collaborative project, unveiling both the benefits and fragilities that derive from the use of such methodology within the mentioned context. The study is organized in two parts. The first one starts with a literature review on the two relevant frames of reference – design thinking and business collaboration. It proceeds to the creation of a conceptual framework to assess the potential value of the design-based approach. The second part focuses on the practical application of to the newly developed instrument to the inTRAIN project – R&D for railway interiors.

Keywords: design thinking, business collaboration, collaborative project management

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INTRODUCTION

"*Complexity is sometimes taken as a necessary condition for proper organizational functioning: only complex organizations can tackle complex problems.*" (Pina e Cunha & Rego, 2010). Many organizations worldwide face multiple interacting objects. As such, in the current business environment, there is a growing need for suitable methods to address intricate issues, which are not typically part of the project manager's palette of techniques (Remington & Pollack, 2007). In fact, a growing body of research suggests that the traditional rational and analytical process of planning and decision-making is not quite enough to tackle the complexity intrinsic to the corporate world (e.g., Mintzberg, 1994). In the view of this tendency, design thinking is increasingly understood as an approach that can add significant value to business.

Currently, design thinking is already accepted as a methodology with much to offer, since it holds the potential to tackle challenges that are complicated, uncertain and involve diverse stakeholders (Liedtka, King, & Bennett, 2013). Specifically, this approach can offer a valuable framework in the development of collaborative projects, which, by their nature, are naturally complex (Podlog, 2014).

However, despite being a subject addressed by an increasing number of books, papers and articles, there is little empirical research on design thinking as a management practice, particularly when it comes to collaborative ventures. Considering this, the present work project aims to provide a better understanding of the role of design thinking on inter-business efforts, thus investigating the methodology as a potential key enabler in the pursuit of techniques to address complexity within this context.

Given the study's purpose, the following research question will be addressed:

What is the impact of design thinking in collaborative project management?

PART I | Theoretical Framework

1. DESIGN THINKING

Although there is still no unquestioned definition for the concept under discussion, an extensive literature review on the subject revealed many points of agreement among scholars and practitioners. Design thinking is now generally accepted as a **systematic** and inherently **holistic** approach to challenges, that works through **iterative cycles** and which resorts to the **methods employed by designers** to successfully meet **human needs**, considering both the **technological system constraints** and the **business restrictions** (e.g., Brown, 2009). A better understanding of this concept requires an individual examination of the characteristics aforementioned.

Systematic Character

As reported by Brown (2009), design thinking provides "useful starting points and helpful landmarks" to address complex problems. Specifically, it proposes that every project goes through three distinct spaces, labeled "inspiration", "ideation" and "implementation". The first one refers to the factor (either a problem or an opportunity) that stimulates the pursuit of solutions. The second one concerns the process of developing and validating new concepts. The third one involves setting a course to introduce the project in the market.

Holistic Essence

Design thinking is inherently holistic. It sees problems as systemic conditions, affecting the whole organization, and, as such, envisions opportunities for systemic solutions, involving everything needed to deliver a complete result (Owen, 2007). This requires facing challenges as a whole, but taking every aspect to heart.

Iterative Nature

Design thinking acknowledges that "there is no "one best way" to move through the process". Instead, it embraces a system of overlapping spaces rather than a series of orderly steps (Brown, 2009). Practitioners move back and forth through the three aforementioned phases, not following a linear course of action (Gruber, de Leon, George, & Thompson, 2015).

Design Ethos

According to Glinska (2015), design thinking "uses tools and methodologies designers have been employing for decades". Among a number of existing practices, there are three commonly mentioned in the literature: needfinding, which comprises the set of activities for developing deep user insight; brainstorming, which concerns a formal framework used to stimulate creative thinking; and prototyping, which encompasses the development of preliminary models as a way to better understand new ideas (Seidel & Fixson, 2013).

Humanistic Values

Design thinking is a human-centered approach that puts the investigation of the users' needs right at the forefront of the process (Gruber *et al.*, 2015). This methodology promotes customer intimacy, which enables the organization to develop a profound understanding of individuals' problems - even those whose existence they are not aware of – and, this way, find new business opportunities. Also, "by engaging actual customers through a series of prototypes and incorporating the insights gained from these real-world experiments, rather than relying on historical data or on market research, design thinking minimizes the uncertainty, and therefore the risk, of innovation" (Glinska, 2015).

Constraints Satisfaction

Design thinking is characterized by the "willing and even enthusiastic acceptance of competing constraints" (Brown, 2009). These consist of three distinct criteria for determining the success of new ideas: desirability, feasibility and viability. The first one refers to the user's perspective and relates to people's needs and wants. The second one encompasses the technology's perspective and involves technical possibilities. The third one concerns the business perspective and considers the capacity for the project to be sustained (Chasanidou, Gasparini, & Lee, 2014).

Having completed the first part of the literature review, the next section focuses on providing insights about the second theme under study.

2. BUSINESS COLLABORATION

Similar to what happens with design thinking, there is no commonly accepted definition for collaboration. Instead, there are several characterizations, "each having something to offer and none being entirely satisfactory by itself" (Wood & Gray, 1991).

McLaughlin (2004) argues that the nonexistence of a generally recognized description for this term can be seen in a positive light, as the associated ambiguity enables different understandings and, as such, does not instantly dismiss potential stakeholders. However, Sullivan and Williams (2007) claim that several interorganizational relationships experience some problems as a result of distinct interpretations of the object of collaboration.

Taking a look at the work of two renowned professionals, Gray (1989) and Bardach (1998), it is possible to identify clear distinctions between their propositions. The first author emphasis the role of bargaining and describes collaboration as "a

mechanism by which a new negotiated order emerges among a set of stakeholders". Yet, the second one suggests that a collective project should reshape the intervenient firms in ways that increase their value to the community. He defines the same concept as "any joint activity by two or more agencies that is intended to increase public value by their working together rather than separately".

Furthermore, Lawrence, Phillips and Hardy (1999) argued that collective efforts are not arbitrated by the market system, but by external instruments. Also, they recognized no legitimate authority to be in charge of the situation, stressing the importance of specifying roles and responsibilities. So, by collaboration they meant "a cooperative, interorganizational relationship that relies on neither market nor hierarchical mechanisms of control but is instead negotiated in an ongoing communicative process".

In turn, Sullivan and Skelcher (2002) pointed out the purpose of joint activities, stating that a "partnership is about sharing responsibility and overcoming the inflexibility created by organizational, sectoral and even national boundaries". Bronstein (2003) relied on a more positive definition, according to which collaboration is "an effective interpersonal process that facilitates the achievement of goals that cannot be reached when individual professionals work on their own".

In the light of the above mentioned, it would seem appropriate to say that collaboration occurs when a group of stakeholders decide to work together in order to overcome existing obstacles and achieve goals they could not have reached on their own, simultaneously sharing the responsibility of the project in question. This process is not subject to market control, nor approves the use of power by any part, but requires the stipulation of rights and duties for every intervenient.

3. THE POTENTIAL VALUE OF DESIGN THINKING ON INTER-BUSINESS COLLABORATIONS

The resort to design thinking in a collaborative context can add significant value to the corporate world. Theoretically, this line of action can improve the innovation process in a group setting and the way it is managed. Indeed, the associated methods and tools allow teams to reduce the level of uncertainty intrinsic to the decision-making process and make informed choices, based on the practical insights gained from iterative cyclic prototyping (Curedale, 2013).

Additionally, design thinking instruments are expected to increase performance in terms of innovativeness of problem-solving. Among the existent tools, brainstorming, for instance, is an effective way to provoke cognitive stimulation and inspire groups to come up with new and creative ideas (Fay, Borrill, Amir, Haward, & West, 2006).

Furthermore, the design-based methodology can work as an effective communication tool for the partnership members, as it creates a shared basis for information exchange, enabling entities to "embody their own ideas in real-time" (Chasanidou *et al.*, 2014).

The same approach can also assist the team in embracing a broader perspective. Engaging interfaces and alluring visualizations can lead people to develop perceptions that they possibly did not have before (Chasanidou *et al.*, 2014).

4. CONCEPTUAL FRAMEWORK

The lack of empirical foundation regarding a practical procedure for the evaluation of the impact of design thinking on an inter-business collaborative context lead to the development of a conceptual framework (fig. 1). Such construction includes numerous concepts encountered during the literature review regarding the two

theoretical fields under study. These concepts were merged or divided where applicable, in order to create clear distinct categories and reduce redundancy to the highest possible level. This process enabled the development of a coherent nomenclature, adopting the most common terms and producing new ones in cases where existing ones were vague.

The creation of the conceptual framework is, then, expected to enable the observation of the criteria that are inherent to the use of design thinking on a collaborative project, as well as the analysis of the impact of each of these elements.

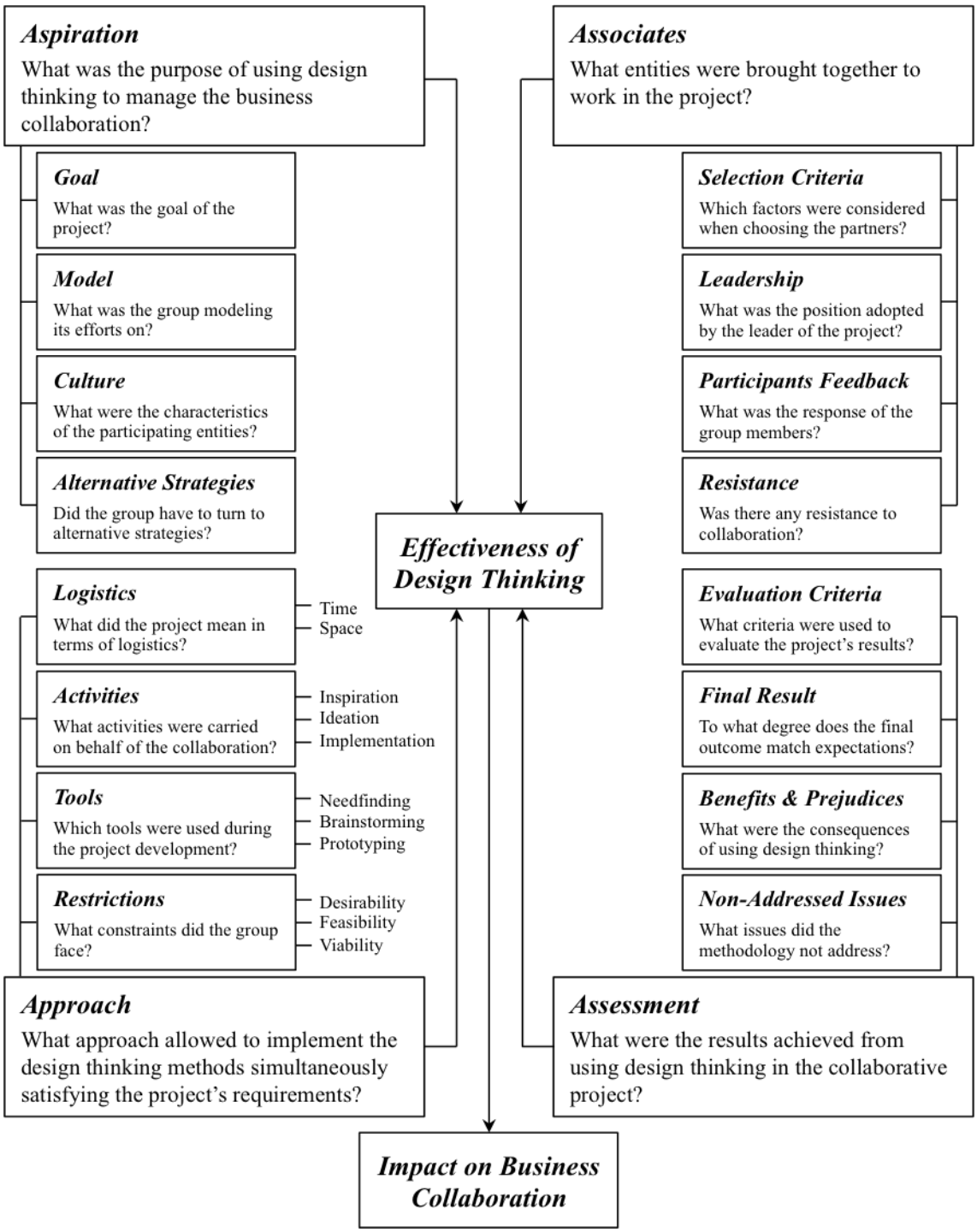
Lund (2014) suggests that consideration be given to four different dimensions: Why? Who? How? What? Specifically, she proposes to examine the reason behind the resort to design thinking in the collaborative set, the group of entities involved in the project, the approach adopted by the participants and the results achieved from implementing the program. The framework contemplates all these variables, hereinafter referred to as the fours A's – Aspiration, Associates, Approach and Assessment. The renaming procedure aims to create a clearer and more distinctive nomenclature.

Additionally, due to the need of further detail, for each of the dimensions above mentioned, four sub-factors were considered to be intrinsically related. These elements put the main subjects in more narrow terms, enabling a better understanding of the questions and, this way, facilitating the formulation of comprehensive answers.

All these variables – the four A's and the correspondent ancillary aspects – determine the effectiveness of design thinking. That is, depending on each of these elements, the methodology will present itself as more or less effective. In that sense, the application of the conceptual framework allows to evaluate how the set of circumstances affected the degree to which the concerned practice was successful in producing the desired result.

In turn, the effectiveness of design thinking determines the impact of such approach on business collaborations. Again, the framework indicates the relation between the level of accomplishment of the methodology and the results it produces on collective projects. Figure 1 illustrates the previous discussion in further detail.

Figure 1: Conceptual framework for the study of the impact of design thinking in business collaboration



PART II | Empirical Study

5. RESEARCH METHOD

This work project starts with a literature review on two different theoretical fields: design thinking and business collaboration. This part of the investigation relied on an exploratory research on both primary and secondary data sources. The original information streams encompassed articles, books, conferences and dissertations. As to the documents exhibiting information that was first presented elsewhere, these included bibliographies, catalogs and magazines.

The study, then, focuses on the development of a conceptual framework for the exploration of the impact of design thinking on business collaboration. There follows a presentation of said conception and its subsequent operationalization, applied to the inTRAIN project.

THE INTRAIN PROJECT

The venture started on February 1st 2012 with the purpose of designing an interior for a suburban railway carriage through intensive R&D activities. The solutions were combined in a full-scale prototype so as to display the knowledge and technical capabilities of the intervenients. The final mock-up was unveiled three years later, on January 30th 2015, representing a controlled risk project for which the possibility of return on investment depended on the spin-off effects for other projects.

The inTRAIN joined the expertise of 11 different companies: 7 consortium members – SETSA, Active Space Technologies, Almadesign, INEGI, ISQ, Optimal Structural Solutions and Spin.Works – and 4 participants – EMEF, ERT, Forbo and Climar. Together, they worked in the development of an integrated supply chain for interior passenger systems for the railway sector.

Although SETSA was the official leader of the program, Almadesign was primarily accountable for the technical coordination of the venture. The company was responsible for project management and, therefore, for the implementation of a structuring methodology to govern operations. Hence, Rui Marcelino, the business owner, and his team opted for resorting to design thinking to handle the collaboration.

So, the present work project uses the case study approach as a research tool. The value of this method stems from the close link with the reality of the empirical world, which, as Glaser and Strauss (1967) argue, enables the construction of a testable, relevant, and valid theory.

The selection of the inTRAIN program as the center of the mentioned research strategy was based on Eisenhardt (1989) belief, according to which "it makes sense to choose cases such as extreme situations and polar types in which the process of interest is transparently observable." Sure it is debatable the extent to which the chosen project fits this criteria, but no doubt that the venture has particularities that distinguish it. The main differentiating feature of the inTRAIN relates to the coordinating role that design thinking assumed in this occasion in particular, essentially due to the absence of an employer and, therefore, of a sovereign entity with the power to rule over any of the companies involved.

Additionally, the present work project is limited to the exploration of only one case study because of the need for a sufficiently high level of detail. According to Yin (1994), "the single case can represent a significant contribution to knowledge and theory-building." Specifically, this author defends that one subject is able to confirm, deny or propagate the theory on the condition that it has specified a clear set of propositions, as well as the circumstances in which the enunciations are true.

The empirical application of the conceptual framework to the inTRAIN program required the collection of detailed information about the project, the majority of which was not widely available to the public. In that sense, it was necessary to go directly to the source and extract the required data. In this case, given the nature of the investigation, which focuses on the study of the impact of design thinking on collaborative project management, it was enough to establish a line of communication with those responsible for the technical coordination of the venture. Therefore, almost all the information gathered for the purpose of the present work project came from Almadesign.

The first step of the data collection process entailed a personal interview with Rui Marcelino, in an effort to get rich insights into the inTRAIN. This qualitative research procedure took a direct approach, as the purpose of the study was disclosed to the respondent and was obvious to him from the questions asked. This one-on-one conversation followed a structured guide and each issue was addressed according to a pre-arranged order. However, despite the interviewer attempts to follow the outline, the specific wording of the interrogations was influenced by the subject's replies. This personal interview encompassed open-ended questions, which provided Rui Marcelino with the opportunity to give the information that seemed appropriate to him. The whole dialogue was recorded for later analysis.

Another step in the data collection process was only possible as a result of the Almadesign willingness to share specific material about the inTRAIN project, like brochures and other descriptive documentation. These sources exhibited both qualitative and quantitative data, including comprehensive descriptions and numerical facts.

The results of the study are presented and discussed in the next sections.

6. DATA ANALYSIS

As set out in the conceptual framework, the study of the impact of design thinking on business collaboration calls for an integrated approach that contemplates all aspects that are relevant to the investigation. In that sense, the inTRAIN project was examined according to the fours A's specified in the mentioned instrument, as well as each of the sub-factors related. Following, there is an exhaustive analysis of the collected data, sectioned according to the structure of the framework, i.e. divided into Aspiration, Associates, Approach and Assessment. Each of these segments starts with a general overview of the subject matter, but then focuses on the ancillary aspects. Such analysis intends to provide understanding of how the effectiveness of design thinking, in this case, was affected by different factors.

Aspiration

Rui Marcelino and his team opted for applying design thinking to the R&D program, as this was a methodology they were familiar with, and whose capabilities they believed in, but also, whose results they had testified. They trusted that this was an effective tool to support the collaboration and administer the expertise of several companies. Naturally, the company's positive perceptions, as well as its previous experience with this approach, promoted design thinking effectiveness. As observed by Brown (2015), competitive advantage comes from the mastery of the methodology, developed over many years of enforcement.

The goal of the venture was to devise an interior for a suburban railway carriage. With the inTRAIN project, the consortium companies intended both to expand their in-house capabilities and to validate the developed solutions. More important, the full-scale prototype was built with the intention of showcasing the know-how and

technological competences of the participating entities and, this way, consolidate their presence in both the domestic and international markets. Now, Buerkli (2013) believes that, sometimes, the use of design thinking does not enable practitioners to engage with the root causes of the issue at hand and, consequently, does not allow them to deliver the best possible solution. Yet, in the case of the inTRAIN project, there is no evidence suggesting that such methodology does not suit the mentioned objectives.

The group modeled its efforts on reputable companies, like IDEO[i] and Lunar Design[ii], the strategy of which has proven unquestionably efficient over the years. Following the lead of such pioneering businesses, translates into the application of the design thinking philosophy in its entirety, having the very best as an example.

As to the ideas and behaviors generated around the inTRAIN project, it was found that Almadesign's vision, characterized by its openness to the contribution of any third party, prevailed over the others. The venture was oriented around a system understood as an entirety of interconnected parts that provided invaluable input. This is deeply aligned with the design thinking holistic essence, as advocated by Owen (2007).

Finally, there was no need to resort to alternative strategies, as the applied methodology proved capable of responding to all the challenges that emerged. At no point during the development of the inTRAIN, the team felt the need to engage in any activities that departed from design thinking.

Associates

The group of companies brought together to work in the inTRAIN project enabled the use of design thinking in an effective manner. Generally speaking, it was right to choose that set of entities, since an enthusiastic acceptance of the proposed approach was verified. In fact, there was a buzz of excitement.

[i] IDEO is an award-winning global design firm that helps organizations in the public and private sectors innovate and grow.
[ii] LUNAR is a product development consultancy that has been among the top design firms for the last decade.

The criterion used to select the partners was the reciprocal awareness of each other's capabilities. This general recognition, combined with a widespread faith in the people who would take part in the interaction, was the main reason that made the choice to be this and not another. The knowledge and mutual confidence that existed right from the start, even before the beginning of the project, allowed the collaboration members to trust the working methods of their partners, namely the design thinking approach.

As stated before, even though SETSA was the official leader of the inTRAIN program, Almadesign was the main responsible for the technical coordination of the project. Thus, when examining the project's leadership, the second company was considered. Being primarily accountable for team management, this entity opted for a participative setting, opening up to external promising ideas. Such position prevailed from beginning to end and went hand in hand with the design thinking philosophy. As remarked by Owen (2007), this approach is characterized by its affinity to teamwork, enabling people to work closely with experts from different fields.

As to the participants feedback, the overall positive response obtained from the collaboration members, revealed a high level of satisfaction with the technical coordination of the inTRAIN project and, therefore, a feeling of contentment towards the applied methodology. Indeed, "the coordinating role that design thinking assumed along the program is proof that everyone, consciously or unconsciously, has accepted the related principles". (R. Marcelino, personal communication, September 28th 2015)

Lastly, despite the minor reservations of those who were not directly involved in the project, there was no resistance to the collaboration. The enthusiasm of the consortium companies made the use of design thinking easier, as they exhibited a natural predisposition to cooperate.

Approach

Almadesign approached the inTRAIN project in a way that enabled the use of design thinking simultaneously satisfying the venture's requirements. "This is what we try to do whenever customers give us time and budget to do so." (R. Marcelino, personal communication, September 28th 2015) When considering the adopted approach, it becomes clear that, even though a few factors hampered the methodology's effectiveness, most had a positive influence.

The deadline for the program's conclusion was three years after its start. And despite any delays, the companies were able to comply with the plan. Yet, these setbacks meant that, in the end, time was short and some solutions fell bellow standards. The partners were forced to speed up the process, which slightly hindered the use of design thinking. There was no opportunity to go back and improve what could be improved, and this is one of the main actions proposed by the methodology (Gruber *et al*., 2015). Regarding the working space, meetings were held, by turn, at the premises of each entity, which improved mutual knowledge and helped people envision a systemic solution. This illustrates the holistic essence of design thinking, as advocated by Owen (2007). In the final stage, the partners always got together around the prototype, which was sited at Entroncamento's rail yard[iii]. This promoted the articulation of a clear objective that anchored everyone to a common goal, another characteristic of the methodology at issue (Chasanidou *et al.*, 2014).

As to the carried out activities, the inTRAIN project went through the three distinct spaces proposed by Brown (2009). The examination of the first one – inspiration – revealed two different factors that motivated the search for a solution. The companies, not only identified the need of the railway users for improved trains, but

[iii] "Entroncamento is for the railway sector in Portugal, as Mecca is to Muslims." (R. Marcelino, personal communication, September 28th 2015)

also saw an opportunity to exhibit their competences, in both the domestic and international markets. With regard to the second one, it was found that there were three distinct sets of activities embodying the "ideation" space – preliminary studies, technical specifications and development of new knowledge. The third one, concerning the implementation of the selected design concept, encompassed prototype construction and solution testing. Despite the clear allocation of the carried out activities to the three spaces, companies had to move back and forth through the process, which is part of the iterative nature of design thinking, defended by Gruber *et al.* (2015).

Regarding the tools used during the development of the inTRAIN project, Almadesign resorted to needfinding, brainstorming and prototyping, the most emblematic instruments offered by the methodology at issue (Seidel & Fixson, 2013).

Lastly, of course, the involved entities addressed all the three perspectives, which, according to Chasanidou *et al.* (2014), determine the success of new ideas. They considered desirability, making sure there was a market for their solution. They considered feasibility, taking railway normative framework into account. And they considered viability, limiting expenditure to the available resources. Furthermore, companies willingly embraced all competing constraints, a behavior that is very characteristic of design thinking (Brown, 2009).

Assessment

Relying on design thinking coordination capacity, during the development of the inTRAIN project, allowed to achieve a satisfactory result that corresponded to what, long before, had been defined as a three dimensional vision. In the light of the results, the methodology seems to be quite effective. Yet, the same approach may have some detrimental effects.

Rui Marcelino evaluated the program's success based on five different criteria: (1) its all-round visibility, (2) its potential to foster the development of new competences among the participating entities, (3) its ability to promote business involvement in other projects, (4) its capacity to drive the companies involved to international markets and (5) its power to cause partners to embrace design thinking and start using it in their own processes. The mentioned evaluation criteria consider the methodology's performance, not only from Almadesign's point of view, but also according to the perceptions of the other participants. Thus, it can be concluded that the established standard measures are a fair indicator of the degree to which design thinking is able to meet the objectives.

Regarding the final result, the general opinion is that, if the delay time was spent during the prototype completion, the end product could have turned out slightly better. Nevertheless, after three years, it was possible to look at the outcome and recognize almost everything that was proposed in the beginning. The fact that the project, in its large majority, matches expectations, once again, indicates the value of design thinking.

The main benefit that resulted from the use of the methodology was the establishment of a common thread that enabled the convergence of the wills inherent to the various companies involved, as proposed by Chasanidou *et al.* (2014). Yet, there might have been some negative consequences. According to Owen (2007), design thinking requires energy to be invested homogenously across every technological area in such a way that no aspect is subject to further development. This prevents the emergence of big disruptive forces, which are on the basis of innovation advances. Yet, projects commonly suffer from the opposite, when some particularity consumes all the attention while everything else remains undone. Hence, design thinking seems to have more positive consequences than otherwise, which corroborates its usefulness.

Finally, as the methodology addresses the project as a whole, all partners were required to contribute, with their experience, to the details that the design-based approach does not tackle. Still, the resort to design thinking did not require the use of any complementary instruments, another indicator of its success.

7. DISCUSSION OF RESULTS

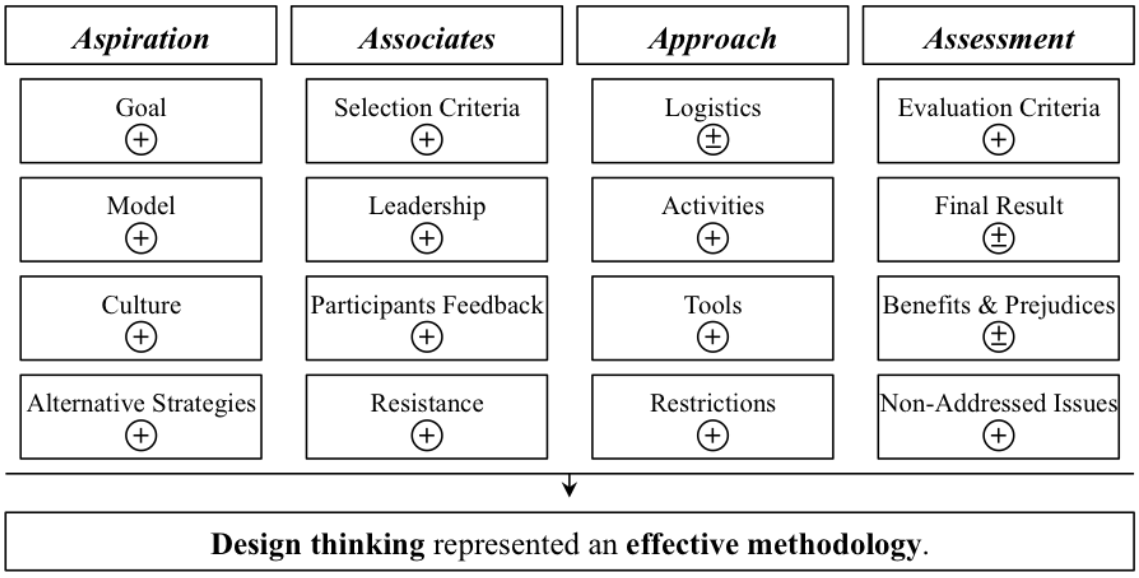
As can be seen from the previous analysis, design thinking represented an effective toolkit in the development of the inTRAIN project. Yet, there was margin to further exploit the potential of this approach. When considering each of the four A's individually, it was found that some of the correspondent ancillary aspects hindered the methodology's effectiveness. So, although the first two dimensions – Aspiration and Associates – had a positive influence, the other two – Approach and Assessment – were not purely beneficial (fig. 2). In fact, when considering logistics, it was found that the delay that occurred in the beginning of the project deprived some of the companies involved of sufficient time to go back and improve their solutions so as to maximize the potential of these components. This clearly goes against design thinking iterative nature, based on a cyclic refinement process, intended to ultimately improve the final product (Gruber *et al.*, 2015). It can, therefore, be concluded that time was one of the aspects that hindered the methodology's effectiveness.

Additionally, when examining the end result, it became clear that the final mock-up could have turned out slightly better, if one of the antecedents that led to that event was different. The time limitations that resulted from the initial setbacks were, again, the problem. So, the outcome seems to be another aspect that indicates that design thinking effectiveness was somehow compromised.

Finally, the study of the benefits and prejudices that resulted from the resort to the mentioned methodology, reveled both positive and negative consequences. In one hand, design thinking assumed a coordinating role that was crucial to direct the expertise of 11 different companies towards a common goal, particularly in the absence of a client whose wishes must be respected. But on the other hand, the same methodology can preclude innovation from directions that were not foreseen at the outset. By demanding a homogeneous distribution of the energy invested in the project across every component under development, design thinking precludes people from taking the next step and committing to substantial innovation efforts (fig 3). So, the occurrence of both benefits and prejudices as a consequence of the use of the methodology also places a question mark on the success of such approach.

Nonetheless, despite some factors having a less favorable impact on design thinking effectiveness (particularly Logistics, Final Result and Benefits & Prejudices), the adverse effects resulting from these elements were not so significant. By looking at the project as a whole and considering all the factors that characterize it, it can be emphatically stated that such methodology was able to produce the desired result (fig 2).

Figure 2: Summary of the influence of the different aspects on the effectiveness of design thinking



After verifying the effectiveness of design thinking, one would expect a positive impact on project management. And, in fact, given its level of accomplishment, the methodology brought significant benefits to the inTRAIN program. However, it was found one detrimental effect of extreme importance (fig. 3).

Figure 3: Summary of the impact of design thinking on business collaboration

Positive Impact	*Negative Impact*
Coordinating role	Inhibition of innovation
Design thinking enables the harmonious functioning of the different parts.	Design thinking encourages a homogeneous distribution of the energy invested in the project.

8. CONTRIBUTIONS OF THE INVESTIGATION

The lack of empirical research on design thinking as a management practice, particularly regarding inter-business collaborative ventures, stressed the importance of developing a conceptual framework to answer the research question above mentioned. Such instrument presents an opportunity for understanding the impact of the mentioned methodology on a project developed in partnership by different companies. Thus, the same tool defined a new vocabulary, comprising the most relevant concepts found in the literature review. Also, it enabled the identification of the key criteria that are inherent to the use of design thinking in collective efforts, as well as the categorization of each of these variables, unveiling the believed relationships among them.

The present work project aims to be a practical instrument to support project managers in the application of design thinking in inter-business collaborative ventures, revealing them, in advance, both the benefits and fragilities of such approach.

9. LIMITATIONS OF THE STUDY

The research question on the basis of this work project calls for an analysis on two different theoretical fields: design thinking and business collaboration. Such

approach entails a loss of in-depth coverage, as this study does not aim to provide an exhaustive description of the areas that encompasses, but extend new approaches to already known grounds, combining different bodies of research. The intention is to provide a framework for discussions that is relevant enough to support the arguments and conclusions presented, assuming it can always be developed and expanded.

Another limitation relates to the fact that the project was not subject to the requirements of a particular client that was paying subcontracted companies to fulfill a certain goal. Instead, partners had some decision-making autonomy, reason why design thinking assumed such an important role, insofar as it enabled driving the involved entities towards a common objective. So, despite the positive outcomes, the study's findings might not translate to all collaborative situations. Yet, the results might still be widely applicable, as they will help companies benefit from the methodology.

Such limitations reveal where new efforts need to be made in the future.

CONCLUSION

The main findings drawn from the present study involve both a positive and a negative aspect. Design thinking can have a beneficial impact on business collaborations, inasmuch as it assumes a coordinating role, which, in the absence of an employer, holds the power to orient the expertise of different companies towards a common goal. The methodology can work as an effective communication tool as it provides several visualization instruments that promote a widespread understanding of the end product and, this way, foster engagement (Chasanidou *et al.*, 2014). However, it was found that the same approach might also have a harmful effect. Such result relates to design thinking holistic essence, which encourages a homogeneous distribution of the energy invested in the project (Owen, 2007), in such a way that there is no room to

develop certain aspects a little deeper. These circumstances preclude the occurrence of disruptive forces and consequently of any quantum leap forward in terms of innovation.

In addition to providing an answer to the research question above mentioned, this piece of research also proposes a conceptual framework for the evaluation of the impact of design thinking on inter-business collaborations. Yet, successive empirical tests of this tool in different contexts are still required to ensure long-term strengthening and field validation. Furthermore, the same instrument can possibly provide a guideline for collaborative project management, when resorting to the methodology in question. However, it is necessary to undertake further research tests so as to assess the extent to which the framework corresponds to a reliable generalization.

Finally, this study allows to gain a better understanding of the implications of design thinking in a project carried by different companies. Also, it collects enough information for the elaboration of a pedagogical case study on the inTRAIN program.

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