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New Design Thinking Tools for the Next Generation of Designer-Entrepreneurs.

Sara Colombo^a, Cabirio Cautela^a, Lucia Rampino^{a*}

^aPolitecnico di Milano

*Corresponding author e-mail: lucia.rampino@polimi.it

Abstract: This paper analyses a new phenomenon to date poorly researched both in entrepreneurship and Design Thinking literature: Design-Intensive Start-ups (DIS), i.e. start-ups that focus on design as primary source for their development.

Two main questions underpin the study: what are the specific features that describe design-intensive start-ups? Which are possible conceptual tools supporting designers in the creation of their own design-based enterprises?

A multiple case studies protocol was adopted to investigate the first question. According to our results, DIS diverge from New-Technology Start-ups on several dimensions, and represent an alternative entrepreneurial model, which is not supported by extant literature. Currently, there are no tools helping designers to become entrepreneurs. Therefore, we developed a set of Design Thinking tools addressing the specific traits of DIS in the steps of their creation and evolution. Such tools are intended to support the decision-making process of designers-entrepreneurs in the foundation of their own start-ups.

Keywords: Design Thinking, Starting-up, New entrepreneurship, Design Educational Tools

1. Introduction

In recent years, as professors of a large Design School, we witnessed an emerging phenomenon: a growing (even if still minor) number of our freshly graduated students who chose to design an unconventional artefact: their own company. Concurrently, more and more incubators, accelerators, and organizations are observing the growth of start-ups differing from the tech-based ones and closer to the design field (Maeda, 2015; NEA, 2016). This emerging phenomenon of designers becoming entrepreneurs encouraged us to perform a study addressing the following questions: how can we describe design-intensive start-ups? How can designers be supported in the creation of their own enterprises with conceptual tools?

In order to answer these questions, we first performed a literature review in the field of new entrepreneurship. Despite the heterogeneous nature of this literature, the key concepts emerging in the domain of start-ups – often summarized in consistent frameworks and “handbooks” for entrepreneurs (Blank and Dorf, 2012) – seem to refer mainly to a peculiar start-up species, i.e. the

New-Technology Start-up (NTS). NTS is defined as “firm that uses or invests in rapidly emerging or evolving technology as a key part of its product development, production or marketing strategy.” (Park, 2005, p. 740-741)

The main literature about innovation provided by new form of entrepreneurship deals with the paradigmatic view of NTS. On the other hand, the Design Thinking (DT) domain neglects start-up as context where to apply tools and design related principles.

We thus performed an explorative study based on a multiple case studies protocol, aimed at pointing out the emergence of a different species of start-ups, the “Design-Intensive Start-up” (DIS). According to our first results, DIS diverge from NTS on several dimensions, and represent an alternative entrepreneurial model, which is not supported by any specific conceptual tools and approach yet.

Currently, no tools indeed are available that help designers to become entrepreneurs. This sounds quite surprising, considering the great amount of DT toolkits published in recent years. Nevertheless, the current theoretical and operational equipment of the designer has been defined on the basis of a relationship with an existing company that operates in a given competitive environment (Verganti, 2008 and 2009; Carlgren, Rauth, and Elmquist, 2016). Indeed, this is what we teach to our design students: to design “something” (i.e. a product, a service, a system, a website) for an established company. On the other side, managerial tools for entrepreneurs are not well suited for designer-entrepreneurs, as DIS have their own features and needs. Therefore, we developed a set of DT tools addressing the specific traits of a DIS in the different steps of its creation and evolution.

The aim of such tools, described in the second part of the paper, is to help the designer-entrepreneur to acknowledge the DIS specific features, in order to take advantage of its peculiarities or to overcome possible developmental barriers.

2. Methods

2.1 Research Design

In order to answer our first research question - how can we describe a new form of entrepreneurship, the Design Intensive Start-ups? - we performed an explorative study consisting of multiple case studies analysis (Eisenhardt, 1989). We applied an inductive method based on the in-depth examination of five case studies: we used each case to reinforce or disconfirm preliminary insights drawn from the others, in order to identify new constructs about DIS that could be common to many cases. This could bring to the definition of a more “robust” theory (Santos and Eisenhardt, 2009).

Our methodological choice stems from the fact that we could not find strong theoretical foundations to base our study upon, neither in the managerial nor in the Design Thinking field.

As a result, our research process was composed of four activities: i) interviews with prominent scholars; ii) case studies collection and selection iii) data collection; iv) data analysis.

2.2 Interviews with scholars

The first activity consisted of interviews with prominent scholars and was aimed at identifying first-hand issues related to DIS to be further investigated by the case-study analysis. We invited 11 international scholars to partake in interviews and 8 of them accepted: Wendy Malem, Roberto Verganti, Sam Bucolo, Martin Steinert, Tore Krinstensen, Davide Ravasi, Enzo Baglieri and Jonathan

Edelman. We involved scholars coming from different regions (Australia, Denmark, Italy, UK, USA) and research fields (design management, entrepreneurship and innovation management), in order to assess the presence and relevance of this phenomenon with an open perspective.

Interviews were performed by means of an on-line questionnaire of ten open questions addressed to confirm (or disconfirm) the existence of the DIS phenomenon and to get insights on the first-hand differences between a technology-push and a design-intensive entrepreneurship.

Two main results emerged. The first one concerns a general agreement on the existence of new forms of entrepreneurship differing from the New-Tech start-ups. The second result was the suggestion of a set of relevant issues and properties proper of DIS to be further investigated.

These insights were used as underpinning knowledge in the subsequent steps of our study.

2.3 Case studies collection and selection

The second activity consisted in selecting five case studies, to be used as primary sources for our inductive research process. We decided to extrapolate our cases from an official start-ups database, the Italian Start-up Register¹.

In order to identify the cases to analyse in depth, we ran an initial skimming activity, applying the following selection criteria:

- Survival. We discarded start-ups founded later than 2011. This because we were interested in analysing ventures that could be considered robust enough to survive to the first three years of activity;
- Website. We discarded start-ups lacking a website, because that impeded us to access secondary sources useful for our study.

Thanks to this skimming activity, the initial panel of 2622 start-ups was reduced to 211. For the second selection activity, we focused on the start-ups' relevance to our topic of interest. In order to be evaluated as design-related, each start-up should possess at least two of the following three features:

- At least one of the start-up's founder is a designer, an architect or an artist;
- A user-centred approach is well recognizable in the solution offered by the start-up (being it a product or a service);
- There is an attention towards aesthetic and/or experiential aspects both in the start-up final offering and in the website.

After this second step, 38 design-related start-ups were selected. In order to reduce the number of cases further, we selected those start-ups that addressed different types of markets (business to consumer, business to business and business to government), that delivered different design "artefacts" (from pure product to pure service) and that contemporarily offered the richest bouquet of information, according to an initial desk research performed on each of them.

On the basis of these three last criteria, we were able to select five start-ups: Milan farming (B2C, product/service), Municipality 3.0 (B2G; service), Immersive events (B2B, service), Safe mooring (B2B; product), and Infant tracking (B2C and B2B; product).

¹ The Italian Start-ups Register (<http://startup.registroimpresa.it/>), launched in 2011, includes all the start-ups corresponding to a number of criteria set by the Italian Government to define and officialise the start-ups phenomenon.

2.4. Data collection

In order to analyse the five selected start-ups in depth, we performed two data-collection activities based on both primary and secondary sources: website and press articles content analysis and interviews with the start-ups' founders.

Interviews

We performed semi-structured interviews with the start-ups founders, debating the following seven areas: motivations and personal stories, founder team, idea generation and development, sources of value creation, user engagement models, business model features, idea diffusion and networking. Each area was explored by one or two open questions.

The group of interviewers was made up of 4 researchers with different backgrounds: architecture, design, sociology and management. Each interview was performed by a couple of interviewers chosen to appropriately mix diverse points of view over each case. The interviews ranged from one hour to 90 minutes in length. We recorded them, took notes to highlight the emerging issues, and subsequently transcribed the records.

The data collection resulted in deep understanding of the five selected start-ups, whose main features are reported in Table 1.

Table 1

	Milan Farming	Municipality 3.0	Immersive events	Safe mooring	Infant tracking
Founding Team	Telecommunication expert, Engineer	IT engineer UX designer	Team of designers/ artists	Team of engineer, accountant, and manager	Engineer and designer
Domain	Vegetable and fruit home delivery	Municipality-citizens relationship	Multi-media events	Yacht and boat equipment	Body data monitoring
Initial Funding	VC	Self-funded + small regional funding	Self-funded + small European funding	Self-funded	Self-funded
Location	Milan	Monte San Pietro (BO)	Bologna	Milan	Monza
Year of foundation	2011	2011	2010	2011	2010
Internal informants	CEO/founder	CEO/founder Designer	CEO/founder PR/founder	CEO/founder General manager/founder	CEO/founder

2.5 Data analysis

The collected data were analysed following the grounded theory's methods (Strauss and Corbin, 1997). First, we performed an in-depth analysis of data coming from both interviews, website and press articles. Each researcher read the cases highlighting "conceptual blocks" that represented start-ups' features which, according to our previous literature review, were evidently different from new-tech start-ups' ones. To be considered relevant, conceptual blocks had to be present in more

than just one case. The researchers discussed their findings in a focus group with the aim of connecting and grouping blocks into more general and higher constructs.

At the end of the analysis, five constructs were assessed as enough relevant and robust. According to us, they represent DIS's features clearly in contrast with the features of NTS predominant in the domain's consolidated literature. These five constructs are described in the following section.

3. DIS Features

3.1 Intrinsic entrepreneurial motivation

The first construct is related to *entrepreneurial motivation*.

Different studies in entrepreneurship dedicated great attention to the personal traits of the entrepreneur (Segal et al. 2005; Gnyawali and Fogel, 1994; Wadhwa et al. 2009; Shane et al., 2003; Miner et al. 1994). Concepts as “need for achievement”, “risk taking”, “tolerance for ambiguity”, “locus of control”, “goal setting”, “independence” are central in studies where personal traits have been related to entrepreneurial success.

While this is generally valid in entrepreneurship, in design entrepreneurs we saw something more, i.e. the designers' tendency to interpret the world through their own personal experiences and to introduce something aligned to their proper credo (Durgee, 2006; Bianchini and Maffei, 2012).

The creation of a new venture centred on strong inner motivation is evident in the words of Safe mooring's CEO:

“We are three 50 years old friends that share a passion for sailing. We wanted to initiate something new together and our first idea was to focus on what we do like most. (...) Moreover, for several years we have been skipping and we know quite well how difficult and dangerous the docking moment can be (...) and consequently, the security issues during mooring became a priority in our proposal”.

In brief, personal experience, passion and inner motivation seem to represent the fundamental ingredients to steer the creation of a DIS entrepreneurial experience.

3.2 Design as a transformative agent

The second construct relates with the *use of design*.

In Design Thinking literature, design is described as a discipline having a deeply transformative role, dealing with and aimed at enhancing the user experience. Designers, in conceiving new products and services, are indeed used to “reframe” the problem (Dorst, 2011), in order to change the product meaning (Verganti, 2011).

The key concept of “reframing” an existing situation and transforming the user experience related to a current solution is recognized as a peculiar feature of the analysed cases.

The case of *Municipality 3.0.*, for instance, well exemplifies the role of design as a reframing agent able to transform a problem in a new and satisfying user experience. This start-up launched a software application that redesigned the relationship and communication process between citizenship and municipality in a country – Italy – where typically such processes are denigrated as inefficient, time-consuming, and latecomer. Municipality 3.0 conceived a software-based application that allowed citizens to signal problems in the city and helped the municipality's employees to follow easy procedures and protocols to fix the signalled defaillance.

In short, the five start-ups we analysed used design to “reframe” a situation around the user, thus discovering a set of “meaning-based needs” (Beckman and Barry, 2007). In conceiving their business space, these start-ups do not refer to the product meanings codified by existing industry players. Conversely, they propose products and services meanings that create innovative user experiences while satisfying a specific need, desire, or while “getting a job done”.

3.3 Socio-cultural narrative in business models

The third construct that emerged from the case analysis regards the business model development logic.

In the classical business literature, business models are moulded by competitive forces and industry logics (Osterwalder and Pigneur, 2010; Amit and Zott, 2012). For instance, in developing the business model of his company, a new software producer in the Web 2.0 domain has to consider the proper features of the technology itself and the structural features of the IT infrastructure (O’reilly, 2007). Constrains and opportunity are to be derived by the business ecosystem.

In DIS, the logic seems to be different. Design is connected to specific socio-cultural trends, i.e. “design discourses”, as to say diffused tendencies shaped by media, artists, retailers, technologists, manufacturers, sociologists, marketers that tend to attribute specific meanings to artifacts (Verganti, 2008; 2009). Thus, “design-driven innovation” is not the solipsistic act of a single designer. On the contrary, new products – and the new meanings they promote – are the results of the interactive process that involves social and cultural forces (Geels, 2004). According to Krippendorff (2006), the meaning of an artifact is determined by the narratives in which it appears as soon as it enters the conversations among stakeholders, bystanders, critics, and users. For this reason, such meanings deeply depend on cultural context (Verganti and Öberg, 2013). The same artifact may invoke different meanings in different historical periods, contexts of use, and social groups. In this vein, the business model fitting in DIS is not searched within a specific business eco-system but there is a progressive alignment between the business model and the social discourse that arises from a precise context (Battistella, Biotto, and De Toni, 2012).

In this regard, the example of Milan farming seems emblematic: the choice to leverage local agricultures, the zero-kilometre product philosophy, the selling of only seasonal and biological products, the overcoming of past distributive and logistic patterns constitute per se – beyond the interactive pieces of a business model – a cultural proposition that takes part as a specific voice to the local discourse about the food industry.

In DIS, the business model seems to fit with socio-cultural local forces rather than with the business ecosystem.

3.4 Leveraging social and local capital permanently

The fourth construct – strictly connected to the previous one – deals with leveraging social and local capital. There are different studies that connect the relevance of social capital to entrepreneurship (Westlund and Bolton, 2003; Kim and Aldrich, 2005). Specifically, social capital is usually employed in NTS as a temporary market where to experiment and test the new technology during the early developmental phases. After those early phases, NTS usually aim at scaling up, by seeking knots of the global network where the possibilities for growth are larger.

In DIS, the employing logic of social and local capital seems more permanent and the exploitation logics follow different avenues. Indeed, social capital is employed as a piece of offering; as a key

provider that is difficult to replace during the growth process; as a communication vehicle to narrate the new cultural meanings associated with the product-service.

In the case of *Immersive Events*, for instance, the social capital constitutes a critical part of the offering. Indeed, this start-up provides immersive experiences through the technique of “mapping” historical buildings, which represent a diffused resource of the Italian cultural heritage.

3.5 Context-dependent competitiveness

What design creates, i.e. a new meaning arising from new user experiences – unlike a new technology (Teece, 1986; Lerner, 1994; Levin et al. 1985) – can hardly be protected by patents. Moreover, because product-service meanings may be exposed to rapidly changing socio-cultural trends (e.g., fads), design is unlikely to be the source of a sustainable competitive advantages for companies and ventures.

For this reasons, design-oriented strategies, rather than leveraging the protection of a regulatory system that preserves the exploitation of new products, are oriented to continuously challenging the existing paradigms about the product meaning and its relationship with the context and the stakeholders (Doorst, 2011; Cross, 2011; Verganti, 2009; Krippendorff, 2006).

As a result, in DIS, the continuous approach to experimentation often goes beyond the exploitative logics. The words of the founder of *Infant Tracking* clearly explain the protection mechanism adopted by design entrepreneurs:

“In order to be protected from imitation, we can use patents. However, another strategy consists in staying a step ahead the competitors. When we launch a product on the marketplace it’s because we already have the second release ready to be launched and we are developing the third one”.

DIS seem indeed to focus managerial attention on designing trajectories of innovation and on stretching their offering rather than on searching for international legal protection.

4. Design Thinking Tools for DIS

The identified DIS features raise some issues connected to how DIS can be designed, founded and maintained. Indeed, the literature we investigated so far and the available tools for entrepreneurs do no address how to generate business ideas that leverage on the entrepreneurs’ passions or that are strictly connected with socio-cultural local capitals. However, such elements affect a lot the creation of a start-up and the steps the founder is required to follow; therefore, they should be taken into consideration by the designers who want to start an entrepreneurial process.

In order to provide designers/entrepreneurs with supporting instruments, we organized two participative workshops² with service designers and design thinking experts, aimed at building a set of DT tools dedicated to the DIS features and needs. The resulting DIS toolkit is composed of five tools, each one addressing one of the five identified DIS features. They represent a first attempt to create a set of tools dedicated to this emerging start-ups species.

² One workshop was held in Milan on April, 2015, in collaboration with PACO Design Collaborative (www.pacollaborative.com). The second one was performed in London on May, 11-12 2015, in collaboration with a research group from the Royal College of Arts.

4.1 Passion Split

The first step in creating a start-up is defining a (new and viable) business idea. Passion split is the tool designed to help the designer identify a business idea based on his/her own passions and intrinsic motivations. In founding a new DIS, designers can be driven by a personal passion (something they love, e.g. sailing or letterpress) or a personal obsession, i.e. a problem they encounter on a small or large scale, and that they are willing to contribute to solve.

Passion Split is designed to guide the designer through its passion/obsession in order to identify a new business idea in that area. The tool is intended to guide the user through the experience they have of a specific pleasant/unpleasant activity and to break up the idea into sub-components. Once decomposed, the designer can replace/change one or more components, in order to imagine a new user experience that can drive the generation of an innovative business idea.

Once the idea has been defined, the tool also helps the designer to identify if it falls into an existing market or if it shapes new market segments, to help to assess the market risk.



Figure 1. The Passion Split tool

4.2 Experience Navigator

When developing a new DIS, designers/entrepreneurs should take into consideration the user experience and the user engagement rules. Indeed, creating new meanings and new experiences for users is key in the generation of innovative design-based business ideas. Changing the industry rules on the user engagement may result in completely new experiences and meanings. This is the case of many successful start-ups, among which Milan Farming, which do not leverage new technologies but emerging social-cultural trends and unusual user engagement rules to create innovative experiences and new markets.

Experience Navigator is a tool that helps the designer/entrepreneur to envision new engagement rules for the user in a specific industry. It starts with the identification of the existing rules in the current industry and asks the designer to add/subtract/substitute/merge other rules coming from different industries, in order to create new engagement systems. The goal is to stimulate new ways of thinking of the user role in the product/service system that is being designed, throughout the whole user journey, from “enticing” to “building loyalty”.

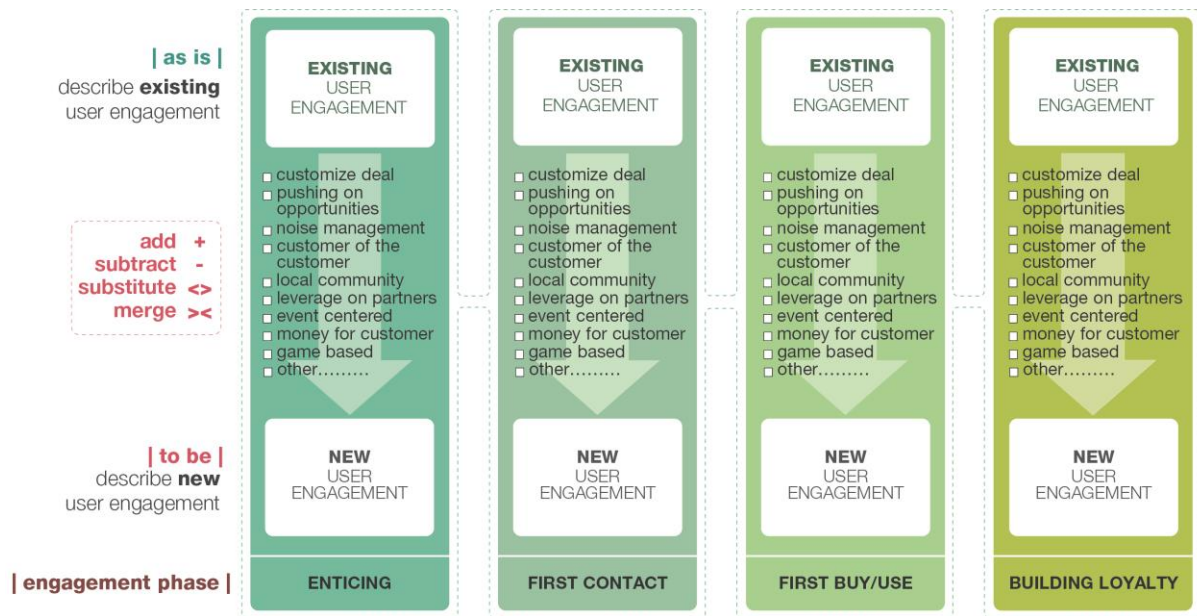


Figure 2. The Experience Navigator tool

4.3 Social Capital Cruiser

The Social Capital Cruiser tool addresses the need of the DIS to be strongly rooted in the social, cultural and industrial context where it is founded. The business model of a new DIS is deeply affected by the local players, which often are the levers DIS uses to start building its own business model.

For this reason, understanding what elements of the value proposition and the business chain can be taken from social capital is a first important step in the business model generation. Such elements can be actors, players, user groups, territorial resources, etc., which are peculiar to a specific geographical area and are connected to the business idea. They can fall into four categories, i.e. early market, solution components, knowledge/competence providers or source of inspiration.

For instance, in Milan Farming two essential social capital elements are represented by local farmers and caring consumers. Once these elements are identified, the Social Capital Cruiser helps the designer/entrepreneur to classify and analyze them according to their criticality to the business model and their accessibility.

The tool also gives suggestions about possible actions to undertake in order to involve the identified elements in the creation of the startup. For each kind of resource (i.e. early market, solution component, knowledge/competence provider and source of inspiration), an “action space” is provided, where the element can be mapped according to its level of criticality and accessibility. For instance, the “caring user” resource in Milan farming is an early market on which the designer/entrepreneur can test his/her idea. By answering to the questions “how critical is it?” and “How accessible is it?” the resource can be mapped in the Early market space (on the right), where suggested actions to take can be found.

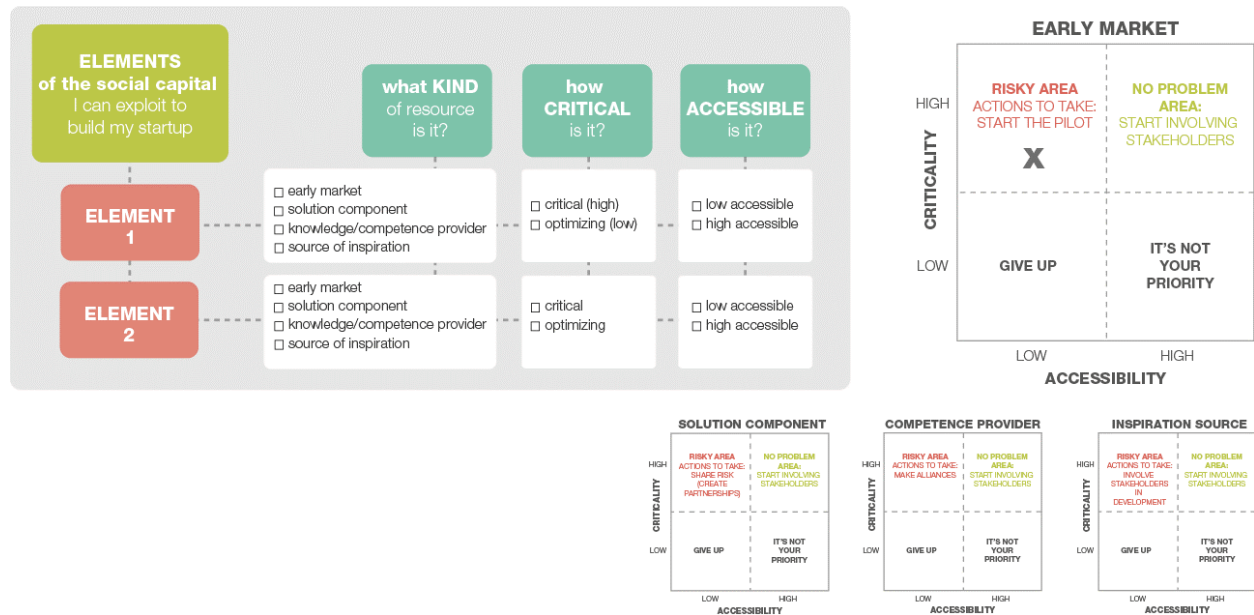


Figure 3. The Social Capital Cruiser tool

4.4 Replicability evaluator

The fourth feature of DIS concerns their difficult to be scaled on different markets, given their permanent connections to the local social capital. However, although scalability may be difficult to achieve, the same business idea may be replicated in different markets or areas, by changing or adapting some features to the new contexts.

The Replicability evaluator tool allows the designer/entrepreneur to gain awareness about the business formula components that can be exported to new socio-cultural contexts with or without modifications.

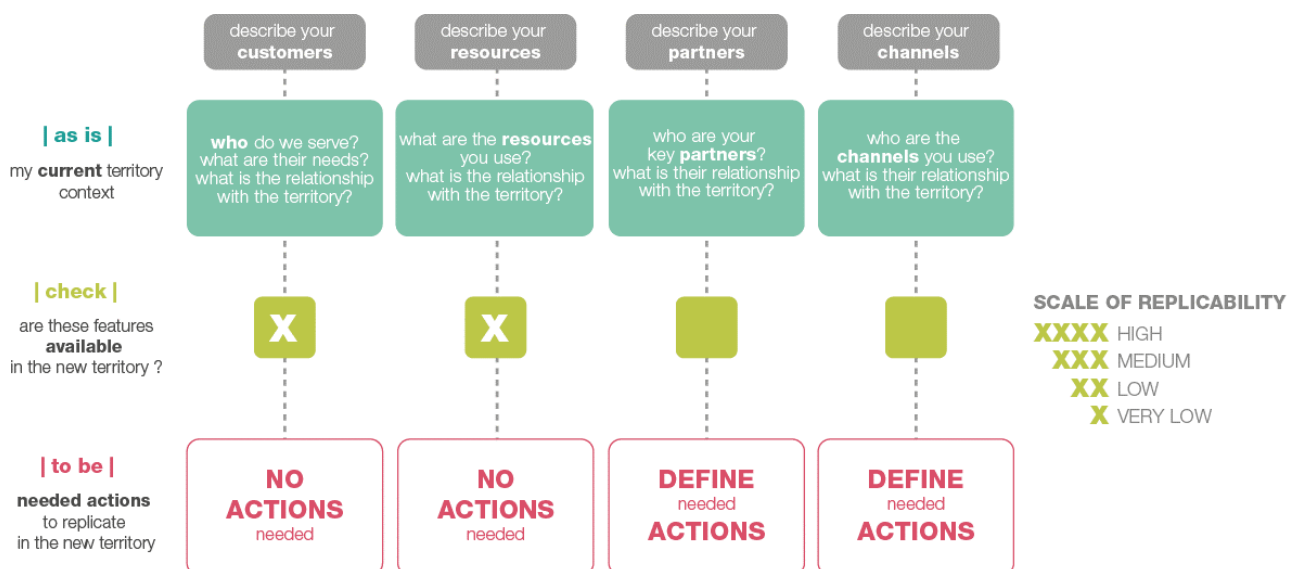


Figure 4. The Replicability Evaluator tool

4.5 Innovation Boxes

DIS need to stay constantly on the innovation edge in order to keep a competitive advantage on the market, by looking at future ways of evolving their offers and trying to differentiate themselves from

existing solutions. This seems to be the most effective protection strategy, alternative to patents , which can rarely be accessed by DIS.

In order to stay on the innovation edge, the designer/entrepreneur should have a deep understanding of the social, cultural and technological trends that surround its business, in order to find inspirations and new paths to develop his/her business.

The Innovation Boxes tool helps the designer/entrepreneur to collect information, inspirations, and stories about socio-technical trends and to categorize them according to their impacts on the specific business, the eco-system of the business and the society. The goal is to visualize clusters of emerging trends, which can reveal unforeseen opportunity areas or can be used as inspirations to develop the offer.

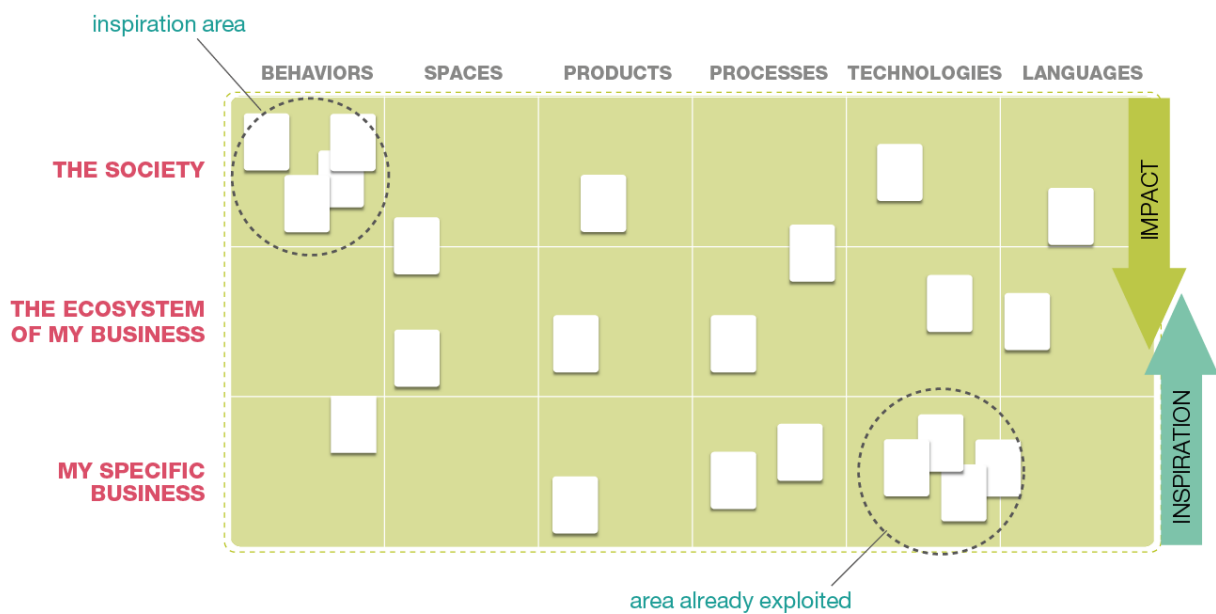


Figure 5. The Innovation Boxes tool

4.6 DIS features vs Tools

Table 2 summarizes the relation between each of the DIS feature stemming from the analysis, the associated emerging issue that the designer/entrepreneur should consider in founding a DIS, and the proposed tool.

Table 2.

DIS feature	Emerging issue	Proposed Tool
Business idea based on passion/intrinsic motivation	Leveraging entrepreneur passion/obsession to generate the business idea	Passion Split
Design as a transformative agent	Reframing a situation around the user, creating new users' engagement rules through innovative artifact's meanings and user's experiences	Experience Navigator

Socio-cultural narratives in business models	Understanding what elements of the value proposition and the business chain can be taken from social capital	Social capital cruiser
Leveraging Social and Local Capital permanently	Detecting the business formula components that can be exported to new socio-cultural contexts with or without modifications	Replicability evaluator
Context-dependent competitiveness	Looking at future ways of evolving DIS offers by continuously challenging the existing paradigms about the product meaning and its relationship with the context and the stakeholders	Innovation boxes

5. Discussion

Design and design thinking literature have been mostly related to innovation in existing companies (i.e. incumbents). Specifically, “design-driven innovation” has been introduced as a third paradigm of innovation studies – to be added to the “market pull” and “technology push” views (Verganti, 2008).

Notwithstanding if design gained a growing attention in innovation management studies, there’s a lack of understanding of how designers mould and characterize their own ventures. If Maeda (2015) underpinned how in recent years designers entered the founding teams of successful start-ups and Unicorns collaborating to the definition of more “design-centred” value proposition and value creation logics, on the other hand, there’s still a poor understanding about the specific features of design-related form of entrepreneurship.

The presented research shows that DIS have specific traits and peculiarities that do not easily reconcile with the characteristics of NTS. Admitting the existence of different models of growth, competitiveness, ways to engage social capitals, entrepreneur’s motivations, and business model development equals to recognize that DIS require new approaches, services and tools to make them survive and grow.

The five emerged constructs constituted a conceptual platform for the development of a set of five creative tools, useful to guide the conceptualization of a DIS. In our intention, these tools are designed – in the current phase - to be employed as educational material in courses addressed to (young) designers who want to become entrepreneurs. Last February such tools have been presented to a group of start-up mentors at Polihub, the Incubator of Politecnico di Milano. Several mentors, the majority of which have a background in Management or Engineering, declared a strong interest in trying out the proposed tools in their coaching activities. Still, we are not yet able to provide any specific evaluation of the actual effects of our tools on the generation and development of a DIS.

The empirical findings and the generated tools - considered as secondary findings – open a new stream in the interplaying between entrepreneurship and design. Specifically, from one hand the paper integrates entrepreneurial studies with a novel perspective centred on design; on the other

hand, it enriches and widens the DT approach adding conceptual tools for the creation of new ventures.

6. Conclusion, limits and future avenues

The paper focuses on a new form of entrepreneurship centered on design. Specifically, we highlighted how DIS show intrinsic features that differ from NTS intrinsic ones. Moreover, we launched some inspirational tools to enrich the design thinking tool “luggage”.

This study is explorative in nature and not immune by limits. First, the limited number of case studies impacts the extension of the results to other DIS. Furthermore, the way of framing design has been centered on a specific stream of design literature. Encompassing other design perspectives could cut off or embrace other venture categories. Lastly, the national-based sampling could bias the constructs.

New research avenues could enlarge the sampling, by searching for data in different economic national systems, thus embracing additional frames of design.

In our view, DIS represent a new field of investigation for both design and entrepreneurship scholars. In particular, the DIS phenomenon can add a novel perspective to Design Thinking studies, by broadening the current boundaries and application fields from existing firms to a firm that does not exist yet.

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About the Authors:

Cabirio Cautela PhD, Associate Professor of Innovation and Design Management at the Design Department – Politecnico di Milano. He is member of Scientific Board of the Department, Director of the Master in Strategic Design and member of POLIHub board, the Incubator of Politecnico di Milano.

Lucia Rampino PhD, Associate Professor at Politecnico di Milano. Her research interests concern design-driven innovation processes, with a recent focus on interactive products. She has taken part in various research projects and serves as reviewer for both Design Journals and Conferences. She is on the Design PhD faculty of Politecnico di Milano.

Sara Colombo, PhD, Lecturer and Postdoctoral researcher in Interaction Design at Politecnico di Milano. Her research focuses on human experience in relation to new technologies. She explores how design can shape technology to generate innovation that brings value to people by partaking in research projects and conferences on this topic.