Exploring the Role of Boundary Objects in Digitalized Business Relationships

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Abstract

Digitalization of is one of the most important phenomena of our era, impacting not only consumer companies but increasingly business to business too. The effects of digitalization are manifold: growing number of touch points among interacting actors, greater fluidity of information, dematerialization of contents, and many others. All these elements are generating higher complexity, which, in turn, requires coordination. Starting point of this study is that in a digitalized environment the importance of boundary objects - the ones to communicate and coordinate the perspectives of various constituency - increases. By analyzing four case studies Salesforce.com, Buzzdetector, Instragram and 3DiTALY, the paper identifies the functions of boundary objects in digitalized business relationships: promoting socialization and meanings coordination; simplify complexity; humanizing objects; storytelling; boost creativity; engage in a broader experience; promote flexibility and contextualization. The study also sheds light on the importance of representing and displaying boundary objects in order to improve the effectiveness of above mentioned functions.

Keywords: digitalization, business relationships, interaction, boundary objects, coordination

Introduction

"When you think about how incumbents are responding to digital disruption, steel companies may not immediately spring to mind. Yet German metals group Klöckner should. The company's CEO, Gisbert Rühl, decided to build a digital innovation unit: 'Today we are more asset driven. Our resources are assets. Five years from now, our assets will be more the platform, intellectual property. Our people will be different to a certain extent. We will have much, much more digital people." (McKinsey interview, 2016).

Digitalization of is one of the most important phenomena characterizing the last decade, and not only with respect to business to consumer markets but business to business as well (Ramaswamy & Ozcan, 2015). The use of digital technologies is changing companies' business models, providing new revenue and value-producing opportunities (Gartner, 2006).

It has been demonstrated that new technology and tools play a significant role in the day-to-day operations of marketing organizations. In 2015 Salesforce surveyed 4.000 marketing managers and discovered that 72% percent of high performer companies will increase their spending on marketing tools and technology in the next two years, 48% of which will increase spending substantially (Salesforce, 2016). Also, over the next five years, the percentage of digital media bought through a programmatic platform will grow from 18% to 60%.

Information and communication through digital technologies have invigorated the discussion on value co-creation (Gensler, Volckner, Liu-Thompkins & Weirtz, 2013). The Internet of Things (IoT) increases complexity but, at the same time, it is a key area for future value creation. ICT opens new possibilities that lead people to be the driving forces of change. Individuals are gaining growing spaces of autonomy and initiative everywhere: in production, in consumption and in social life in general. At the same time, there is a big data challenge for companies: organize their disparate data sources across enterprise systems and the massive marketing ecosystem.

The effects of digitalization are manifolds: increased number of touch points among interacting actors, greater fluidity of information and the dematerialization of contents, among others. All these elements generate complexity and require an improved coordination and communication. In this study

we assume that a way to manage such complexity is through the improved role of boundary objects in a digital environment.

Boundary objects have been defined as "objects that live in multiple social worlds and which have different identities in it" (Star and Griesemer, 1989: 438). These objects, which can be either abstract (conceptual) or concrete (physical), serve to communicate and coordinate the perspectives of various constituencies (Amabile, 1988; 1996; Bowter & Star, 2000). Boundary objects translate, coordinate, and align the perspectives of the different parties (Klimbe et al., 2010). They allow coordination without consensus or shared goals and make available an actor's local understanding to be reframed in the context of a wider collective activity (Benchey, 2003).

Notwithstanding boundary objects have been studied in many different fields -sociology, psychology, information technology, computer science, strategy, organizational theory, medicine, biology- their role in inter-organizational relationships in digital contexts still need to be explored. In particular, we notice that the majority of studies developed the concept of boundary objects with respect to peer to peer interactions rather than in business relationships (see for instance Perry Smith, 2006; Perry Smith and Shalley, 2003).

This study explores the functions of boundary objects in digitalized business relationships. An interactive, qualitative approach was adopted to gain insights into the phenomena under investigation, which is quite new and unexplored (Gummesson, 2000, 2003). Four cases have been selected where the role of boundary objects emerge as particularly key: Salesforce.com (cloud computing company), Buzzdetector (digital intelligence company), Instragram (social media company) and 3DiTALY (3D printing and connected services).

The study will identify which are the main functions of boundary objects in digitalized business relationships; by doing this, it will provide important managerial implications on how boundary objects can be strategically used by companies to increase the effectiveness of business relationships. The research have implications not only for industrialized economies but also for developing ones, where innovation will require more and more interactions with companies from different Countries and cultures as well as the digitalization of many interaction points.

The paper is divided into the following sections. Section 2 reviews the literature on boundary objects, representations and symbols. Section 3 describes the methodology of research. Section 4 presents the four cases studies, while Section 5 discusses findings and concludes the article.

Boundary objects in business relationships

"*All our offices worldwide are exactly the same in terms of spaces, furnishings, colors, layout... so that employees and visitors do not need to adapt when moving from one site to another*". (LEGO, General Director).

One way to reach coordination in a multi-stakeholder system is through boundary objects. This quote provides an example of how a physical environment can become a boundary object that facilitates interactions. When actors participate into shared activities, based on shared understandings of the rules that guide actors' behaviors, it occurs a process of socialization which allows for coordination. Learning and acting is a social processes developed in a social context where actors, by interacting, construct knowledge and meanings.

Boundary objects that support the construction of meanings can be abstract or concrete (Carlile, 2002; 2004). Wenger (2000) identifies three different types of boundary objects: artifacts, discourses, and processes. Artifacts correspond to standardized forms, methods, objects, models, and maps; discourses represent a common language that allows people to communicate and negotiate meanings across boundaries; and processes include explicit routines and procedures in an organization.

By acting and interacting, people can in fact transform their subjective meanings in artifacts, giving sense to reality and therefore constructing it. Boundary objects translate, coordinate, and align the perspectives of the different parties (Klimbe et al., 2010). The plastic character of boundary objects lies in being adaptable to local needs and in being robust enough to maintain a common identity across different uses: "they are a means of translation" able to maintain "coherence across intersecting communities" (Bowker and Star, 1999, p. 297).

Boundary objects have different meanings in different social contexts, but their structure is common enough for all intersecting social worlds to recognize and to use them as a means of translation, bringing coherence across intersecting social contexts (Nenonen and Storbacka, 2012). Boundary objects are weakly structured in common use, and become strongly structured in individual site use. When identified by multiple actors, boundary objects serve as a common point of reference to facilitate conversation around contested issues at the same time. Wenger (2000) also describes boundary objects as entities that can link communities together, as they allow different groups to collaborate on a common task. These objects satisfy the informational needs of a community of practice and facilitate coordination without consensus: they enable an actor's local understanding to be reframed in the context of some wider collective activity (Fischer et al., 2005). Boundary objects by definition have an array of meanings associated with them, each useful in individual situated practices (Marick, 2002).

Carlile (2002; 2004) affirm that boundaries can be represented and transformed according to three processes. The first is transfer, which relates to the managements of formats (pipes, syntax, management of information, etc.) and occurs when the relationship is stable and there is a shared repertoire. The second is translation, which emerge when it is impossible to forecast, when there is change, when meanings cannot be determined or when there is interactivity (mediation, joint activity, and so on). In this case the boundary object becomes a cognitive mediator that represents a transaction zone for the perspectives in attendance. Finally, there are transformation processes, taking place when the interests of actors diverge, when there is negotiation of interests and knowledge, or the construction of a compromise. In this last case the boundary object becomes a social mediator, and issues like power, allegiances, exchanges of contributions and identity become particularly relevant.

Connected to boundary objects, an increasing number of business marketing scholars are studying the role of symbols, representations, maps and visualization tools to improve the effectiveness of business relationships. The main reason is that managers have difficulties in integrating huge pieces of scattered individual cognitive visions (Mouzas et al., 2008).

Recently, Akaka et al. (2014) found symbols to be the central factor for value co-creation by supporting coordination of interactions, communication among groups, as well as the integration of resources. Value co-creation, in fact, results from the integration of resources (i.e., the enactment of integrative practices) among multiple actors, which, in turn, requires communication and coordination (Maglio and Spohrer, 2013). Similarly, Corsaro (2014) introduced the concept of value representation as "the way an actor translates its own idea of value in something that can be observed by the other actors, and its meaning shared among them" (Corsaro 2014: p. 992). The issue of representing is not only a responsibility of the supplier toward the customer, but both parties should be involved in it. An important point is that value representations are enacted by parties while they interact; even looking at the same object (e.g., product, relationship, etc.) each party will develop its own idea about which are the key dimensions of the perceived value. In this logic, narratives become particularly important as sense-making tools through which actors construct their reality and express their idea of value (Weick, 1995).

A recent Industrial Marketing Management special issue on the interlink between action, cognition and outcomes (2015) also stressed the importance of inter-subjective representations for the behavior of actors and the results they generated. For example, Mouzas and Henneberg (2015) noted how inter-cognitive representations inscribe shared understandings and thus provide an objective basis and guidance for further interactions. Araujo and Kjellberg (2015) emphasized the link between

(coordinated) action and the resulting (shared) cognitive structures that guide future coordinated action. In co-creating value, indeed, the relevant meanings are generated through the experiences of parties over time.

Research methodology

An interactive, qualitative, case-study approach was adopted to gain insights into the phenomena described (Gummesson, 2003). This qualitative method allows for a phenomenological and contextual approach to the real-life context within which managers operate (Eisenhardt, 1989), and facilitates rich and in-depth descriptions that are important, given the complex and multifaceted nature of the phenomenon in question (Dubois & Gadde, 2002).

More specifically, the study applies an abductive approach where the researchers went back and forth between theory and empirical evidence during the research process (Dubois and Gadde, 2002). The final aim was to develop theory through analysis and description of new phenomena and not necessarily to reach an objective truth.

In line with interpretative research guidelines, four cases have been selected where the role of boundary objects is particularly evident. We decided to select them so as to get a wider view of the phenomenon under investigation and draw insights more from their differences than from their similarities. The cases are:

Salesforce.com, cloud computing company, which is implementing a new modality to represent business relationships in its CRM solution;

Buzzdetector, digital intelligence company, it is investing into the visualization of concepts to make them more understandable to its business customer companies;

Instagram, a social media based on visual aspects mostly in the form of pictures and videos;

3DiTALY, 3D printing company which aims at integrating traditional fabrication with digital fabrication.

The investigation was based on analysis of archival records and interviews with 30 informants as illustrated in Table 1. We adopted an expert judgment technique (Coffey and Atkinson, 1996) to select interviewees who could provide insights.

Interviews lasted approximately from 50 minutes to 1,30 hours. The interviews were tape-recorded and transcribed.

The researchers analysed archival materials in order to gather additional background information and to substantiate the interview data.

Data collection and data analysis were carried out by the research team to achieve complementary insights and enhanced confidence in the findings (Eisenhardt, 1989). We supported the cases description with the use of some narratives (Yin, 2014; Gummesson, 2000). Every narrative offered a plausible story for a particular outcome and the connected sequences of events, thereby reducing equivocality (Weick, 1995).

COMPANY	BUSINESS	INTERVIEWED PEOPLE	COMMONALITIES AMONG CASES	DIFFERENCES AMONG CASES
Salesforce.com	Cloud computing company, CRM	Marketing Manager; Country Manager; 7 Sales people who use Salesforce CRM; 2 consultants, expert in CRM	Enhanced role of boundary objects and attempts to represent and display these objects.	Focus on coordination among business people inside companies through CRM
BuzzDetector	Digital Intelligence company	Founder; Marketing Manager		Focus on how a company can translate effectively online conversations into concepts
Instragram	Social Network	Country Manager; 7 Marketing managers in btob companies		Example of open interaction which involve very heterogeneous interacting actors
3DiITALY	3d Printing and connected services	Founder; New business developer; 2 Resellers; 5 Customers;		Focus on how the digital environment can integrate with the physical one.

Case analysis

SalesForce.com

Salesforce.com is a cloud computing company founded in 1999 and specialized in software as a service (SaaS). In June 2004 the company's initial public offering was listed on the New York Stock Exchange under the stock symbol CRM and raised US$110 million.

Most of Salesforce.com success is due to the development of an integrated platform, *Service Cloud Lightning,* which keeps track of all contacts, opportunities, accounts, partners and competitors in one single platform that everyone can share throughout the organization, allowing the sales division to function more efficiently no matter where they are physically. The platform enables companies to create a customer-centred business from marketing to sales, customer service and business analysis. This innovative approach made possible to Salesforce to compete with the "big four" enterprise software companies in the world (Oracle, SAP, IBM, Microsoft) and to become the company with the highest rate-growth in US in 2015.

The company not only provides its business customers the basic tools to create and manage strong relationships with the final leads, but they are also able to personalize the way they engage their customers through different combinations of apps, tools, different levels of difficulty and extensions. Every customer who can access the dashboard is allowed to modify it according to its needs and preferences. The idea is to share the infrastructure but leaving organizations free to determine their content.

"*Thousands of users suddenly find themselves living in the same apartment building; they all pay the rent, but then they have the opportunity to create their own apartment and furnish it as they see fit*." (Country Manager, Salesforce Italy).

Around its CRM, the company has created a community of 150 thousand people, where all sides in the game try to share the information in order to simplify the support part. Salesforce collects

suggestions from the community, from blogs, from influencers and tries to figure out how to improve its software, often by re-contacting people who made valuable suggestions.

Particularly interesting for the scope of this case, are recent updates to improve contents and visual aspects of its Salesforce CRM interfaces:

"*The last release of Salesforce CRM works like FaceBook, where a person uploads a photo and its friends comment it. Similarly, in our CRM a business opportunity is not anymore a record, but it becomes an object, expressed through a text, an image, a graphic, an audio message, a 'like' and, above all, it is an object that becomes social.*" (Federico Della Casa, Country Manager Salesforce Italy).

So, Salesforce's social media function and news feed work very much like Facebook, making it very familiar and easy to use. Salespeople can easily browse the news feed and post status updates, upload files, share links and more, right from the dashboard. This fosters internal communication, interaction and coordination among colleagues within the company.

Making this parallel with Facebook is an expression of a profound change for Salesaforce: from a quite static and impersonal approach, toward a personal and interactive one, where the same business opportunity takes on meaning and significance through the continued participation of different stakeholders who contribute to its definition. So, no more emails that speak of subjects and objects, but they are objects and subjects that speak of people.

This logic has become pervasive across the entire Salesforce organization, to the point that joining the company for new people means absorbing such transformation, a new way of thinking business activity not as isolated ones but collective.

In 2010, another important innovation has characterized the development of the company's business: in a manner similar to what Apple has created for the consumer world, Salesforce has made for business. They launched Salesforce AppExchange, an online application marketplace for third-party applications that runs on the Force.com platform. They created a single ecosystem for building, discovering, and running all the company apps. To understand the magnitude of this solution, in Salesforce 14 thousand people work in the AppExchange business unit.

BuzzDetector

Buzzdetector is a digital intelligence company specialized in providing operative indications to customers through the analysis of millions of conversations turned into meaningful insights. Conversations have an extraordinary ability to influence the choices of both individual consumers and business decision makers.

The social web has added a multiplier effect that spread beyond the physical boundaries: every day there are 2.4 billion conversations mentioning at least one brand and 3.3 billion marks citations. This makes it essential to include conversations between business intelligence tools, creating a single complex reality that includes on-line and off-line. Companies today are under increasing pressure to achieve results; to do that they need of information ready to use, prompt time and easily accessible. With the advent of the social web, the scenario went complicating.

"Data is beautiful and complex.
Too much data=No Data" (Analyst, Buzzdetector).

So, while digitization has highlighted the importance of conversations, data and information know-now are becoming increasingly complex. Opinions, judgments, choices are formed in a unique ranging from digital to physical interactions: news does not come anymore from predetermine unique sources, but people themselves become media.

The intuition of Buzzdetector's founder was to replace or, better, integrate the mathematical-statistical component in data analysis with the human component: algorithms often taken individually are not enough to make correct decisions, indeed they can lead to wrong answers. This consideration led to assign a strong emphasis to people in data analysis and in their elaboration: "*We believe in the human factor*" (Founder, BuzzDetector").

The mission of the company can be summarized into three main activities "*We listen for words, we visualize concepts, we enlighten meanings*". For the scope of this study, the second point is particularly relevant. Buzzdetector experts have realized the importance of visualizing concepts for their business customers: knowledge now goes through signs, symbols and representations, leading to blur the distinction between off-line and on-line. The purpose of analysts is to work on quality, accuracy, and also on the significance of its representation:

"*The transformation of data into meaningful information can only happen through an aesthetic/functional path*". (Andrea Facchini, Founder Buzzdetector).

Buzzdetector fits into this market with the goal of making data accessible and usable in practice through the combined work of analysts, designers, and information aesthetics experts. The company is concerned to find ways to involve the client trying capturing its attention, put him/her in a position to concentrate on what he/she sees, finding an impact view and therefore generating a one-to-one approach-textualized. In this process, the customer is an integral part of the context: it is not anymore a passive recipient of documents, but data are contextualized according to its environment. In this way Buzzdetector extracts strategic insights from conversations ready to be distributed to any stakeholder.

Instagram

"*Social media is changing the way we work, offering a new model to engage with customers, colleagues, and the world at large. We believe this kind of interaction can help to build stronger and more successful business relationships. For Intel, it is a way to take part in global conversations related to what we do and what we care*". (Marketing Manager, Intel)

In the last years the presence of social media has become viral. Companies in business-to-business are starting to introduce social networks in their marketing activities. Social media are considered a vehicle for soft marketing through relationship and brand development, rather than hard-sell vehicles. This is even more key considered the growing importance of branding in business to business. The principal marketing applications for social media in btob are content marketing, market research, business networking and sales prospecting.

Among social media used by business to business companies, there is Instagram: a tool launched in March 2010 by Kevin Systrom and Mike Krieger. It has highly engaged the global community, with more than 400 millions active accounts, built on the power of visual storytelling: 80 millions photos and 5 billion likes daily.

Especially for those companies that are selling highly visual products, it is important to take into account the potentiality of this social network, whose simple design allows captivating visuals to take center stage. BtoB companies are increasingly using this photo focused social platform to achieve extra visibility and betters engage the community of followers, creating a network that gives to the company more of a human touch.

Instagram's business profile is still in a testing phase, even if recently its development started to grow really fast. Its main goals are:

Show off products and services: company take pictures of new products, share pictures of their most popular products (retail business), or take photos of their work (service business).

Go behind the scenes: they show how products are made, especially if unique. This activity doesn't provide only interesting content for Instagram account, but also shows customers and followers exactly what goes on in the background.

Include employees: companies are making their Instagram page more personal by including employees in their posts. They share pictures of their team members while at work or having fun at company outings.

Ask customers to show off their photos: letting customers know the company is on Instagram and the hashtags they can use to show off their photos.

Post deals on Instagram.

The visual aspects commonly used on Instagram by btob companies are Photo ads, Video ads and Carousel ads. With the photo ads, businesses can show their story with images inspiring people to see the brand in a different way though the creativity of these pictures. With video ads, they offer a landscape format and the same visually immersive quality as the photos, joining the power of the sound, of the sight and motion. Through carousel ads, people can swipe to see additional images and a call to action button takes them to important sections of the website to learn more about.

To express their business visually, companies create a content strategy establishing connective elements across images and videos to make business identifiable and recognizable; to do that effectively, they should drive action with these ads sharing stories to a huge audience in a creative and high quality way.

Intel is an example of a b2b Company which has a strong presence on Instagram. The company also developed a training program to its employees about the use of social media to achieve business results. The principles that they are applying are *Disclosure*, as the presence in social media must be transparent; *Protect*, to make sure that transparency does not violate Intel's confidentiality or legal guidelines for commercial speech; *Use common sense*, as in online social networks the boundaries between private and public, personal and professional are blurred, so employees have to keep in mind cultural values of the company.

3DiTALY

"*Digital manufacturing reverses the economic logic of traditional manufacturing. In mass production, almost all costs are to cover the initial equipping of the machine: the greater the complexity of the product and more changes to be made, so the costs rise. With digital manufacturing, it is exactly the opposite: things that are expensive in the traditional production, become free.*" (Chris Anderson – Maker)

The advent of 3D printing is a cultural revolution which stands in antithesis to a hyper-specialized society where people only perform the activities for which they have the relevant expertise. The industrial production that prevailed up to now, in fact, is efficient and cost-effective only in the production of thousands of identical pieces, while producing a single piece with the classical systems is difficult and, in proportion, enormously expensive. 3D printing has shortened the supply chain and reduced the related costs, democratizing technology. It has made possible the rapid prototyping, without the necessary production of series and without waste of economic resources. Before the diffusion of 3D technology, prototyping costs were extremely high, often prohibitive

In this business operates 3DiTALY, born in 2013 as a network of companies specialized in 3D printing printers, services, materials consumption, scanners and training activities. The company's philosophy wants to subvert the traditional supply chains of industrial production, shortening the distance between inventor and entrepreneur. This philosophy encourages creativity and DIY (Do It Yourself) through the widespread accessibility to digital manufacturing machines. Interest groups are

built around ideas and projects giving rise to a new form of entrepreneurship that exceeds the logic of traditional marketing and becomes more social.

The company targets creative people, inventors, companies, schools, and citizens providing them the machines, equipment and services needed to give substance to their ideas. Each user is able to develop a culture of doing and can acquire the skills needed to turn ideas into prototypes and products.

3D printing allows putting human creativity at center. For this reason, every 3DiTALY dealer combines different skills to facilitate cross-creative approaches: architects, designers, engineers, communications experts and marketing persons. Application of 3D printing are extensive: rapid prototyping for architects, urban planners and designers, mechanics, mechatronics, automotive, jewelry, art and contemporary sculpture, physical computing, toys, 3d photo, interaction design, cinema, fashion design, cake design, applied sciences and biomedical, robotics and many others.

Recently 3DiTALY set up the Digital Arts & Manufacturing Academy (DAMA), based in Milan. The academy aims to train the future professionals of the digital fabrication. The scope is to integrate the cultural baggage of craftsmanship with the technologies of digital fabrication, thus giving rise to the figure of the 'digital artisan.

3DiTALY is also very sensitive about sustainability issues. First of all, 3d printers use a material called PLA (Poly Lactic Acid), which is a biodegradable plastic obtained from starch, widely used for shopping bags, and which can be reused almost indefinitely. Second, by producing objects in small quantities, 3D printing allows to save on materials, limiting costs and toxic processes. In terms of social sustainability, the company is experimenting new applications of 3D technology to solve the housing crisis in Third World Countries: slums will be replaced by modular and affordable housing, reusable and non-invasive for the natural territory.

In the future the company plans to further expand the area of digital fabrication, thinking to new fields of application and new technologies, such as holograms.

Discussion, conclusions and implications

The importance of the business space in digital marketing has heavily increased in recent years both for B2B and B2C companies. Individuals and companies have access to information any time and any place they want thanks to digital world.

The large amount of information available, the increasing number of interaction points and the dematerialization of contents has also made more complex the management of all and diversified touch points between interacting actors, whatever consumers, business managers or the general public. In this study we show that digitalization is leading to a greater need for coordination, which in turn assign a key role to boundary objects. Through analysis of four cases, this study highlights the functions that boundary objects specifically play in digital contexts. We have summarized them in the following:

Boost socialization and coordinate meanings
In a digital context boundary objects are even more the result of collective efforts. The heterogeneity of actors in networks, in terms of objectives, position, power, culture, and so on requires the creation and sharing of a 'sense' that makes the network cohesive. In the Salesforce.com case, the company is proposing a new CRM at the base of which there is simplicity, total mobility and sociability. The case highlighted how the business opportunity can assume sense and meaning through the continued participation of various persons which contribute to its representation and thus definition. Through representations of business relationships, they come to exist and these representations can then be used in prospective terms for converging on a certain clue of future value potential.

Simplify complexity
Instagram is based on the idea of simplicity, where photos and videos are the boundary objects around which opinions organize. In the Buzzdetector case, it has been key the capability to translate enormous amount of on-line conversations into concepts, therefore simplifying complexity, and making these concepts available to different stakeholders.

Humanizing objects
Digitalization is not only about technology, but a cornerstones of a human centric innovation, whose progress is fuelled by the increase in the complexity of the products, processes and relationships. This calls for more attention to people and to the progress of artificial intelligence that make the machines more capable of living together in complementary roles with human intelligence. Empowering people to work on the complexity with their fluid intelligence, allows moving on from an impersonal world (Glynn, 1996). On that, it is interesting the case of Buzzdetector, which integrates the mathematical-statistical component of the data analysis with the human component; to display more effectively concepts, they combine abilities of analysts and designers. Again also in Salesforce the new modality to represent a commercial relationship moves from a static and impersonal logic, towards a more personal and interactive one.

Story telling
Instagram social media highlights the increasing role of boundary objects in form of pictures and videos as ways to tell stories about the company, its solution and its customer in an appealing and human related way. At the end, purchasing and sales managers in btob companies are driven not only by economic considerations but also by emotional instances. Thanks to the use of boundary objects in a digitalized environment, people would not need any more to exchange emails discussing about objects, but they are objects and topics that start to talk about people.

Boost creativity
Human centric service innovation offers a balanced approach that take into account people, technology, and information by offering a new opportunities to co-create value for business, as well as for society. The ICT opens new possibilities that lead people to be the driving forces of change (Perry-Smith, 2006). The presence of boundary objects boost the creativity of individuals who can more easily contribute to change with new ideas.

Engage in a broader experience
Belonging to a network involves the development of a collective sense that goes beyond the concept of the product or service (Madhok and Tallman, 1998). The creation of new meanings occurs through the activities and speeches that link the various actors, primarily enterprises and customers, in a process of social construction that takes place before, during and after the exchange (Penaloza and Venkatesh, 2011). In the 3D printing case, architects, designers, inventors, craftsmen, but also individuals can easily see translated their ideas into a physical product.

Promote flexibility and contextualization
In the case analyzed, it is evident how social objects become flexible and in continuous evolution. In such a way, they are used to grant a higher contextualization of communication practices, by representing what is occurring in a specific context in a certain time moment. 3DiTALY makes a further step on that by showing how adaptations could stay in the integration between a digital environment and a physical one.

This paper also highlighted that more and more companies are investing in the attempt to represent and display boundary objects or, in other words, they try to make them less intangible, also due to the importance of presenting ideas and concepts in a way that fosters efficient and effective understanding of it.
Connected to this point, future research in marketing should get closer to the stream of information design and data visualization. Information design can be increasingly important in the future to assign

a shape to information so that they can be straightforwardly understood, shared and modified by interacting parties.

The cases analyzed also shed light on the need to gain a joint understanding of business to business markets along with business to consumer ones: the customer experience is becoming increasingly holistic. This is even truer in a digital environment where the same individual can manifest different identities: a consumer, business decision maker, an influencer, a citizen, a passionate, and many others.

Future research could also study the use of boundary objects in digitalized context as a way to better connect developed and underdeveloped Countries, thus improving collective wealth.

Implications under a managerial point of view are also important. It emerges from the study that boundary objects should be not considered as natural and not controllable, but rather as strategic tools on which the company can act to improve the effectiveness of its business relationships both in a digital and physical world. This would imply to figure out new specific roles who have the responsibility of these boundary objects management and that possibly should possibly have combined skills of communication, marketing and design.

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