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The value of technology affordances to improve the management of nonprofit organizations

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Abstract

Purpose – This paper aims to investigate the benefits generated by the use of new technologies by nonprofit organizations, with focus on how these artefacts can improve their ability to achieve their social mission.

Design/methodology/approach – To understand the potential use of technology by a nonprofit organization, the concept of affordance was applied. The authors propose a processual model of affordances' interdependences that enrich the extant literature. Six nonprofit organizations in two Brazilian regions were deeply investigated using a multiple case study method.

Findings – The authors identified new sub-categories of technology affordances, which are not just related to nonprofit but that could be also applied to other types, including for-profit. Sub-categories of affordances seem to play different roles in the actualization process. The authors are not proposing determinist connections among sub-categories, but they argue that they sustain some sub-categories precede or create the condition for others to emerge.

Originality/value – Nonprofit organizations lack theoretical and empirical investigations on management in general and on technology management in particular. In its turn, the technology field does not pay much attention, both in terms of research and practice, to the specificities of the third sector where the nonprofit

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organizations operate. This process model of potential uses of new technologies that might favor nonprofit organizations contributes to the cross-fertilization between two distinct fields: third sector and technology management.

Keywords Affordance, Technology, Nonprofit organizations

Paper type Research paper

Introduction

This study puts together two areas that often evolve separated: third sector and information and communication technology (ICT). On the one hand, the so-called third sector is composed by private organizations of public interest, involving entities that are not part of the government and neither of the market (Salimon and Siqueira, 2013). It is a kind of intermediary space between business and government, often including voluntary and nonprofit initiatives. In Brazil, since the 1990s, nonprofit organizations have been considered increasingly relevant for social, economic and cultural development (CGI.br, 2015; Mendonça and Machado Filho, 2004). Despite such an importance, the management of the third sector remains one of the biggest challenges for both theory and practice. On the other hand, despite being clear on the benefits of ICT in supporting organizations in their operations and goals' achievement, a 2014 survey carried out by the Brazilian Internet Manager Committee in Brazil (CGI.br) noted that basic tools such as computers and internet are not universalized instruments in nonprofit organizations, and just a few of them have structured ICT departments. Therefore, the incipient application of new technologies to nonprofit organizations points to the lack of attention given by the ICT industry towards the specificities of this sector (Popjoy, 1992; Jariego, 2007). The practices observed in these organizations reflect their stage in terms of the use of ICT. Additionally, there is a shortage of research that explores the IT contribution to the accomplishment of the third sector organizations' missions. From a management perspective, to put forward a research field combining ICT and nonprofit organizations can be seen as emergent and timely.

This study investigates the capabilities generated by the use of ICT by nonprofit organizations, with a focus on how these tools can improve their ability to achieve their social mission. The barriers that prevent the full use of ICT are also observed. Our research question is: *How might the use of ICT support nonprofit organizations in the achievement of their mission?* To examine this link between ICT and nonprofit organizations, we adopted a conceptual lens inspired by the theory of affordances (Strong *et al.*, 2014). Technology affordance means the technology potential that comes from a goal-oriented behavior and that turns into concrete actions. Affordances only exist in practice and in context. The very same technology might have different potentialities when considering different situations. The affordances emerge from the interplay between technology and actor characteristics (Leonardi and Barley, 2008). Nonprofit organizations have a number of characteristics that differ from for-profit. These issues reinforce the use of affordances lens as a reference in understanding technology potential, its barriers and the difficulties in applying it in specific contexts. Thus, this theory emphasizes the existence of aspects that may constraint or enable affordances (Leonardi, 2011).

Our study included six case studies that were analyzed based on the conceptual framework, which established an analysis model identifying the characteristics of technology and organizations, as well as the objectives that guide the implementation of technology in the organizational context. Our study makes two main contributions. First, it extends the seminal work of Strong *et al.* (2014) on the theory of technology affordances by identifying new sub-categories and by proposing a processual model of affordance

interdependencies that have the potential to enhance existing knowledge. Second, we contribute to literature on the management of the third sector not only by creating a bridge with the literature on ICT but also by shedding some light on the potentialities of the use of technologies for the accomplishment of their social mission. The paper is structured as follows: we present the theoretical background, our theoretical lens and our methodology, which include six rich case studies. Using the theory of affordances, we analyze our empirical data that provide a number of insightful results open to future investigations.

Theoretical background

Information and communication technology and nonprofit organizations

Nonprofit organizations have been structured as an important research field in recent years due to their role in social development and in the demands not fulfilled by the government (Sales and Silva, 2015). The growth of these organizations in civil society has been increasingly demanding their professionalization, use of different management tools and application of technology. To understand how ICT has been applied by nonprofit organizations and how research has been addressing this issue, a search for publications that use the expressions "ICT" and "nonprofit" was conducted. We surveyed not only journals specialized in the third sector but also major journals publishing studies on the ICT area. We found 89 articles. After the reading of the abstracts, 44 articles were eliminated because they did not mention ICT and nonprofit organizations. From those 45, 17 were eliminated because although they mentioned the two topics, they did not directly address the relationship between ICT and nonprofit organizations. The remaining 28 papers were deeply reviewed and consolidated in Table I.

Based on this review, it was possible to observe that the use of ICT in the nonprofit sector is a novel theme, emerging just recently in the 1990s. This decade was the period in which studies on this sector in Brazil were intensified (Sales and Silva, 2015). The papers reviewed also indicated that investigations have been scattered over time, as in the past five years, only eight studies have been highlighted. Despite the social relevance of nonprofit organizations and the fact that ICT has being configured as an essential tool for their development and innovation, few systematic studies that reinforce the use and results achieved by these organizations from the use of ICT have been found (Senne and Barbosa, 2015).

Table I.
The relationship between technology and nonprofit organizations[1]

28 references that address the relationship between technology and nonprofit organizations	17 references that mentioned technology and nonprofit organizations, but do not focus on the relationship between these themes
Popjoy (1992), Elliott *et al.* (1998); McNutt and Boland (1999); Berlinger and Te'eni (1999); Alexander (2000), Burt and Taylor (2000); Ebrahim (2002); Zorn (2002); Burt and Taylor (2003), Saidel and Cour (2003); Te'eni and Young (2003); Schneider (2003), Brainard and Brinkerhoff (2004); Finn *et al.* (2006), Fryer and Granger (2008); Vaccaro and Madsen (2009), Ashta (2009); Melitski *et al.* (2010); Lee (2010); Zorn *et al.* (2011); Meijer (2012); Rodríguez *et al.* (2012); Saab *et al.* (2013), Zort *et al.* (2013); Al-Busaidi (2014); Crump and Peter (2014); Eimhjellen *et al.* (2014), Tremblay-Boire and Prakash (2015)	Bryer and Magrath (1999); Kloss (1999); Golensky and DeRuiter (1999); Young (2001); Lindenberg (2001); Miller (2002); Austin (2003); Chaskin (2003); Standley (2001); Sowa *et al.* (2004); Haque (2005); Chalasani *et al.* (2005); Alfirevic *et al.* (2008); Becla (2012); Ngamassi *et al.* (2014); Granjon (2014); Jager and Schroer (2014)

The studies listed in Table I mention a variety of technologies, going from internet-based application to phone systems. They also suggest a variety of organizational types, including humanitarian, social, religious, philanthropic, charitable, cultural, educational, scientific and environmental issues, among others (Sales and Silva, 2015). Despite such a diversity, no robust theoretical and methodological approaches were identified. Most studies lack a clear conceptual point of view (Duncombe and Boateng, 2009). In addition to the theoretical weaknesses of this field, the practice reveals little attention given by ICT professionals to nonprofit organizations. Technologies purposively designed to meet the needs of this sector are practically inexistent in the market (Popjoy, 1992). The fact that nonprofit organizations are not adequately targeted by the ICT industry combined to the lack of academic studies reinforce the relevance of our research topic.

In line with Sales and Silva (2015), we argue that ICT has the potential to enable greater efficiency and sustainability for nonprofit organizations. They can bring more transparency in the relationship among nonprofit, civil society and government, and transparency is recognized as crucial social demand (Vaccaro and Madsen, 2009; Tremblay-Boire and Prakash, 2015). The internet has been used as a strategic tool to promote accounting transparency, accountability and provision of information to groups interested in the nonprofit sector (Rodríguez Pérez and Godoy, 2012, 2015).

The ICT-enabled connectivity has changed the relationship between nonprofit organizations and different actors, influencing roles and social responsibilities of organizations (Ashta, 2009). Digital technologies have transformed communication and helped empower groups and communities, providing new opportunities and ways to impact society (Fryer and Granger, 2008). These authors emphasize that communication enables the participation of more citizens, the exchange of ideas and the development of collaborative and collective action. ICT has an important role in expanding the possibilities for interaction and association, allowing information to be disseminated more broadly across organizational boundaries (Lee, 2010). Networking and association with other nonprofit organizations is one of the potentialities of ICT use, assisting in the development and internationalization of innumerable nonprofit organizations (Lee, 2010; Burt and Taylor, 2003). Therefore, ICT can make nonprofit organizations expand their areas and venues of action. ICT help to achieve the organizational mission and consolidate the values of the organizations through new approaches and action strategies (Burt and Taylor, 2003; Te'eni and Young, 2003; Brainard and Brinkerhoff, 2004; Saidel and Cour, 2003).

Nonprofit organizations have been migrating from a hierarchical and centralized communication style in traditional websites to communication in decentralized networks (Eimhjellen *et al.*, 2014). Online communication tools and social media enable a direct involvement between the organization and its public, allowing to build communities and to collaborate, to raise funds and to deliver services (Zort *et al.*, 2013; Tremblay-Boire and Prakash, 2015). Websites and communication technologies and social media using dynamic content reinforce the values of these organizations, spread their objectives, promote engagement and mobilize people and resources for a collective action (Zort *et al.*, 2013; Eimhjellen *et al.*, 2014). In addition to communication and information sharing, ICT also assists in the administrative management of these organizations, facilitating the coordination of schedules and activities (Saab *et al.*, 2013). Technological tools support financial management through budget control and increase organization visibility, influencing its access to funding sources and to resources (Berlinger and Te'eni, 1999; Tremblay-Boire and Prakash, 2015). Berlinger and Te'eni (1999) indicate the existence of ICT tools that assist management and administrative functions as well as those that assist

in achieving an organizational objective, such as online discussion groups and communication tools.

Access of nonprofit organizations to ICT does not necessarily imply their effective use (Fryer abd Granger, 2008), as there are some barriers that prevent the effectiveness of the application of technological tools in nonprofit organizations. Eimhjellen *et al.* (2014) emphasize several aspects, such as the size of the organization, inertia, structure, age, resources and guidance that interfere with technology use. Size (e.g. the number of volunteers) and complexity are frequent barriers in such a manner that smaller organizations have more difficulty in implementing technological solutions (Rodríguez *et al.*, 2012).

Nonprofit organizations have a very specific mission focused on social demands (Sales and Silva, 2015). The orientation and characteristics of these businesses are identified as an inhibitor of technology application because of the difficulty in finding tools that focus on these issues (Berlinger and Te'eni, 1999; Burt and Taylor, 2003; Eimhjellen *et al.*, 2014). Lack of resources and funding sources, sometimes from public funds, are obvious barriers to the constant updating and consolidation of technology use (Finn *et al.*, 2006; Fryer and Granger, 2008; Zort *et al.*, 2013). Besides these factors, Eimhjellen *et al.* (2014) highlight that the difficulty in controlling organizational boundaries are seen as a possible reason of why the social media of nonprofit organizations are not as present as their websites. Zort *et al.* (2013) appoint the lack of usefulness perception of the artifacts as barriers to effective technology in nonprofit organizations.

The workforce profile made up by employees and volunteers may also restrict the application of technology. Studies highlight some features as technology barriers, namely, reduced work staff and lack of training, experience, skills and knowledge necessary for the handling of artifacts (Popjoy, 1992; Burt and Taylor, 2000; Schneider, 2003; Finn *et al.*, 2006). Due to reduced budget, a great number of nonprofit organizations have difficulty retaining talent with the skills needed for ICT implementation and use, influencing the level of professionalization of these organizations (Saidel and Cour, 2003). The aspects aforementioned indicate that there are differences among nonprofit organizations regarding the potentiality and objectives of technology allocation, as well as the results achieved through these artifacts.

Affordance theory, a theoretical lens to understand the potential of information and communication technology for nonprofit organizations

Technology affordances refer to the array of potential uses enabled by ICT artifacts (Markus and Silver, 2008). The concept of affordances has been incorporated into ICT literature and permeates the relationship between technology and organization (Zammuto *et al.*, 2007). The potential emanating from technological artifacts comes from behavior-oriented goals of people that use such artifacts that become concrete actions (Strong *et al.*, 2014). Affordances emerge from the interrelationship between the characteristics of the technology and the actors or groups of actors (Markus and Silver, 2008). In this research, this relation is observed at organizational level and not individual level, according to Zammuto *et al.* (2007).

The affordance lens considers reciprocity between the action taken in given organizational context and the capabilities of the technology (Majchrzak *et al.*, 2013), going beyond the technology functionality and recognizing the artifact as a social object (Zammuto *et al.*, 2007). The affordance theory is useful to understand the imbrication of human and material agencies because they are interdependent phenomena. Leonardi (2011) points out that affordances are not a property of the actors or the artifacts, but made from the relationship between them.

Strong *et al.* (2014) present an explanatory model of the affordances, highlighting the effectiveness of the goals that guide human action from technology and achievement of concrete results. The theory shows the study of the technology associated with organizational change, thus providing a view on the role of technology and organization in the process of change. Affordance actualization involves human action, reinforcing that an affordance can exist for one group or organization and may not exist for another (Leonardi, 2011; Strong *et al.*, 2014.). Actualization occurs when affordances are used toward achieving organizational goals using technology (Volkoff and Strong, 2013; Strong *et al.*, 2014). The affordances reinforce the view on goals that guide the actions, showing a dynamic process by which the results are achieved, identifying the potential value of technology and challenges associated with different actions (Strong *et al.*, 2014).

Technologies differ in terms of potential action based on the context in which they are used, as an artifact can produce multiple results (Leonardi, 2011). Affordances are not always identifiable a priori, although they are easily observable when the technology application context is understood (Leonardi and Barley (2008). Strong *et al.* (2014) highlight the need to expand studies that observe technology from the lens of affordances, directing the focus to other organizational contexts such as nonprofit organizations, which are object of this research. Zammuto *et al.* (2007) emphasize that affordances depend on the capabilities of technology and on organizational aspects such as processes, controls, social capabilities and expertise, in such a manner that the organizational characteristics of nonprofit organizations reinforce the importance of understanding the potential of technology.

Although the characteristics of a given technology are common to different organizations and contexts, the affordances are not (Leonardi, 2011). There are factors that constrain or enable affordances, aspects dealt with in the previous section as barriers. These restrictions indicate that the existence of affordance does not guarantee its achievement or the accomplishment of the objective that guides the relationship between action and technology (Leonardi, 2011; Goh *et al.*, 2011). The organizational social dynamics presents effectiveness on technology, which reinforces that similar technologies in different contexts may have diversified affordances (Leonardi and Barley, 2008).

Nonprofit organizations differ from other organizations not only in their social and material settings but also in the opportunities of changes, reinforcing that the goal which guides the actions in these organizations is social change. Strong *et al.* (2014) indicate that affordance lens is a new and not fully developed reflection that opens a great number of new research methods. However, affordances highlighted by the authors are specific to the investigated case, indicating that the organizational specificities that support or restrict the actualization of the technology potentialities must be considered. The adequacy of the affordance actualization model for other organizational contexts – nonprofit organizations (Figure 1), and the investigation of barriers that limit the achievement of affordances are research proposals presented by Strong *et al.* (2014).

The literature on technology in nonprofit organizations presents the potentialities of these artifacts arising from the social aspects and technological elements of these

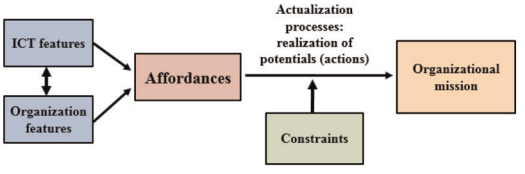

Figure 1.
Process of actualizing affordances of technology for nonprofit organizations

organizations. The observed affordances were classified into four categories (Table II), wherein each category has a series of sub-categories that comprise diverse potential applications of ICT in nonprofit organizations.

The category "coordination" includes the management of organization activities and its working environment, highlighting the integration between different areas and projects. "Networking" is related to the association of the organization with its partners, providing structure and joint performance work, which in some cases involves participation in international organizations. The affordances of "communication, mobilization and

Table II. Categories and subcategories of affordances of technology in nonprofit organizations

Category of affordance	Sub-category of affordance	Main references
Coordination	Managing budgets and financial resources. Coordinating activities and the implementation of projects (agendas) Sharing information and communicating with the internal public Developing human capital - organizational learning Building a collaborative workspace - reconfiguration of internal relationships. Standardizing the quality of services Making the workspace flexible (team mobility through teleworking)	Elliott *et al.* (1998); Berlinger and Te'eni (1999); Alexander (2000), Burt and Taylor (2000); Schneider (2003); Te'eni and Young (2003); Saidel and Cour (2003), Burt and Taylor (2003); Lee (2010); Zorn *et al.* (2011); Saab *et al.* (2013)
Networking formation	Promoting association with other organizations to constitute networks Reconfiguring relationships with external organizations promoting internationalization Sharing knowledge and experiences with other organizations Promoting political and economic association with other actors	Elliott *et al.* (1998), Burt and Taylor (2000); Burt and Taylor (2003); Te'eni and Young (2003); Lee (2010), Zort *et al.* (2013); Ngamassi *et al.* (2014)
Communication, mobilization and advocacy	Mobilizing and coordinating actors to participate in the actions developed Conducting campaigns that give visibility to the name and organization of the social role Influencing the actors in regards to the causes advocated as a way of impacting society and empowering groups and communities Defending collective objectives (lobby) for the resolution of a problem or the rights of an entity or group Influencing decision-making and gaining public opinion on an issue	Elliott *et al.* (1998), McNutt and Boland (1999); Burt and Taylor (2000), Brainard and Brinkerhoff (2004); Fryer and Granger (2008), Lee (2010); Zort *et al.* (2013), Eimhjellen *et al.* (2014); Tremblay-Boire and Prakash (2015)
Access to resources and accountability	Conducting campaigns to obtain financial funds Accessing public notices and public and private funding programs Committing to transparency regarding the activities and use of resources (informational and accounting transparency - accountability) Assisting the funding agencies in monitoring fund use	Alexander (2000), Ebrahim (2002); Schneider (2003), Saidel and Cour (2003); Finn *et al.* (2006), Vaccaro and Madsen (2009); Lee (2010); Zorn *et al.* (2011); Rodríguez *et al.* (2012); Saab *et al.* (2013), Zort *et al.* (2013); Eimhjellen *et al.* (2014), Tremblay-Boire and Prakash (2015)

advocacy" involve the potentiality of technology for the organization to mobilize people in support of its objective and to communicate with different audiences, bringing together those who can be helped or participate in the actions. "Access to different resources and funding programs" involve an important affordance category linked to organizational sustainability. All those categories of affordances seem to support the achievement of the organizational objectives, helping the nonprofit organizations to cope with their social mission.

The affordances of technology, observed from studies on nonprofit organizations, permit the identification of different benefits of ICT for these organizations such as access to financial, human and material resources; improvements in the work organization; organizational transparency to different audiences; and learning and organizational development among others. However, these benefits are not always accessible to organizations because there are factors that can limit the actualization of the technology potentiality. These barriers were categorized into four groups (Table III): lack of resources,

Category of barrier	Sub-category of barrier	Main references
Lack of resources	Availability of financial resources and equipment. Equipment received from donations, which are often obsolete. Reduced budget to finance the actions and commitment of donor dependency - availability of financial and material resources. Lack of technology to meet the specific characteristics of nonprofit organizations. Few resources devoted to training for new technologies. Organizations with small teams in which, in some situations, make people accumulate functions (size of the organization)	Popjoy (1992), McNutt and Boland (1999); Schneider (2003), Saidel and Cour (2003); Finn *et al.* (2006); Rodríguez *et al.* (2012); Zort *et al.* (2013), Eimhjellen *et al.* (2014); Tremblay-Boire and Prakash (2015)
Workforce profile	Team having employees and/or volunteers who do not always have experience or knowledge on how to handle and use the technology. Employee age and level of professionalism. Resistance of people in changing and adopting technologies Staff turnover. Manager profile. Difficulty in retaining talent	Popjoy (1992), McNutt and Boland (1999); Berlinger and Te'eni (1999); Saidel and Cour (2003), Schneider (2003); Finn *et al.* (2006), Zort *et al.* (2013); Eimhjellen *et al.* (2014)
Organizational structure	Some organizations have a very hierarchical and formal structure, whereas others have a more organic and horizontalized structure (greater ease of adopting technology)	Eimhjellen *et al.* (2014)
Specificities of the organizational mission	The organizational orientation involves values, goals, actions and purposes, which may result in an organizational complexity different from traditional business Specificity of the organizational mission (humanitarian, religious, non-hierarchical values) often hampers the direct application of technology	Berlinger and Te'eni (1999); Burt and Taylor (2003), Eimhjellen *et al.* (2014); Tremblay-Boire and Prakash (2015)

Table III. Barriers to the actualization of the technology affordances in nonprofit organizations

workforce profile, organizational structure and specificity of the mission and organizational complexity.

One of the main categories of restrictions to perform the affordances of technology is the difficulty in accessing technological, material, human and financial resources. The workforce profile highlights the lack of people with expertise in technology and aspects such as turnover and difficulty of these organizations in retaining talent. Organizational structures and traditional hierarchy may have more difficulty in effecting technology potentiality more than horizontal organizations. Finally, the mission of nonprofit organizations has as consequence of different business logic, to a degree that in some situations, these characteristics restrict the application of ICT and the full use of its potential.

Methodological design

The methodological design is based on a multi-case study carried investigating six nonprofit organizations. We seek to understand "how" and "why" some mechanisms facilitate the use of ICT, while others make it more difficult to achieve the goals and mission of the nonprofit organization. The selection of the cases and of the respondents was based on theoretical criteria. To facilitate the consideration of aspects that could influence the issue of study, thus facilitating the comparison among the cases, we selected organizations with predefined similarities and differences. Similarities include the size and the type of activity of the nonprofit organizations. We selected those that have between 20 and 50 employees, which are considered medium-sized. Their mission were also analyzed, we tried to select organizations whose strategies include educational work aimed at policy formation and strengthening of popular groups, production and dissemination of knowledge and methodologies, social mobilization, the impact on public policies, social control and management of networks and forums (Cicconelo, 2010). In terms of differences, we applied two main criteria. The first was regional. We selected from two distinct regions, namely, Southeastern and Northeastern regions, which are those with the highest number of nonprofit organizations in Brazil according to Brazilian Institute of Geography and Statistics. The second criterion was the perceived intensity on the use of ICT by those entities.

To retain six organizations according to those selection criteria, we had the help of one of the Brazilian entities that better know the entire third sector and have a database with rich information about nonprofit organizations: the ABONG, Brazilian Association of Non-Governmental Organizations. In a meeting with representatives of ABONG, we applied the selection criteria to a list of 9,999 nonprofit organizations and 39 remained. We have then qualitatively estimated the type of use of Internet, i.e. the level and nature of the use of websites and social networks. From this analysis, we had on our hands a list of 13 organizations. They were contacted by phone in order to gather further knowledge regarding their profile of technology use. Then, six nonprofit organizations were chosen, three from São Paulo and three from Bahia (Table IV).

A total of 30 semi-structured qualitative interviews were conducted. We selected five respondents from each of the six selected organizations. The selection of the respondents in each case begun with one manager, who helped to identify relevant users of ICT applications inside (employees, volunteers) and outside (partners, suppliers or beneficiaries) the case. All interviews were audio recorded and transcribed. Three protocols for the interviews were elaborated considering the specificities of each class of respondents: managers, internal actors (e.g. employees or volunteers) and external actors (e.g. partners, suppliers or beneficiaries). In all organizations, the manager was the first to be interviewed,

	ICT usage contribution considered positive (more complexity)		ICT usage contribution considered limited (less complex)
Southeastern region (São Paulo)	*Law case* – it has been working for 20 years on the issue of sexuality and religion	*Gender case* – it has been working for 18 years in combating racism and violence against women	*Equality case* – it has been working for 23 years on promoting racial equality, education, justice, labor and public policies
Northeastern region (Bahia)	*Education case* – it has been working for 17 years on children and adolescent rights regarding communication, education and use of technology	*Childhood case*– it has been working for 15 years in the areas of education and social mobilization focusing on children in early childhood	*Culture case* – it has been working for 34 years on the defense of children, adolescents, women and the fight against racism

Table IV. Summary of the cases investigated

as he/she has a global view of the organization. In this first interview, references were requested from other potential participants. From the referees, we selected two respondents among the staff or volunteers of the organization, and two respondents among what we called the external actors. The selected external actors were people who, due to their activities, had involvement with the targeted case. The analysis of all the empirical material was based on Miles *et al.* (2014) basic guidelines for coding.

Results

Affordances of technology in Brazilian nonprofit organizations

The six cases indicated different potential uses of technology and different levels of ICT application. From each case, an analytic table was built based on the elements investigated by Strong *et al.* (2014). This analysis extends the aspects observed by the authors, incorporating the barriers of the affordance actualization. We identified the category and the subcategory of affordance, the technology features, the organizational features in terms of skills and abilities to use ICT, quotations that illustrate the concept of affordance technology, which was evidenced by the respondents, the technology in practice, observing how it is actually used by the organization, the organizational goals to be achieved through the application of technology, and the barriers that restrict the potential of ICT in being effective. Appendix 1 shows one example of an analytical table, the one of the Culture Case. The same analysis was conducted for the other five cases. For reasons of length, we cannot include all the six tables in this paper.

We compared the results of each individual case – a cross-case analytical process – but we did not identify some significant differences between the cases. Because the in-depth comparative analysis was not the aim of this study, we decided not to emphasize the comparisons. On the other hand, the individual analysis of each case – a within-case analytical process – allowed us to identify the contextual character of affordances, in a manner that the specificities of each organization made the affordances observed in a specific reality not always present in other situations. However, not every potentiality denoted by the literature was present in the investigated contexts, in addition to new affordances arising from the survey data. The analysis of the six cases highlighted the affordances of technology that emerged from the research data (Table V).

Table V.
Affordances of technology in the investigated cases

Affordances	Law case	Gender case	Equality case	Education case	Childhood case	Culture case
Category: Ccoordination						
Coordinating activities and the implementation of projects (agendas)		X	X	X	X	X
Versatility of the workspace (mobility team)		X		X	X	
Developing human capital					X	
Managing budgets and financial resources – control	X			X	X	X
[NEW] Integrating the organization and democratizing information and access to it	X		X	X	X	X
[NEW] Building the organizational memory	X	X		X	X	X
[NEW] Speeding up work performance – practicality and dynamism	X				X	
Category: networking formation						
Promoting association with other organizations to constitute networks	X	X			X	
Sharing knowledge and experiences with other organizations	X			X	X	X
Reconfiguring relationships with external organizations	X					
Category: communication, mobilization and advocacy						
Mobilizing and coordinating the actors to participate in the actions developed	X	X	X			X
Conducting campaigns that give visibility to the name and social function of the organization – comprehensive communication	X	X	X	X	X	X
[NEW] Communicating and obtaining answers more quickly	X	X		X	X	X
[NEW] Interacting and producing information collectively		X		X		
[NEW] Drawing the organization closer to its target audience – more direct communication	X			X		
Category: access to resources and accountability						
Conducting campaigns to obtain financial funds	X		X			X
Committing to transparency regarding the activities and use of resources (informational and accounting transparency – accountability)			X		X	X
Renegotiating budgets and expenditures forecasts					X	
[NEW] Reducing costs	X	X		X		

The "coordination" category focused on the management and internal communication of the organization (Zorn *et al.*, 2011). The technology makes the coordination of the work and projects possible, in addition to easing the work of the team, allowing people to develop their activities remotely in an integrated manner with other members of the organization (Lee, 2010). In addition to these aspects reported in the literature, the results pointed to an organizational and informational integration, the construction of the memory of the organization, dynamism and agility in the execution of work as new categories of affordances of ICT for the nonprofit organizations.

Technology showed potential in reconfiguring relations with partners and sharing knowledge with others organizations, providing "networking formation." In the investigated cases, ICT has an important role to promote associations and to exchange experiences and projects reinforcing the ideas presented by Zort *et al.* (2013).

"Communication and mobilization" involve affordances linked to interactions with external stakeholders to promote and publicize the organization, its activities and actions (Brainard and Brinkerhoff, 2004; Eimhjellen *et al.*, 2014; Tremblay-Boire and Prakash, 2015). Results indicated new potentialities of technology that involve issues such as responsiveness, recognition and proximity to the public. Technology has been essential in the management of relations and communication processes of nonprofit organizations. Social media allows communication processes to be built collectively with the participation of external agents, forming a way to impact society and empower groups and communities. Communicating and mobilizing people have become quite important for nonprofit organizations to a point that in some cases they are essential to complete the mission of the organization.

The action of "advocacy," based on theoretical reflections, was grouped with the communication and mobilization category. However, advocacy has been appointed as a mission for some of the cases investigated (law, gender and equality), and it is not considered a category of affordances. Therefore, involving communication processes, the potentiality of technology for the practice of influencing decision-making processes (lobby) and gain public opinion in support of a cause is considered a tool for achievement of the organizational mission.

Nonprofit organizations have donations from the private sector and participation in government programs as the main sources of funding. This feature has been identified in the investigated cases, in a manner that it reinforced the ICT potential in expanding "access to these resources," as in addition to the notices published on the internet, technology can assist in conducting campaigns (Alexander, 2000; Saab *et al.*, 2013).

Resource use transparency helps nonprofit organizations in the relationship with their funding agencies, and technological artifacts have helped in the accountability processes. In the investigated cases, the technology is highlighted as an effective control tool. However, it does not consolidate itself as a resource to strengthen organizational transparency. In the analyzed contexts, the use of technology for accountability is not consolidate. The managers did not perceive this important technology affordance. Non-profit organizations operate with public resources to achieve results for society. In this way, although the technology could be seen as a governance mechanism, our results suggest that it has not been used for this purpose.

The mission of the nonprofit organizations investigated is linked to social change, which can be made in different ways, such as educational activities (seminars, training and courses), publication of information materials and dissemination of knowledge, awareness, discussion, social groups mobilization and advocacy of the causes defended. All these actions can be performed through technologies and online platforms. All the previous

affordances of technology are important for the achievement of the organizational mission. In the cases investigated, technologies were considered essential to achieve organizational goals. As ICT potentialities, respondents indicated that technology has permitted the identification of new demands in society, providing these organizations to expand their work through new approaches to reach new audiences and areas of activity. Results pointed to affordances that reinforce the role of technological artifacts to consolidate the organization and its results.

However, in some organizations, the observed affordances do not become effective in their fullness. This occurs because despite the identified ICT potential, there are restrictions or constraints that hinder the achievement of objectives through technology (Leonardi, 2011; Goh *et al.*, 2011). The limiting factors were called barriers to the achievement of affordances. Table VI presents the barriers that emerged from the six cases, which were classified into four groups.

The lack of resources is one of the main difficulties faced by nonprofit organizations to achieve their objectives through ICT. All organizations indicated that the public official announcements and public and private funding programs have rules that limit the use of resources, which should be directed almost exclusively for the business purposes of the projects. These restrictions have hampered investment in technology.

As reduced budgets, which are often from donations, are insufficient to invest in technology and enable people, some organizations have obsolete equipment and outdated technology. In the interviews, the respondents have indicated the type and the time of use of the existing technologies in the organizations. This allowed us to understand the lack of adequate technologies for the development of organizational activities. The difficulty in having financial resources pressures some organizations into not purchasing specialized technological artifacts to expand communication activities and instrumentalize financial management. Still, there are very few tools specifically designed for the particularities of the management of nonprofit organizations, being too expensive for these organizations.

The lack of financial resources has reflected in the team profile because some organizations have difficulty in hiring skilled professionals to implement the potentialities of ICT. The behavioral profile of the team has also reflected in actualizing the affordances of ICT, as in some cases, resistance of people against technologies, learning difficulties and problems on how to appropriately handle artifacts.

The investigated organizations presented teams with members from different generations, leading to differences in knowledge across the usefulness and application of technology as well as difficulties in terms of adaptation. In addition to the differences in age, teams are also heterogeneous because they are formed up of contractors and volunteers. As we know, volunteers in many cases work in the organization not for their professional profile, but because of their engagement with its cause.

Managers have a strong relationship with the mission of the organization, although not necessarily technical management skills. Some managers are unaware of the utility of various technological tools and as a result do not encourage investment in technology. Some nonprofit organizations are thought to operate offline, creating problems with the technical staff that value the use and potentialities of technological devices.

In many nonprofit organizations, there is no strategic thinking driving its performance, which may be related to the specificity of the mission focused on humanitarian and social causes. This feature brings a complexity in terms of directing these organizations with the help of technological tools. In addition, a great number of organizations fail to take advantage of the potentiality of ICT due to the lack of access to technology by the public helped by their actions.

Barriers	Law case	Gender case	Equality case	Education case	Childhood case	Culture case
Lack of resources						
Lack of financial resources to invest in infrastructure and training	X	X	X	X	X	X
Lack of technological resources focused on nonprofit management	X			X	X	X
Outdated equipment and technological artifacts	X		X	X		X
Lack of tools and equipment for specialized activities	X	X				
Difficulty in inserting the heading "investment in technology" in the projects due to the official announcements rules	X	X	X	X	X	X
Workforce profile						
Lack of trained and specialized staff to work with technology	X	X		X	X	X
High cost of skilled labor in technology and training	X		X			X
Difficulties in learning and dealing with new technologies	X			X	X	
Profile managers – lack of knowledge of ICT use	X					X
Resistance of individuals with technology (fear and handling difficulties)	X				X	
Organizational structure						
Working team reduced compared to the volume of activities and actions				X	X	
Specificity of the mission and organizational complexity						
Lack of clear planning and strategies of organization activities		X	X		X	

Table VI.
Barriers to the actualization of the affordances in the investigated cases

Therefore, results showed great potentiality of technology to support the actions of nonprofit organizations as a tool to achieve their mission. However, some factors were highlighted as challenges for the management of these organizations because they can restrict or disable the achievement of results and technology affordances.

Discussion

The decision of working with categories and subcategories of affordances was due to the potentialities that are embedded into each other, which made it possible to identify relationship between affordances. Each subcategory seems to play a different role during the actualization processes. We identified three main types of roles:

(1) basic role, a starting point of technology use;

(2) outputs, immediate results of the use of the technology, generally associated to performance gains; and

(3) outcomes, medium-term results that influence the profile of the collaborators and the organizational dynamics.

Figure 2 shows the interrelationship between the affordances categories and subcategories.

For instance, the affordance "coordination" has three basic categories, two categories of related to outputs and two to outcomes. "Coordinating activities and the implementation of projects," "Managing budgets and financial resources – control" and "Integrating the organization and democratizing the access to information" illustrate the most basic uses of technology, directed to daily operational activities. Once those basic roles are accomplished, some outputs could be identified, therefore affecting the dynamics and performance of the

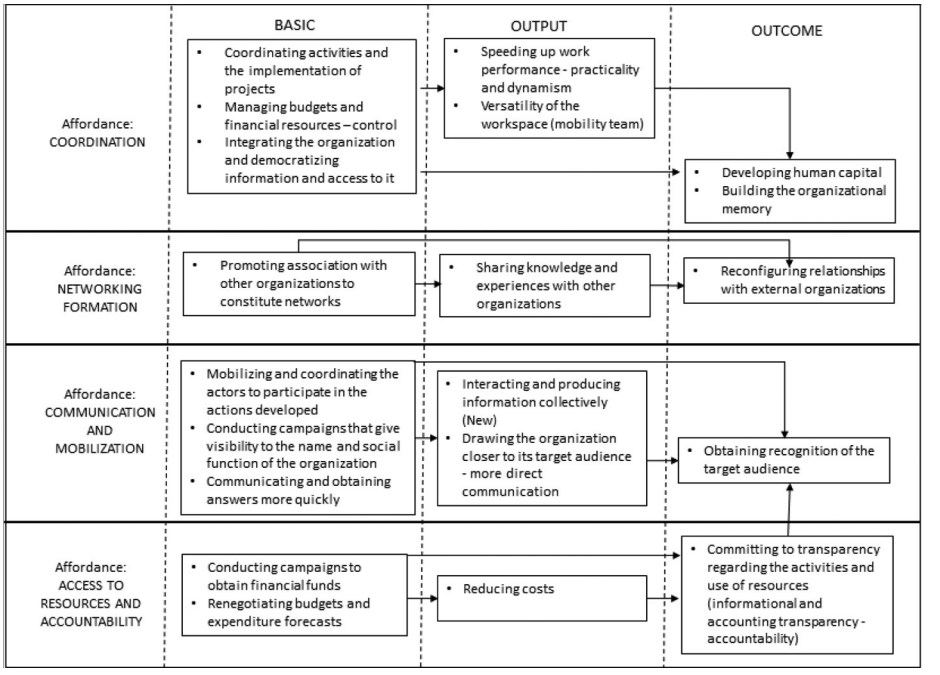

Figure 2.
A processual model of ICT affordances for the nonprofit sector

organization (e.g. "Speeding up work performance – practicality and dynamism" and "Versatility of the workspace (mobility team)." Finally, medium-term changes – the outcomes – are possible to emerge, like "*Developing human capital*" and "*Building the organizational memory.*" It is important to outline that the outcomes are not directly dependent on the outputs, they can emerge from the basic affordance. We are not arguing for a direct cause-effect connection, but in a processual logic, that one element facilitates or creates the condition for the emergence of the subsequent.

As the affordances "coordination, networking, communication and mobilization as well as access to resources and accountability" categories are essential to achieve some organizational goals, our results point toward possible trajectories of the use of ICT as enablers of important organizational changes, therefore facilitating the nonprofit ones to achieve their mission. The identification of the interdependencies among different categories of technology affordances allows us to understand that a gradual path could be draw. It is difficult to an organization to build an organizational memory without before integrating the organization and democratizing access to information. Because one of the barriers to the actualization of the affordance is the lack of knowledge of ICT use, it is important that training programs be in place to develop the skills and knowledge to use the basic functionalities.

The concept of affordance implies the relationship between a given technology and the actions took in a given organizational context. Such a relational view is crucial for the actualization of the potentialities of the technology. Our six case studies shown differences in the use of ICT. For instance, the law, gender and education cases use technological artifacts directly linked to their mission. In other three cases, although the respondents related ICT with the organizational mission, they revealed a basic use in their daily activities. Why? Because while each technology has a set of potentialities, they are just potentialities. The only way to actualize those potentialities is by their knowledgeable use. Lack of resources, workforce profile and organizational structure are barriers which may limit the achievement of affordances and the main cause could be the lack of knowledge of the functionalities of a technology, from the basic to the more advanced.

When we ignore all the potentialities of a given technology, those potentialities are compromised. For instance, if we understand that a tool like the email is just a way to exchange messages, we could use the email in the long run without promoting a more collaborative way of working. Although the range of functionalities of a technology drive their potentialities, the lack of knowledge and skills of the existing ones somehow delimitate the boundaries of the results.

Concluding remarks

This study aimed to analyze the use of technology by nonprofit organizations, highlighting their potential as a tool for achieving their organizational mission. The first main contribution of this study is to expand the work of Strong *et al.* (2014) regarding their *affordance actualization model*. The framework was adapted to analyze the nonprofit organizations. The main adaptation refers to the level of analysis. The theory defines affordances as emerging from the interrelationship between the characteristics of the technology and the characteristics of the individual actors. In our study, in line with Zammuto *et al.* (2007), we defined affordances as emerging from the interrelationship between the characteristics of the technology and the characteristics of the nonprofit organization. Although our respondents were individuals, our research protocol tried to collect data not about the individual use of ICT, but about the organizational use of ICT

(institutionalized routines, norms and ways of doing). Applying the categories and sub-categories initially proposed by Strong *et al.* (2014), we identified new sub-categories, which are not just related to nonprofit but that could be also applied to other types, including for-profit. Most importantly, we propose a processual model of affordances' interdependences that enrich the extant literature. Sub-categories of affordances seem to play different roles in the actualization process, some being more basic, although other are already connected to outputs and outcomes. We are not arguing about determinist connections of cause and effect among the sub-categories, but we sustain that some sub-categories precede or create the condition for other to emerge. Future research could take those insights seriously and go further on the investigation of the theoretical relevance of this notion of "affordances interdependences".

Our second main contribution is regarding the cross-fertilization between two distinct fields: third sector and ICT. The third sector field, particularly the segment of nonprofit organizations, lacks theoretical and empirical investigations on management and on ICT. In its turn, the ICT field does not pay much attention, both in terms of research and practice, to the specificities of the third sector where the nonprofit organizations operate. Our identification of a rich repertory of technology affordances and the cartography of interdependencies is beneficial to both fields. We argue that the theory of affordances represents a promising theoretical framework for future investigations, as the results produced by this kind of lens not only help in the understanding of the non-realized potential of ICT but also indicate some avenues for adjustment and action.

There is a number of challenges in the way organization use ICT. Likewise, the potentialities of those sociotechnical artifacts depend on the nature of the organizational mode of operation and mission. Analyzing the use of ICT in the third sector, our results identified not only several potential uses of technology already present in the literature but also new sub-categories of affordances. ICT provides organizational support from resource management leading to increasing transparency in the relationship with funding agencies, beneficiaries, government and society. Communication tools, such as social media, are powerful tools to empower and mobilize different social actors in engaging and supporting the social mission. ICT enables new interactions and relationships with a range of groups and organizations leading to the construction of partnerships and networking. Technology has clearly been constructing a new view to nonprofit organizations, increasing visibility and relevance in society.

ICT has a role to play to support nonprofit organizations in the achievement of their organizational mission. With the support of ICT, crucial activities to social transformation like education, awareness and communication might be improved. In other cases, technology facilitates access to external resources, enabling organizations to reach different audiences, another key element to support these organizations to achieve their goals. However, there are still innumerous challenges to achieve organizational results through the use of ICT, as observed analyzing the barriers presented in the six cases. These barriers include both the profile of the workforce and characteristics of the technology itself, in addition to the context where the organizations operate. Our results indicate a relevant relationship between the different categories of affordances showing that some capabilities are essential to support the achievement of organizational mission, even if not directly linked to organizational results. This interrelationship deserves to be further investigated as well as the construction of a framework that clearly focusses on the specific application of technology in nonprofit organizations.

Note

1. Due to limited space, the list of references in this paper shows only the articles used in the text. The complete list of the survey, including the texts not used in this study may be available upon request to the authors.

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Appendix 1

Category and sub-category of affordance	Technology features	Org. features – skills and abilities	Examples of affordances based on research evidence	Technology in practice – how technology is actually used	Organizational goals with technology	Barriers to the actualization of affordances
Coordination – Managing budgets and financial resources	Computer E-mail, Internet access	All users have basic knowledge on the use of technology. However, some indicated the need for learning some specific tools	"(Technology is used) for internal control even for access to information, [[. . .]] for payments, balance inquiries, finance controls, [. . .] To open announcements for research". (Interviewee 11)	Financial management from banking controls	Collection and management of financial resources	Lack of financial resources and management system that assists in administrative activities and accounting
Coordination – Integrating the organization and democratizing access to information	Server, database manager, software: Office, adobe acrobat	All users have basic knowledge of using technology	"We work integrated with the server [. . .], If the secretary needs the office, she knows where to find it on the server. [. . .] All you have to do is share it and everyone has access to all the machines ". (Interviewee 11)	Centralization of data and files on the server so that everyone has access to the information	Streamline the access to information and integrate the activities carried out by different people	Outdated equipment and limitations in terms of financial resources. Difficulty in putting administrative lines in the projects, making it difficult to update the tools
Coordination – Implementing projects	Computer E-mail, Internet access	Users with basic knowledge of technology. Managers with difficulties in using the Internet, attaching files to emails and using text editors	"We operate in network, which mobilizes us with daily contacts and projects, which are sent by email. Coordinators can send and receive daily reports, enabling faster completion". (Interviewee 13)	Contacts and exchange of information via email	Monitor the implementation of projects and budget execution	Lack of a management system that assists administrative activities and accounting
	Website, social media, photo and video	One of the organization's	"It would give more speed and visibility because today the organization has a lot of	Publication of images and videos of the	Give visibility to the results of their work	Obsolete equipment and lack of financial

(*continued*)

Table AI. Affordances of the culture case (example of an analytical table used for each case)

Table AI.

Category and sub-category of affordance	Technology features	Org. features – skills and abilities	Examples of affordances based on research evidence	Technology in practice – how technology is actually used	Organizational goals with technology	Barriers to the actualization of affordances
Coordination – Building organizational memory [NEW]	equipment, image editing software	members has knowledge about social networks, digital files and photos	work, but we still have little visibility." [[. . .]] For example, since the beginning we should have filmed them and have the capacity to store the material ". (Interviewee 12)	actions of the organization on online platforms. Organization of the files of the institution and availability of this information online	and produce some data on the organization's actions	resources, Thus, limiting the possibility of upgrading tools
Communication and mobilization – Mobilizing and articulating actors to participate in the actions developed	Social Media (Facebook, etc.); image editing software and Office	Some managers are not trained in the use of social media and do not understand the usefulness of these tools	"Mobilizations and joints; the social network has paid off for us in this direction. Publicity of events and facts related to our work, or the theme that our work is related to". (Interviewee 14)	Publication of actions and events on social networks	Disseminate the organization and its actions	Resistance of some leaders and lack of knowing the potential of technology. Lack of an expert to assist in communication strategies
Network formation – Sharing knowledge and expertise with other organizations	Social Media (Facebook, etc.); image editing software and Office	Some managers are not trained in the use of social media and do not understand the usefulness of these tools	"Besides exchanging information, there is the exchange of activities, knowledge, construction of common agendas and especially information and facts that help the strengthen joint work". (Interviewee 14)	Exchanging information with partner organizations	To achieve the organizational mission and access to resources	Resistance of some leaders and lack of knowledge on the potential of technology. Reduced investment in the technological area

(*continued*)

Category and sub-category of affordance	Technology features	Org. features – skills and abilities	Examples of affordances based on research evidence	Technology in practice – how technology is actually used	Organizational goals with technology	Barriers to the actualization of affordances
Access to resources and accountability – Conducting campaigns to obtain financial funds	The website of the organization, communication tools such as e-mail (internet), the federal government system for management agreements and notices (SICONV)	The government program requires specific knowledge that has been learned in practice and the exchange of experience	(Technology) changes access to official announcements from the government [[. . .]] the search for resources, the search for partners and publicity of how people can donate". (Interviewee 11)	Campaigns to obtain financial funds (donations) via e-mail or website. Use of a Government agreement system	To obtain resources to finance the organization's activities, carry out its projects, and apply for official government announcements	High cost of maintaining the website and empowerment of people. Lack of skilled personnel

Table AI.