Received: 1 March 2019 | Revised: 23 December 2019 | Accepted: 28 February 2020

DOI: 10.1111/isj.12290

WILEY

SPECIAL ISSUE PAPER

Social, commercial, or both? An exploratory study of the identity orientation of digital social innovations

Carla Bonina[1] | David López-Berzosa[2] | Mariarosa Scarlata[3]

[1]Surrey Business School, University of Surrey, Guildford, UK

[2]Exeter Business School, University of Exeter, Exeter, UK

[3]Department of Business Economics and Quantitative Methods, University of Bergamo, Bergamo, Italy

Correspondence
Carla Bonina, Surrey Business School, University of Surrey, Guildford GU2 7XH, UK.
Email: c.bonina@surrey.ac.uk

Abstract

The information systems literature has studied digital innovation extensively and focused primarily on its commercial related objectives. Yet, digital social innovations (DSIs) seek to solve social problems, while implementing commercially viable approaches. Drawing from the social entrepreneurship literature and using computational social science methods, we identify the peculiar utilitarian (commercial) and collectivistic (social) identity orientations that shape DSI. We use a sample of 292 DSI initiatives from Latin America and find that DSIs present both utilitarian and collectivist identity orientation. We also find that the collectivistic identity orientation tends to be more salient in less developed contexts. This allows us to discuss implications for the research on DSI and to open up a discussion on the role of context and possible tensions that may emerge in combining both identity orientations.

KEYWORDS

digital social innovation, Latin America, social enterprise, topic modelling

1 | INTRODUCTION

In a world with increasing poverty, inequality, environmental degradation, and injustice, digital innovation appears as a ray of hope to solve societal problems. Digital social innovation (DSI) employs digital technologies, community engagement and collaboration, co-creation strategies, and bottom-up approaches to solve socially pressing problems such as healthcare, corruption, immigration (Cangiano, Romano, & Loglio, 2017). For example, the emergence of

digital data released in open format—so called open data—has led to the development of a new world of apps that are helping citizens in the Global South to access better public services or to fight corruption through citizen empowerment. In Latin America, *Dymaxion Labs* utilizes open data produced by satellite imagery, georeferenced data, and machine learning techniques to generate real-time information. This information is then used by local authorities and policy makers to identify actions to tackle access to critical public services such as sanitation. In Peru, the independent digital media company *Ojo Publico* opened up an unprecedented amount of data on the Peruvian healthcare system. This revealed several conflicts of interest in Peru, forcing authorities to enact stricter controls in the sector, ultimately improving the country's transparency and accountability in healthcare.

The pervasive availability and affordability of new digital technologies have opened a whole new world of possibilities to solve social problems with a business-oriented approach. The wide diffusion of affordable and, yet, sophisticated digital infrastructures and technologies (Fichman, Santos, & Zheng, 2014) have fostered the expansion of digital innovators that are capable of leveraging them to build solutions for unmet social needs. Often, innovators develop DSIs to solve social problems through the adoption of collaborative innovations. In this model of social change, innovators co-create solutions for a wide variety of social problems. These solutions are openly available to other innovators and users, who can then act to further improve and advance them. Like social enterprises, DSIs mobilize resources that are abundant, cheap, and locally available. DSIs, adopt a model based on a collectivistic orientation of open-source mechanisms that allow a solution to be codeveloped and shared by many stakeholders (Zeyen et al., 2013). Yet, just like social enterprises, DSIs need to adopt an economic, utilitarian, orientation in that they are called to respond to the typical market mechanisms that allow innovations to survive. As such, DSIs undertake what has been defined as a dual organizational identity orientation (Brickson, 2005; Di Lorenzo & Scarlata, 2019; Moss, Short, Payne, & Lumpkin, 2011).

While the business world quickly adapts its practices to new developments, scholarly work on DSI is still in an embryonic stage. So far, the literature has delved into an analysis of DSIs that separate the social and commercial orientation embedded in their actions. Indeed, the information systems (IS) literature acknowledges that there is a social angle in digital innovation (Majchrzak, Markus, & Wareham, 2016). However, scholarly work on digital innovation has focused primarily on its business-related objectives and economic-driven goals (Kohli & Melville, 2019). This has resulted in an implicit assumption that because, DSIs evolve around social innovation, only their social aspects need to be investigated. Just recently, Khan, Lacity, and Carmel (2018) engage in a discussion about the dual nature of impact sourcing innovations, that is, digital innovations that seek to enable digitized work that offers employment to marginalized groups of individuals mainly based in developed countries, calling for more systematic work in the area.

Overlooking the dual orientation of DSIs limits our holistic understanding of the phenomenon. Studying DSIs and their dual orientation would allow us to better grasp variations in DSIs and the strategic challenges associated with having dual orientations. In fact, the social entrepreneurship literature tells us that dual orientations generate potential tensions related to the management of the diverging organizational logics (Battilana & Dorado, 2010), values (Besharov, 2013) and a multitude of stakeholders (Pache & Santos, 2012) that shape orientation. This, in turn, may result in defying economic sustainability to fulfil the organizational social mission, and vice versa, leading to potential threats to growth (Kannothra, Manning, & Haigh, 2018), identity (Smith, Knapp, Barr, Stevens, & Cannatelli, 2010), social and economic performance (Battilana, Sengul, Pache, & Model, 2014; Stevens, Moray, & Bruneel, 2015), legitimacy (Battilana & Lee, 2014; Pache & Santos, 2012) and, ultimately, survival (Gras & Mendoza-Abarca, 2014; Tracey, Phillips, & Jarvis, 2011). At the same time, Moss et al. (2011) show that social enterprises (SEs) have a higher social, collectivistic orientation than their commercial counterparts, whereas Bacq and Eddleston (2018) as well as Di Lorenzo and Scarlata (2019) show that the development of an economically oriented organizational mindset helps SEs to increase their social impact. SEs tend to rely on a linguistic, highly values-centered discourse to make sense of and convey what they do to the multitude of stakeholders they work with (Lee, Ramus, & Vaccaro, 2018). The research questions we therefore ask in this article are the following: *What is the extent to which DSIs exhibit dual identity orientation? Do DSIs show utilitarian (economic), collectivist (social) identity orientation, or both? What is the extent to which contextual variables, such as organizational form, country development, technological capability, influence the utilitarian or collectivistic orientation of DSIs? What is the extent to which identity orientation influences funding success?*

In order to understand and explain how "digital innovation" and "social" unfold in DSIs, we rely on the identity orientation construct (Brickson, 2005) used in the social entrepreneurship literature (Di Lorenzo & Scarlata, 2019). Identity orientation relates to the "nature of assumed relations between an organization and its stakeholders" (Brickson, 2005, p. 577) and can be utilitarian, that is, commercially focused, or collectivistic, that is, socially driven. The identity orientation construct helps us to assess the dual dimension of DSIs—that is, to quantify the utilitarian (economic) and collectivistic (social) identity orientation along a continuum, rather than presenting them as a dicothomy, as implicitly done in the IS literature (Kohli & Melville, 2019). We then look at the role of contextual factors in shaping the DSIs' identity orientation, as suggested by Pache and Santos (2012).

To answer our research question, we use probabilistic topic modeling (Blei, 2012), a computational social science method, to quantify the utilitarian and collectivistic identity orientation of a sample of Latin America based DSIs. We rely on a sample of 292 DSIs that were submitted to a competitive investment fund in Latin America in 2017. The core mission of the fund is to invest in innovative digitally enabled solutions to promote civic engagement as well as transparency and improve democracy in the region. Privileged access to confidential information submitted to the competition allow us to have data on the stated utilitarian and collectivistic orientation of DSIs applying for funding.

Our results show that DSIs do exhibit both utilitarian and collectivistic identity orientation, with a marginal higher utilitarian identity orientation. We also find that for-profit start-up DSIs are more utilitarian oriented, whereas established for profit are more collectivistic oriented. For-profit DSIs emphasize innovation, technology and customers, whereas nonprofit DSIs emphasize growth, commonality, and public image. In addition, those DSIs that work in less developed contexts are more collectivistic oriented, whereas those that have digital capabilities are more collectivistic oriented. Our results also suggest the need of a balanced combination of utilitarian and collectivistic orientation when DSIs seek external funding. From an academic point of view, our work seeks to open a broader conversation within the IS community and encourage a wider set of discussions on the existence and role of utilitarian and collectivistic identity orientations in DSIs. Our work relies on a quantitative assessment of the extent to which DSIs are dual oriented innovations and differentiates from the recent work in the IS literature that mainly adopts a qualitative type of approach (Khan et al., 2018). We offer a novel perspective on DSI and seek to spur a more quantitative approach to investigate the interdependences between different identity orientations. Doing so, future work could deepen our understanding of the peculiar aspects of DSI in terms of values, stakeholder management, business model formulation and execution.

This article is structured as follows. First, we review the current debates and literature on digital innovation in IS to identify the elements that are missing when delineating a comprehensive profile of DSI. We then introduce the notion of identity orientation, borrowing it from the social entrepreneurship literature, to emphasize the importance of utilitarian and collectivistic goals and the tensions that emerge from the combination of these diverging orientations. We later explain in detail our sample and method of analysis, followed by our results. Finally, the article ends with a discussion of results and contributions, identifying avenues for future work.

2 | CONCEPTUAL FRAMING: DIGITAL INNOVATION, SOCIAL ENTREPRENEURSHIP, AND IDENTITY ORIENTATION

Within the IS literature, digital innovation is conceptualized in related yet different themes. In a recent exhaustive review of the digital innovation topic, Kohli and Melville (2019) acknowledge the literature is diverse and diffuse, spanning a variety of research streams and fields. Kohli and Melville (2019) further identify three conceptualizations of digital innovation in the literature. The first one, "information technology (IT) innovation", refers to the introduction of information technology that is, (a) new to a given organization and, (b) generates concomitant organizational change. A second conceptualization, "digital product innovation," focuses exclusively on product or service innovations, that is, those new products or services that are either embodied in IT or enabled by IT (Yoo, Boland, Lyytinen, & Majchrzak, 2012; Yoo, Henfridsson, & Lyytinen, 2010). The third, "IS innovation" accounts for a "product, process, or

business model that is perceived as new, requires some significant changes on the part of adopters, and is embodied in or enabled by IT" (Fichman et al., 2014, p. 330). In other words, IS innovation focuses on the creation or development of new market offerings, business processes, and business model innovation in which the IT artefact is a critical element.

The streams of the literature that focus on IS innovation and digital product innovation maintain a business-centric perspective (Kohli & Melville, 2019; Nambisan, Lyytinen, Majchrzak, & Song, 2017; Yoo et al., 2012). This is often addressed from the perspective of large, global multinationals operating in developed contexts (Barrett, Davidson, Prabhu, & Vargo, 2015). Although the social angle of digital innovation—understood as the welfare of human beings as members of society—is present in IS innovation, this tends to fall under the umbrella of specific subthemes, such as social inclusion (Trauth, Joshi, & Yarger, 2018), societal challenges (Majchrzak et al., 2016), or IS innovation in emerging economies (Srivastava & Shainesh, 2015). Within the stream of IT innovation, the studies of information and communication technologies for development (ICT4D) have highlighted aspects related to social welfare, where scholars highlight dimensions of the process of IT innovation such as national culture or global politics, which are normally absent in mainstream IS (Avgerou, 2008, 2017).

In the IS literature, the global practice of sourcing IT services from less developed contexts has recently turned into an analysis that accounts for their engagement with social development and impact (Babin & Nicholson, 2012; Khan et al., 2018). Referred to as social sourcing (Madon & Sharanappa, 2013) or impact sourcing (Heeks, 2013), the idea behind this new practice of global IT sourcing is to incorporate social and developmental goals within business practices (Sandeep & Ravishankar, 2016).

Impact sourcing has been investigated as an innovative approach whereby innovations are exploited commercially through the digitization of work, in an effort to generate employment opportunities for marginalized individuals based in developing countries (Nicholson, Sahay, & heeks, R., 2018). Khan et al. (2018) acknowledge that digital impact souring has both commercial and social objectives. Drawing from the social entrepreneurship literature and the dichotomous orientations these digital innovations have, the authors conduct a case study of a US-based SE. Results indicate that both orientations are used for innovation purposes. In particular, social orientation crafts the venture's mission and resource mobilization, while commercial orientation is followed for performance. While this work informs about when each of these orientation prevails, it fails to provide generalizable insights as to whether both orientations coexist in DSIs. More specifically, Khan et al. (2018) rely on a narrow definition of social orientation conceptualized as employment.

In this article, we seek to unfold the identity orientation of DSIs at a generalizable level. For this purpose, we build a characterization of DSIs and employ the identity orientation construct developed by Brickson (2005) and used in the social entrepreneurship literature (Di Lorenzo & Scarlata, 2019). DSIs and SEs share many aspects. In both cases, the focal point lies in a social value proposition. In addition, the definition of SE stems from its social value proposition and the development of socially innovative market solutions that (a) simultaneously create value for society's members (Santos, 2012), and (b) employ revenue generating market strategies to spur economic self-sustainability (cfr. Among others Austin, Stevenson, & Wei-Skillern, 2006; Bhatt, Qureshi, & Riaz, 2019; Moss et al., 2011; Scarlata, Zacharakis, & Walske, 2016).

Drawing on the literature, we define DSI broadly as the development of *new products, services or processes, that are either embodied on IT or enabled by IT, whose goal is to meet social needs or stimulate social change*. Therefore, the definition of DSI make it an example of social entrepreneurial activity. DSI is offered by organizations that combine resources to explore and exploit opportunities for value creation by meeting social needs and stimulating social change (Moss et al., 2011). The emphasis is on the adoption and leveraging of digital technologies to deliver on those objectives in innovative ways. DSIs are new, hybrid products/services that innovatively combine "*activities, practices, processes, and meanings*" (Battilana & Lee, 2014, p. 398) from diverging sectors, i.e., the commercial and social ones.

While we know that SEs simultaneously pursue social and economic objectives, and hence possess utilitarian and collectivistic identity orientations, we also know this may generate potential tensions. SEs need to manage diverging organizational logics (Battilana & Dorado, 2010), values (Besharov, 2013) and a multitude of different

stakeholders (Pache & Santos, 2012). Ultimately, this may push SEs in defying economic sustainability objectives to comply with their social ones, and vice versa. This, in turn, generates potential threats to organizational growth (Kannothra et al., 2018), identity (Smith et al., 2010), performance (Battilana et al., 2014; Stevens et al., 2015), legitimacy (Battilana & Lee, 2014; Pache & Santos, 2012) and, ultimately, survival (Gras & Mendoza-Abarca, 2014; Tracey et al., 2011).

Moss et al. (2011) show that SEs still tend to have a higher social identity than their commercial counterparts (Moss et al., 2011), whereas Bacq and Eddleston (2018) as well as Di Lorenzo and Scarlata (2019) show that the development of an economically oriented organizational mindset helps SEs to increase their social impact. SEs tend to rely on a linguistic, highly values-centered discourse to make sense of and convey what they do to the multitude of stakeholders they work with (Lee et al., 2018; Sandeep & Ravishankar, 2016). We expect the same to hold for those ventures that develop DSIs.

3 | METHODOLOGICAL APPROACH

3.1 | Data and sample

In order to answer our research questions, we empirically analyze 292 DSI initiatives in 19 countries in Latin America. These DSIs were submitted to a funding competition opened in 2017 by a civic technology investment fund from the region. The competition aimed at spurring digitally enabled new services or products to enhance civic engagement, help to fight corruption and/or improve democracy in the region. The authors obtained privileged access to the submitted proposals and the extensive textual data available for each of the initiatives. Application forms give us access to demographics information for each DSI, such as name, organization type (start-up vs. established for-profit organizations and nonprofit ones), number of employees, funding requested, digital capabilities of the DSI, country of the leading organization submitting the proposal, country's level of socioeconomic development, and whether the DSI wins the funding competition. Table 1 reports descriptive statistics on sampled DSIs by organizational form, number of employees and funding requested.

Beyond demographic data, we have full and extensive textual information on the social problem each DSI seeks to address, its relevance, the solution proposed, the technological details of the DSI, the DSI go-to market strategy, and the DSI business model. We use this data as a proxy for the DSI mission statement, that is, the focal point of our analysis on identity orientation, as discussed in the *Measures* section below. In addition, the texts included information on the perception of the applicant DSI about its strengths and weaknesses, the perceived potential risks, and the support the DSI expects from the investor. Beyond textual data, one of the authors participated in three DSI regional conferences and several specific workshops between 2017 and 2018, where applicant DSIs and the investor running the competition were taking part. This direct engagement allowed the authors to gain further deep insights into the identity orientation of DSIs and was crucial in interpreting the results.

3.2 | Measures

In order to answer our research questions, we rely on the organizational identity orientation construct proposed by the seminal work by Albert, Ashforth, and Dutton (2000) and further refined by Brickson (2005). The identity orientation construct relates to the "*nature of assumed relations between an organization and its stakeholders*" (Brickson, 2005, p. 577). Identity orientation can be disentangled into "normative identity orientation" and "collectivistic identity orientation" (Brickson, 2005). Moss et al. (2011) rely on Brickson's (2005) definition of the construct, integrating it with Foreman and Whetten (2002) as well as Glynn (2000). As such, "utilitarian identity orientation" refers to the business identity of an organization and to the creation of economic rents. A utilitarian identity orientation follows

TABLE 1 Descriptive statistics of the sample

Type of organization	*N*	Employees			Funding requested (total, US$)		
		Min	Mean	Max	Min	Mean	Max
Established business (for-profit)	33	1	15.3	285	70 K	132 K	150 K
Start-ups (for-profit)	68	1	3.22	6	40K	115 K	150 K
Non for-profit	191	1	25.5	1,667	50 K	134 K	150 K
Countries	Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Dominican Republic, Uruguay, Venezuela						

the principles of economic rationality and efficiency, as well as revenue, profit, and economic return maximization (Moss et al., 2011). A "collectivistic identity orientation" emphasizes elements related to the importance of social relationships, community involvement and empowerment, equality, and social progress (Brickson, 2005; Foreman & Whetten, 2002; Glynn, 2000; Moss et al., 2011).

We operationalize identity orientation relying on the measure developed and validated by Moss et al. (2011) as well as Short, Payne, Brigham, Lumpkin, and Broberg (2009) and implemented by Di Lorenzo and Scarlata (2019). The measures proposed by Moss et al. (2011) and Short et al. (2009) are originally developed in the context of SEs.

Moss et al. (2011) measure "utilitarian identity orientation" as manifested in the extent to which organizations emphasize product, growth, and technology. Product "*reflects an organization's emphasis on the products and services it offers to the marketplace*" (Moss et al., 2011, p. 808) and relates to offer solutions to people's need to transform ideas into lucrative business opportunities (Shane & Venkataraman, 2000). As such, product strongly related to the creation of economic returns.

"Growth" and "technology" are used by entrepreneurial ventures to exploit and maximize economic returns as well as improving the survivability of the company (Delmar, McKelvie, & Wennberg, 2013; Phillips & Kirchhoff, 1989; Santarelli & Vivarelli, 2007). Last, "autonomy" refers to the extent to which initiatives adopt processes, practices, and decision-making styles that are entrepreneurially oriented, as per Covin and Slevin (1991) and Lumpkin and Dess (1996).

Moss et al. (2011) measure "collectivistic identity orientation" as commonality, customers, geographic domain and public image. According to Moss et al. (2011), these measures relate to the impact of the initiative on the community. Commonality stems from Etzioni's (1993) concept of communitarian thinking where actions are strongly embedded in a broad community of actors. The demands of the community shape the DSI actions and responses.

Customers, geographical domain, and public image are measures that stems from the work by Pearce and David (1987). More specifically, customers related to the impact of the initiative on a specified group of people in a specified geographical location, with customers being defined as "*customers who donate to a social venture and customers who are recipients of the venture's products and services"* (Moss et al., 2011, p. 812). The geographic domain measure relates to the specific focus of the DSI on a discrete customer area. Last, public image refers to the "*expression of concern in its mission statement about how the organization is perceived by outsiders"* (Moss et al., 2011, p. 813).

Table 2 summarizes the measures of the identity orientation construct, as developed by Moss et al. (2011), Short et al. (2009) and adopted by Di Lorenzo and Scarlata (2019).

To deepen our analysis, we use a series of contextual variables. First, previous work shows that the legal form determines the extent to which organizations are socially (collectivistic) or economically (utilitarian) oriented. More

specifically, nonprofit organizations are those in charge of solving societal problems (Hansmann, 1980) and have a collectivistic identity orientation. Conversely, for-profit firms are driven by economic motives and are utilitarian identity oriented (Foreman & Whetten, 2002; Pratt, Schultz, Ashforth, & Ravasi, 2016). We therefore look at whether the organizational form of DSIs influences their identity orientation. In particular, we look at whether the DSI is developed by an organization that may be a for-profit start-up or not, or a nonprofit.

Second, start-ups are more concerned with survival and growth than established companies (cfr. e.g., Gimeno, Folta, Cooper, & Woo, 1997). Established for-profit companies devote part of their resources to corporate socially responsible actions that reinforce the collectivistic identity of the organization (Carroll, 1991). This results in established for-profit firms being more collectivistic oriented than their start-up counterparts. We include in the analysis the stage of development of the organization proposing the DSI.

Third, we look at whether the level of development of the region where DSIs are created influence their identity orientation. The level of development of the countries in our sample relies on the human development index (HDI) from the United Nations Development Programme. HDI "*emphasize[s] that people and their capabilities should be the ultimate criteria for assessing the development of a country, not economic growth alone*" (UNDP 2018). Depending on the value of each country's HDI, we cluster countries into three groups: very high HDI, high HDI, and medium HDI. Countries with very high HDI were Argentina, Chile, and Uruguay whose HDI ranged between 0.843 and 0.804 in 2017. Countries with high HDI included Costa Rica, Brazil, Mexico, Venezuela, Ecuador, Peru, Colombia, Paraguay, Panama, and Bolivia whose HDI ranged between 0.794 and 0.693 in 2017. Countries with medium HDI included El Salvador, Guatemala, Dominican Republic, Nicaragua, and Honduras where the HDI ranged between 0.674 and 0.617 in 2017.

TABLE 2 Measures of utilitarian and collectivistic identity orientations in DSI, adapted from Moss et al. (2011)

Identity orientation	Coding definition	Examples of topics coded in our sample
Utilitarian identity orientation		
Product	What are the social venture's primary products or services?	Services, solution, product
Technology	Is the use of technology specified in fulfilling the venture's mission?	Apps, application, technology, digital
Growth	Indication of a desire to expand or increase	Development, expansion
Autonomy	Actions of individuals and teams to carry new ideas to completion	Do it, to make it happen
Innovativeness	Willingness to experiment and create in order to exploit marketable ideas and inventions	Construct, create
Collectivistic identity orientation		
Commonality		
Customers	Suggests that all in a corporation are members of a single community	Network, cooperation
Geographic domain	Who are the social venture's customers? Where does the social venture operate?	Citizens, women, youth Urban, Mexico, city
Public image	Is the social venture responsive to social, community, and environmental concerns?	Open government, communities, transparency

Abbreviation: DSI, digital social innovation.

Fourth, we look at whether having digital capabilities influences the identity orientation of DSIs. We obtain this information from the application forms that each DSI submitted to enter the funding competition and label it "digital capabilities." We measure "digital capabilities" as a dummy variable equal to 1 if the DSI has them, 0 otherwise.

Fifth, we look into whether the identity orientation of the DSIs influences funding success. We measure funding success as a dummy variable equal to 1 if the DSI wins the funding competition, 0 otherwise.

3.3 | Method: Computational social science/topic modeling

To analyze our data we rely on a combination of content analysis (Neuendorf, 2002) and probabilistic topic modeling (Blei, 2012; Blei & Lafferty, 2007). Content analysis is a low intrusive technique that allows textual analysis to capture organizational insights, enabling a great deal of reliability and replicability (Neuendorf, 2002).

Probabilistic topic modeling is a subset of machine learning that uses a suite of algorithms to discover and annotate the main themes that pervade large collection of documents (Blei, 2012; Blei & Lafferty, 2007). Topic modeling analyzes words within a collection of documents to: (a) discover the themes that run through them and (b) assess how those themes are connected to each other (Blei, 2012). In our empirical exercise, we specifically rely on *Latent Dirichlet Allocation* (LDA). Formally speaking, LDA assumes a *hidden structure* of documents (texts), that is, the researcher posits a latent structure in the observed documents and then learns that topic structure using posterior probabilistic inference. The latent structure consists of the topics, set of words per topic and their distribution in the observed documents. The central computational problem for topic modeling is therefore to infer the latent topic structure, based on the observed set of documents (Blei, 2012).

Topic modeling differs from other coding-based approaches in that it does not require any prior annotations or labels of the documents. Instead, topics emerge from the automated analysis of the original texts. Probabilistic topic modeling provides an algorithmic solution to the analysis of narratives that does not hold any prior assumptions and is able to scale to large corpuses of texts with minimal human intervention (Kobayashi, Mol, Berkers, Kismihók, & Den Hartog, 2018; Schmiedel, Müller, & vom Brocke, J., 2019). In this sense, this approach is different to other computer-assisted content analysis that require the researcher to build a proprietary dictionary based on the actual terms used in the documents. Topic models are increasingly applied to social sciences, for example, in the analysis discourses (Nikolenko, Koltcov, & Koltsova, 2017) and the analysis of scientific abstracts and literature (Griffiths & Steyvers, 2004). This includes the literature analysis in IS (Larsen & How, 2016; Sidorova, Evangelopoulos, Valacich, & Ramakrishnan, 2008).

To apply probabilistic topic modeling, we first compiled the narrative texts that the 292 DSI used to express the initiative, the problems it intends to solve, the technical details and strengths of the organizations involved in the proposed activities. This exercise allowed us to build a dictionary with all words used in these texts, which amounted to 17,145 words. After the identification of the 17,145 words used by DSIs in our sample, we apply probabilistic topic modeling algorithms to compute the distribution of the topics conditional on the previously built dictionary of words. Being topic modeling an unsupervised machine learning technique, we experiment with a set of models of increasing complexity, testing those from 2 to 50 topics. This exercise results in 16 topics and a coherence score of 0.46 (Mimno, Wallach, Talley, Leenders, & McCallum, 2011), where each topic would have a collection of 10 words that best represent them. After the identification of these 16 topics, we measured the "identity orientation" of the DSIs in our sample, relying on the measures of "utilitarian" and "collectivistic" identity developed by Moss et al. (2011) and Short et al. (2009) and subsequently adopted by Di Lorenzo and Scarlata (2019). In order to assess the reliability of our measures, we follow the approach proposed by Krippendorff (2004). The words in each topic were therefore independently coded by two members of the research team. Individual results were then compared. The inter-rater reliability of the coding done by the two researchers was 78%. Conflict was managed through extensive discussions among the two coders. The final intensities attributed to each category were the result of this process.

Last, we implement multivariate tests of variance (MANOVA) to identify the relative importance of both utilitarian and collectivistic identity orientation in the sampled DSIs. To do so, we standardize the measures by Moss et al. (2011) and transform them according to their mean and standard deviation. Preliminary analysis of the data reveal deviations from required MANOVA assumptions in normality and balanced designs. To solve these problems, we use nonparametric bootstrapping techniques and allow for a factorial structure of the explanatory variables (Konietschke, Bathke, Harrar, & Pauly, 2015).

4 | RESULTS

Table 3 reports the descriptive statistics for the identity orientation measures proposed by Moss et al. (2011) as well as Short et al. (2009) for the 292 DSIs in our sample. On average, DSIs exhibit similar levels of utilitarian and collectivistic orientation with a slight predominance of the utilitarian component (0.68 vs. 0.64, respectively), suggesting DSIs emphasize their utilitarian identity. DSIs also score high on product and technology for utilitarian identity orientation, with an average of 0.25 and 0.38, respectively, and commonality, with an average of 0.14. We also find significant positive correlations among commonality and product (ρ = .22, p < .5) as well as growth (ρ = .34, p < .5). This suggests DSIs with higher commonality values, that is, have "*a greater realization that a venture is a member of a broader community*" (Moss et al., 2011, p. 813), are also more alert to the product/service they offer to the target community. These correlations also indicate that DSIs more attentive to the community tend to emphasize their growth.

Digital social innovations that more explicitly mention the geographic domain of their activity emphasize more growth (ρ = .40, p < .5) but, at the same time, are less autonomous (ρ = −.18, p < .5) and innovative (ρ = −.21, p < .5). These negative correlations can be explained by the need to be responsive to the specific needs of the communities in the areas targeted by the DSIs.

Table 4 reports results from multivariate tests for differences between identity orientation and (a) organization type, (b) level of country development, (c) digital capabilities, and (d) funding success. Results are expressed in a normalized scale (z-score) where zero corresponds to the average value for the population, positive (negative) levels correspond to positive (negative) standard deviations from the average.

Results from Table 4 show that nonprofit DSIs are more collectivistic oriented (.20) than for-profit DSIs (−0.47 and −0.21) and that for-profit start-ups have a higher utilitarian identity (0.31) than their established (0.02) and nonprofit counterparts (−0.11). Table 4 also suggests both for-profit start-ups and established DSIs emphasize: innovation (.39 and .34, respectively), technology (.23 and .10, respectively), and customers (0.1 and 0.1, respectively) over their nonprofit counterparts (−0.2, −0.12, and −0.05, respectively). Conversely, nonprofits put more emphasis on growth (.12), commonality (0.1), and public image (0.2) that their established for-profit counterparts (−0.28, −0.13, −0.18, respectively).

We also find an increasing level of collectivistic identity, and decreasing of utilitarian one, as we move from the countries with a very high level of HDI (Group A, collectivistic identity orientation = −0.22) to countries with a high level of HDI (Group B, collectivistic identity orientation = −0.12) and those in the middle level (Group C, collectivistic identity orientation = 0.1). These results support the idea that there is a significant and inverse relationship between level of development and identity orientations whereby DSIs in better-developed regions tend to be more utilitarian than those in less developed regions.

Regarding "digital capabilities," DSIs possessing them are more collectivistic oriented, whereas a lack of such capabilities makes them more utilitarian oriented (.05 vs. .2, respectively). Digging more into this result, we see that DSIs those who lack digital capabilities are more concerned with autonomy and less about their customers, although they are more utilitarian oriented, and about their public image. Conversely, DSIs that have digital capabilities at the time of the application, are more concerned about the technology they have, their customers, and their public image.

TABLE 3 Descriptive statistics and correlations of identity orientation measures

	Identity orientation measures	*N* = 292	Mean	*SD*	1	2	3	4	5	6	7	8	9	10	11
1	Product (P)		0.25	0.04	1										
2	Technology (T)		0.38	0.10	.44**	1									
3	Growth (G)		0.02	0.01	.50**	.01	1								
4	Autonomy (A)		0.03	0.02	−.32**	−.24**	−.19**	1							
5	Innovativeness (I)		0.01	0.01	.13*	−.12*	−.08	.03							
6	Commonality+ (C+)		0.14	0.04	.22**	−.06	.34**	−.17**	.05	1					
7	Customers (C)		0.07	0.03	−.12*	.00	−.15**	.00	−.21**	−.09	1				
8	Geographic domain (GD)		0.05	0.02	−.02	.08	.40**	−.18**	−.21**	−.22**	−.3**	1			
9	Public image (PI)		0.39	0.09	−.44**	−.21**	−.19**	−.37**	−.37**	−.09	.2**	.01	1		
10	Utilitarian		0.68	0.12	.69**	.92**	.25**	−.15*	−.01	.03*	−.06	.07	−.41*	1	
11	Collectivistic		0.64	0.09	−.34**	−.19**	−.01	−.41**	−.39*	.22**	.38**	.0.0**	.91**	−0.4	1

**Coefficient is significant at $p < .01$.; *Coefficient is significant at $p < .05$.

TABLE 4 Multivariate test for differences: Organization type and identity orientation

		Identity orientation		Utilitarian identity orientation measures					Collectivistic identity orientation measures			
	n	Utilit.	Collect.	Product	Tech	Growth	Autonomy	Innov.	Common.	Customers	Geogr. domain	Public image
Type Org.												
For-profit (start-up)	68	.31 **	−.47 **	.02**	.23 **	−.22	.27**	.39*	−.24**	.10*	−.01**	−.45**
For-profit (established)	33	.02**	−.21**	−.02**	.01**	−.28*	−.06**	.34**	−.13**	.10*	.18**	−.18**
Nonprofit	191	−.11**	.20**	−.00**	−.12**	.12**	−.08**	−.20*	.10**	−.05*	−.03**	.20**
Country development (HDI index)												
A	77	0.14**	−0.22**	−0.14**	0.23**	−0.29**	0.47**	0.55*	−0.26*	0.16*	−0.24**	−0.54**
B	186	0.02**	−0.12**	0.01**	0.03**	−0.34**	−0.06**	0.44*	−0.03*	0.11*	−0.33**	−0.24**
C	29	−0.07**	0.10**	0.01**	−0.17**	0.06**	−0.08**	−0.19*	0.06*	0.07*	−0.07**	0.25**
Existing digital capabilities												
No	75	.02**	−.16**	−.08**	−.34	−.20	.11**	.63**	−.03	−.15**	−.09*	−.37**
Yes	217	−.03**	.05**	−.02**	.07	−.04	−.06**	−.09*	−.02	.02**	−.02*	.07**
Funding success												
No	209	0.13**	−0.14**	0.14	0.23**	−0.0**	0.14**	0.21*	−0.25**	−0.10	0.06**	−0.27*
Yes	15	0.05**	0.09**	0.29	0.08**	0.34**	−0.20**	−0.25*	0.15**	−0.23	0.18**	0.05*

Note: *Z*-standardized scale.

Abbreviation: HDI, human development index.

**Coefficient is significant at $p < .01$.; *Coefficient is significant at $p < .05$.

TABLE 5 Two-way MANOVA: HDI group, organization type, and identity orientation

			Identity orientation		Utilitarian identity orientation measures					Collectivistic identity orientation measures			
Org. type	**HDI group**	***n***	**Utilit.**	**Collect.**	**Product**	**Tech**	**Growth**	**Autonomy**	**Innov.**	**Commonality**	**Customers**	**Geogr. domain**	**Public image**
For-profit start-ups	A	20	.06**	−.56*	−.30**	−.12*	−.36	1.02*	.36*	−.30	.25	−.22	−.54**
For-profit established	A	47	.42**	−.41*	.10**	.48*	−.15	−.08*	.34*	−.22	.01	.13	−.40**
Nonprofit	A	10	.39**	−.74*	−.23**	.32*	−.37*	1.20*	.94*	−.26	.23	−.62	−.67**
For-profit start-ups	B	54	.03**	−.33*	.19**	−.04*	−.13	−.09*	.64*	.02	.02	−.48	−.30**
For-profit established	B	123	−.06**	−.09*	−.09**	.01*	−.29	−.03*	.03*	−.36	.12	.22	−.03**
Nonprofit	B	19	.02**	−.32*	−.06**	.12*	−0.61*	−.06*	.64*	.25	.20	−.72	−.38**
For-Profit Start-ups	C	12	.00**	−.30*	.50**	−.29*	.25	.33*	.10*	.08	−.12	−.18	−.35**
For-profit established	C	12	−.11**	.34*	−.14**	−.04*	−.09	−.21*	−.29*	.14	−.09	.15	.32**
Nonprofit	C	5	−.34**	.75*	−.33**	−.18*	.01	−.37*	−.37*	−.03	.41	−.18	.78**
											Wald-type statistic (WTS):		
											Test statistic	*df*	*p*-Value
										Org. type	97.85	18	<.001
										HDI group	71.13	18	<.001
										Org. type: HDI group	96.73	36	<.001

Note: *Z*-standardized scale.

Abbreviation: HDI, human development index.

**$p < .01$.; *$p < .05$.

TABLE 6 Two-way MANOVA: Digital Capabilities, type of organization, and identity orientation measures

			Identity Orientation		Utilitarian identity orientation measures					Collectivistic identity orientation measures			
Org. type	Digital Capab.	*n*	Utilit.	Collect.	Prod.	Tech	Growth	Auton.	Innov.	Comm.	Custom.	Geogr. domain	Public image
For-profit start-ups	No	50	.10**	−.14*	.2**	−.32	−.37	.43	.34**	−.20	−.3*	.10	−.16**
For-profit established	No	13	.02**	−.16*	.08**	−.42	−.2	.25	.39**	−.25	.15*	−.03	−.50**
Nonprofit	No	7	.16*	−.18*	.32*	−.28	−.02	−.36*	.16**	.35	−.29*	−.33	−.46**
For-profit start-ups	Yes	18	−.04*	−.08**	−.06*	.08	−.35	.02	.12**	−.26	.19*	−.14	−.11**
For-profit established	Yes	20	−.14**	.10**	−.08**	−.32	.02	−.16	−.16**	−.01	.2*	−.09	.23**
Nonprofit	Yes	105	.02**	.11**	.07**	.05	.21	−.03*	−.22**	.20	.16*	−.01*	.01**
											Wald-type statistic (WTS):		
											Test statistic	*df*	*p*-Value
										Org. type	18.05	4	<.001
										Digital capabilities	13.179	2	<.001
										Org. type: Digital capabilities	3.517	4	.475

Note: Z-standardized scale.
**$p < .01$.; *$p < .05$.

TABLE 7 Two-way MANOVA: Funding success, organization type, and identity orientation measures

			Identity orientation		Utilitarian identity orientation measures					Collectivistic identity orientation measures			
Org. type	**Funded**	***n***	**Utilitarian**	**Collective**	**Prod.**	**Tech**	**Growth**	**Auton.**	**Innov.**	**Comm.**	**Custom.**	**Geogr. domain**	**Public image**
For-profit	No	28	.10**	−.14**	−.02*	.22**	−.26	.17	.39*	−.20**	.01	−.08	−.38**
Nonprofit	No	181	.02**	−.14**	.30**	.23**	.17**	.11	.03	−.30**	−.31	.20*	−.16*
For-profit	Yes	5	−.10**	.08**	−.03*	−.14**	.10	−.07	−.19*	.10**	−.03	.02	.22**
Nonprofit	Yes	10	.17**	.10**	.60**	.30**	.58**	−.32	−.31	.20**	−.33	.43*	−.11*
											Wald-type statistic (WTS):		
											Test statistic	*df*	*p*-Value
										Org. type	40.6	9	<.001
										Funded	31.4	9	<.001
										Org. type: Funded	17.06	9	.048

Note: Z-standardized scale.

**Coefficient is significant at $p < .01$.; *Coefficient is significant at $p < .05$.

Last, DSIs attracting capital exhibit lower levels of utilitarian orientation than their non-successful counterparts (0.05 vs. 0.13). Conversely, larger levels of collectivistic orientation are associated with funding success (0.09 vs. −0.14).

4.1 | The role of the DSI organizational form on its identity orientation

Tables 5 and 6 report results including the organizational form of DSIs in our sample and identity orientation.

Table 5 reports results related to an in-depth analysis on the relationship between identity orientation of DSIs, their organizational form and the level of development of the regions where they are established. Based on Table 5, we observe that the effect of country development index is significant, particularly among established for-profits and nonprofits DSIs.

For-profit start-ups tend to be less utilitarian oriented as they move from a high to a low human development country (i.e., from Group A to Group C). Their utilitarian identity falls from .06 when they are active in a country from Group A, to .3 if they are in Group B, to 0 if they are in Group C. Conversely, we observe an increase in their level of collectivistic orientation as they move from a more to a less developed country (coefficient increases from −.56 for Group A to −.33 for Group B and −.3 for Group C). Established for-profit DSIs are significantly less utilitarian oriented when they move from a more to a less developed country group (.42 for Group A, −.06 for Group B, −.11 for Group C).

Regarding nonprofit DSIs, we see that they tend to be significantly less collectivistic oriented when they operate in Group A and B countries (−.74 and −.32). When these DSIs are active in less developed countries, they are significantly more collectivistic oriented (.75).

Table 6 reports MANOVA results for Digital Capabilities, Organization Type and Identity Orientation, suggesting DSIs with existing digital capabilities exhibit lower levels of utilitarian orientation and higher levels of collectivistic one. More specifically, we find that DSIs that do not have digital capabilities tend to be more utilitarian oriented independently from the legal form they undertake. However, both established for-profit and nonprofit DSIs tend to be more collectivistic oriented if they do have digital capabilities (.10 and .11, respectively). Also, DSIs that do not have digital capabilities at the time of the application are significantly more concerned about their product and innovation no matter their legal form, whereas those DSIs that do have digital capabilities are more concerned about customers and public domain.

4.2 | Impact of identity orientation on funding success

Table 7 reports on the results of a two-way MANOVA relating Funding Success, Organization Type, and Identity Orientation. Larger levels of collectivistic orientation increment funding success in both for-profit and nonprofit DSIs. Emphasis on communication, geographic domain, and public image play a positive role in fund attraction. Also, successful for-profits exhibit lower levels of utilitarian orientation than their unsuccessful counterparts (−0.1 vs. 0.1). This utilitarian orientation effect is however reversed in the case of nonprofits with successful ones exhibiting larger levels of utilitarian orientation than their counterparts (0.17 vs. 0.02).

5 | DISCUSSION

This study delves into an assessment of the extent to which DSIs, that is, new products or services, that are either embodied on IT or enabled by IT, whose goal is to meet social needs, incorporate elements of both utilitarian and collectivistic identity orientation.

Building upon IS work on impact sourcing and service innovation (Sandeep & Ravishankar, 2016; Srivastava & Shainesh, 2015), we integrate the current IS debates with recent work in the social entrepreneurship field. We then look at whether DSIs are dual oriented innovation and make an assessment of the role of contextual variables in shaping such orientation (Khan et al., 2018; Pache & Santos, 2012).

We use probabilistic topic modeling, which allows the analysis of large amounts of textual data. This helps us to quantify the identity orientation of 292 Latin American DSIs submitted for a funding competition. Our analysis suggests that DSIs do exhibit both utilitarian and collectivistic identity orientation, with a marginal dominance of the utilitarian vs. collectivistic identity orientation. DSIs show a higher utilitarian identity orientation, given their focus on product and technology—two of the key elements within the utilitarian identity orientation measure used in this analysis. This finding is consistent with the definition of digital innovation itself, that places a prime role to the new product or services that are embodied in IT or enabled by IT (Kohli & Melville, 2019; Yoo et al., 2012).

Our results also show that the level of utilitarian and collectivistic orientation of DSIs is influenced by the human development of the country where such DSI is initiated, as well as the type of organization that develops it. First, nonprofit DSIs are more collectivistic oriented than for-profit counterparts; conversely for-profit start-ups exhibit a higher utilitarian identity than their established and nonprofit counterparts. These results suggest that organizational economic survival drives the identity orientation of start-ups. Start-ups initially focus on their economic sustainability to secure survival and then move toward adopting a more collectivistic orientation as they evolve into established firms (Gimeno et al., 1997).

Second, we find a statistically significant regional effect on the identity orientation of DSIs whereby those started in regions with a high HDI exhibit higher utilitarian identity orientation; on the other end, those DSIs that operate in countries with lower levels of human development exhibit higher levels of collectivistic identity orientation.

Although our data does not allow to make further inferences regarding the institutional context these ventures operate, we believe this finding supports the importance of context and institutional environments for DSIs. We expect that, as in the case of social enterprises, different types of institutional challenges may be operating in shaping the way DSI exhibits a more utilitarian or collectivistic identity orientation (Bhatt et al., 2019).

Third, we find that DSIs in the process of developing digital capabilities exhibit an utilitarian orientation with a special emphasis on product and innovation, activities both associated with the initiation, creation and implementation of new technology artifacts (Alavi & Leidner, 2001; Sambamurthy, Bharadwaj, & Grover, 2003). In contrast, DSIs that have existing digital capabilities at the time of the funding application emphasize their collectivistic identity orientation, with special focus on customers and public image. This, in turn, suggests an emphasis on the exploitation of technologies create business value (Kohli & Melville, 2019). In addition, it may suggest a less naïve view on what IT can do to help solving social problems.

Fourth, our results offer an interesting perspective on the impact of identity orientation and funding success. We find that larger levels of collectivistic orientation play a positive role in the ability to attract financial investment in both for-profit and nonprofit DSIs. The optimal positioning strategy is, however, contingent on the type of DSI under consideration: whereas successful for-profits compensate their implicit utilitarian orientation with above mean levels of collectivism, in the case of nonprofits however the ability to secure funding is contingent on their ability to exhibit above mean levels of utilitarian orientation (over their less successful for-profit and nonprofit counterparts, respectively). This dual logic that balances collectivistic and utilitarian orientation and that can be found in those DSIs obtaining funds, provides support for hybridization as a sustainable approach to blend multiple logics in response to the demands of their environment and garner the social and material support they require to thrive (Kraatz & Block, 2008; Pache & Santos, 2012).

5.1 | Contributions

Our research makes a number of contributions. First, we build upon Khan et al. (2018) and introduce the idea that DSIs can be seen as a specific form of social enterprise. This allows extending the notion of digital innovation to account for

the explicit and peculiar social mission characterizing DSIs by relying on the identity orientation measures developed in the social entrepreneurship literature. By doing so, we contribute to an emerging call within IS to offer better characterizations of DSI, which ackowledges its potential to fulfill social impact through commercially viable innovation and the dual value orientation of social enterprises (Khan et al., 2018; Madon & Sharanappa, 2013; Sandeep & Ravishankar, 2016; Srivastava & Shainesh, 2015). Our study helps building a better understanding of the nature of DSIs, showing they have dual identity orientations. This suggests that focusing either on the utilitarian or collectivistic identity orientation would result in overlooking one or the other key elements that characterize DSIs. As such, our work encourages other IS scholars to theorize on the nature of DSIs further, taking into account the peculiarities, and tensions, that such innovations face as bearers of dual identity orientation.

Our research also extends the seminal work by Moss et al. (2011) as well as Di Lorenzo and Scarlata (2019) since it proposes the use of a novel methodological approach to measure identity orientation. First, by relying on probabilistic topic model, we are able to move beyond mission statements and include a much wider analysis of the purpose of DSIs. Our analysis, in fact, allows us to extrapolate key text related to the problem DSI seek to solve, why it matters, how it seeks to solve it, any indication about the business model adopted by the organization. In doing so, we are able to more accurately gauge the actual statements of purpose that seem to guide and direct the initiatives. We also move beyond the use of pre-defined categories of text to code identity orientation measures and let these emerge from the analysis (Kobayashi et al., 2018; Schmiedel et al., 2019). To this respect, we contribute to the social entrepreneurship literature by bringing in a new methodological approach to the quantitative analysis of what organizations pursuing both commercial and social objectives actually do. Our methodological approach offers also a contribution to the study of DSI; it addresses the need to complement classic qualitative inquiries like case studies or ethnographies to scale them to broader patterns of digital innovation narratives, contexts and potential effects (Nambisan et al., 2017).

Our work also makes contributions for practice. It suggests that the dual identity of DSI needs to be recognized by those operating in the field, such as donors, governments and policy makers. Our own sample suggests the important role that donors and funders of DSI may have in enabling social impacts. To foster an environment where DSI can flourish would require developing the right legal frameworks, support in funding and training that recognizes both, the utilitarian and collectivistic identity orientation of these ventures. In Latin America, for example, very few countries count so far with the right legal frameworks for companies to be registered as social enterprises, and to facilitate pursuing commercial and social objectives jointly in their ventures.

5.2 | Limitations and future research opportunities

Although this article makes important contributions to academics and practitioners, it has its own peculiarities. First, the DSI sample we use in the empirical analysis may be subject to selection bias. In fact, DSIs in our sample were submitted to an investment fund specifically focused on funding this type of initiatives. As such, initiatives may well have over-emphasized in their narratives the technological aspects of their DSIs and, therefore, their utilitarian identity orientation to increase the likelihood of obtaining funds. This, in turn, may have influenced our results as technology is one of the measures used to estimate utilitarian identity orientation. We mitigated this limitation by controlling for the type or organization, regional scope and the existence of digital capabilities. Future work could dig into the analysis of the importance of technological aspects in DSIs and its effect on the social impact of such innovations. A potential way of addressing this would be to build a control group of DSIs that do not apply to funding competitions and look at the extent to which utilitarian and collectivistic identity orientation remains present in such innovations.

The methodology we use has also its limitations. Because probabilistic topic modeling is an unsupervised technique of machine learning developed primarily with engineering applications in mind, validating data discovery findings could be difficult (Blei, 2012). We tried to maximize the validity of our results by: (a) following recent best

practices in social science (Schmiedel et al., 2019), and (b) combining the expert knowledge of the methods with the knowledge of the phenomena (bring par from methodology). This is why we team up social scientists and computer scientists to carefully draw our conclusions. To analyze our findings, not only we rely on standardized statistical methods but also use expert knowledge of the phenomenon under study, complementing results obtained through probabilistic topic modeling with our own interviews with DSIs and with direct participant observation in the field. Furthermore, probabilistic topic modeling does not remove the implicit subjectivity of content analysis, and this is a limitation of the method as well. Future research could improve it and leverage recent advances in topic modeling techniques (Dieng, Ruiz, & Blei, 2019; Kong, Scott, & Goerg, 2016) and the incorporation of semi-supervised techniques (Nikolenko et al., 2017).

Third, our work relies on the identity orientation measure developed by Moss et al. (2011) and Short et al. (2009) that the authors categorize as either utilitarian or collectivistic. Future work could build upon their measures and develop a new, more comprehensive scale for the identity orientation construct. In particular, future work could rely upon the recent measurement scale of social identity developed by Sieger et al. (2016) to build a more nuanced measure of the collectivistic identity orientation for DSIs, which takes into account the peculiar technological aspects of innovation as suggested by Nambisan (2017).

Fourth, our work is not able to look into the tensions that emerge from enacting multiple identities simultaneously. Our work shows that DSIs exhibit both utilitarian and collectivistic identity orientations, but we are not able to quantitatively assess the level of tension that these diverging orientations give rise to or their implications. Our data speak about DSIs being unsure on how to pursue a commercially viable solution, without generating compromises on their social mission. Future work could explore these tensions in deep, using the narratives of specific DSI ventures to assess at which stage of the funding process these tensions emerge and how they are managed. This is increasingly relevant both for the IS and social entrepreneurship literature. In addition, the fact that the technology dimension is highly present in the results, does not show whether digital technology is replacing face-to-face relationships in DSI, or complementing it, or whether the two orientations unfold in the gestation and/or diffusion stages of innovation. Research that explores these relations and their dark sides implications, would be an important line of future inquiry.

Finally, we did suggest that the context in which DSI operates is relevant. Research in social entrepreneurship shows that "social organizations that aspire to be entrepreneurial may be inhibited from taking innovative action by insufficient resources including a lack of social support for their efforts" (Moss et al., 2011, p. 820). We know that while digital technologies can be leveraged to achieve faster and transformative solutions for development (Faik & Walsham, 2013; Smith, Reilly, & Benkler, 2014), DSI can be hindered by the fact that surrounding institutions can be weaker and/or that funding can be unclear on how the dual identity orientation unfolds. This results in an uncertain environment and a lack of availability of financial and nonfinancial resources (Austin et al., 2006; Barrett et al., 2015; Bhatt et al., 2019; Pache & Santos, 2012; Srivastava & Shainesh, 2015). Future work in this area could expand on institutional work (Bhatt et al., 2019) and explore how contextual environmental conditions affect the identity orientation that DSIs adopt, and how identity orientation shapes both resource acquisition and the type of resources being acquired. In particular, we need to have a better understanding on the contextual variables that require DSI to emphasize either its collectivistic or utilitarian orientation to attract resources, and how the two can be successfully and efficiently managed.

6 | CONCLUDING REMARKS

Despite the limitations that our study may bear, this article offers a novel perspective on the nature of DSIs, identifying their dual, hybrid nature, and calls for more work in the area to fully grasp the nuances of combining utilitarian and collectivistic identity orientations.

ACKNOWLEDGMENTS

The authors would like to thank the associate editors and the anonymous reviewers to help us improve this work. We also benefited from useful comments from the participants of the Digitalization and Sustainable Development seminar held at Royal Holloway, University of London, in 2019. This piece of research would not have been possible without the investor that shared its submissions details with us, for which we are very grateful. All authors contributed equally to this work.

ORCID

Carla Bonina https://orcid.org/0000-0001-9186-3239
David López-Berzosa https://orcid.org/0000-0002-5560-5133

REFERENCES

Alavi, M., & Leidner, D. (2001). Review: Knowledge management and knowledge management systems: Conceptual foundations and research issues. *MIS Quarterly*, *25*(1), 107–136.

Albert, S., Ashforth, B. E., & Dutton, J. E. (2000). Organizational identity and identification: Charting new waters and building new bridges. *Academy of Management Review*, *25*(1), 13–17. https://doi.org/10.5465/amr.2000.2791600

Austin, J., Stevenson, H., & Wei-Skillern, J. (2006). Social and commercial entrepreneurship: Same, different, or both? *Entrepreneurship Theory and Practice*, *30*(1), 1–22. https://doi.org/10.1111/j.1540-6520.2006.00107.x

Avgerou, C. (2008). Information systems in developing countries: A critical research review. *Journal of Information Technology*, *23*(3), 133–146. https://doi.org/10.1057/palgrave.jit.2000136

Avgerou, C. (2017). Theoretical framing of ICT4D research. In J. Choudrie, M. S. Islam, F. Wahid, J. M. Bass, & J. E. Priyatma (Eds.), *Information and communication technologies for development* (pp. 10–23). Cham: Springer International Publishing.

Babin, R., & Nicholson, B. (2012). *Sustainable global outsourcing: Achieving social and environmental responsibility in global IT and business process outsourcing* (1st ed.). London: Palgrave .

Bacq, S., & Eddleston, K. A. (2018). A resource-based view of social entrepreneurship: How stewardship culture benefits scale of social impact. *Journal of Business Ethics*, *152*(3), 589–611. https://doi.org/10.1007/s10551-016-3317-1

Barrett, M., Davidson, E., Prabhu, J., & Vargo, S. (2015). Service innovation in the digital age: Key contribution and future directions. *Management Information Systems Quarterly*, *39*(1), 135–154.

Battilana, J., & Dorado, S. (2010). Building sustainable hybrid organizations: The case of commercial microfinance organizations. *Academy of Management Journal*, *53*(6), 1419–1440.

Battilana, J., & Lee, M. (2014). Advancing research on hybrid organizing—Insights from the study of social enterprises. *The Academy of Management Annals*, *8*(1), 397–441. https://doi.org/10.1080/19416520.2014.893615

Battilana, J., Sengul, M., Pache, A.-C., & Model, J. (2014). Harnessing productive tensions in hybrid organizations: The case of work integration social enterprises. *Academy of Management Journal*, *58*(6), 1658–1685. https://doi.org/10.5465/amj.2013.0903

Besharov, M. L. (2013). The relational ecology of identification: How organizational identification emerges when individuals hold divergent values. *Academy of Management Journal*, *57*(5), 1485–1512. https://doi.org/10.5465/amj.2011.0761

Bhatt, B., Qureshi, I., & Riaz, S. (2019). Social entrepreneurship in non-munificent institutional environments and implications for institutional work: Insights from China. *Journal of Business Ethics*, *154*(3), 605–630. https://doi.org/10.1007/s10551-017-3451-4

Blei, D. M. (2012). Probabilistic topic models. *Communications of the ACM*, *55*(4), 77–84. https://doi.org/10.1145/2133806.2133826

Blei, D. M., & Lafferty, J. D. (2007). A correlated topic model of Science. *The Annals of Applied Statistics*, *1*(1), 17–35. https://doi.org/10.1214/07-AOAS114

Brickson, S. L. (2005). Organizational identity orientation: Forging a link between organizational identity and organizations' relations with stakeholders. *Administrative Science Quarterly*, *50*(4), 576–609.

Cangiano, S., Romano, Z., & Loglio, M. (2017). The growth of digital social innovation in Europe. An Open Design approach to support innovation for the societal good. *The Design Journal: An International Journal for All Aspects of Design*, *20*(1), 3546–3559. https://doi.org/10.1080/14606925.2017.1352857

Carroll, A. B. (1991). Corporate social responsibility: Evolution of a definitional construct. *Business & Society*, *38*(3), 268–295. https://doi.org/10.1177/000765039903800303

Covin, J. G., & Slevin, D. P. (1991). A conceptual model of entrepreneurship as firm behavior. *Entrepreneurship Theory and Practice*, *16*(1), 7–26. https://doi.org/10.1177/104225879101600102

Dieng, A. B., Ruiz, F. J., & Blei, D. M. (2019). Topic modeling in embedding spaces. arXiv preprint arXiv:1907.04907.

Delmar, F., McKelvie, A., & Wennberg, K. (2013). Untangling the relationships among growth, profitability and survival in new firms. *Technovation*, *33*(8–9), 276–291. https://doi.org/10.1016/j.technovation.2013.02.003

Di Lorenzo, F., & Scarlata, M. (2019). Social enterprises, venture philanthropy and the alleviation of income inequality. *Journal of Business Ethics*, *159*(2), 307–323. https://doi.org/10.1007/s10551-018-4049-1

Etzioni, A. (1993). Normative-affective choices. *Human Relations*, *46*(9), 1053–1069. https://doi.org/10.1177/001872679304600903

Faik, I., & Walsham, G. (2013). Modernisation through ICTs: Towards a network ontology of technological change. *Information Systems Journal*, *23*(4), 351–370. https://doi.org/10.1111/isj.12001

Fichman, R., Santos, B. D., & Zheng, Z. (2014). Digital innovation as a fundamental and powerful concept in the information systems curriculum. *Management Information Systems Quarterly*, *38*(2), 329–353.

Foreman, P., & Whetten, D. A. (2002). Members' identification with multiple-identity organizations. *Organization Science*, *13*(6), 618–635. https://doi.org/10.1287/orsc.13.6.618.493

Gimeno, J., Folta, T. B., Cooper, A. C., & Woo, C. Y. (1997). Survival of the fittest? Entrepreneurial human capital and the persistence of underperforming firms. *Administrative Science Quarterly*, *42*(4), 750–783. https://doi.org/10.2307/2393656

Glynn, M. A. (2000). When cymbals become symbols: Conflict over organizational identity within a symphony orchestra. *Organization Science*, *11*(3), 285–298. https://doi.org/10.1287/orsc.11.3.285.12496

Gras, D., & Mendoza-Abarca, K. I. (2014). Risky business? The survival implications of exploiting commercial opportunities by nonprofits. *Journal of Business Venturing*, *29*(3), 392–404. https://doi.org/10.1016/j.jbusvent.2013.05.003

Griffiths, T. L., & Steyvers, M. (2004). Finding scientific topics. *Proceedings of the National Academy of Sciences*, *101*(Suppl 1), 5228–5235. https://doi.org/10.1073/pnas.0307752101

Hansmann, H. (1980). The role of non-profit enterprise. *Yale Law Journal*, *89*(5), 835–901. https://doi.org/10.2307/796089

Heeks, R. (2013). Information technology impact sourcing. *Communications of the ACM*, *56*, 22–25.

Kannothra, C. G., Manning, S., & Haigh, N. (2018). How hybrids manage growth and social–business tensions in global supply chains: The case of impact sourcing. *Journal of Business Ethics*, *148*(2), 271–290. https://doi.org/10.1007/s10551-017-3585-4

Khan, S., Lacity, M., & Carmel, E. (2018). Entrepreneurial impact sourcing: A conceptual framework of social and commercial institutional logics. *Information Systems Journal*, *28*(3), 538–562. https://doi.org/10.1111/isj.12134

Kobayashi, V. B., Mol, S. T., Berkers, H. A., Kismihók, G., & Den Hartog, D. N. (2018). Text mining in organizational research. *Organizational Research Methods*, *21*(3), 733–765.

Kohli, R., & Melville, N. P. (2019). Digital innovation: A review and synthesis. *Information Systems Journal*, *29*, 200–223. https://doi.org/10.1111/isj.12193

Kong, J., Scott, A., & Goerg, G. M. (2016). Improving topic clustering on search queries with word co-occurrence and bipartite graph co-clustering. Google Research. Retrieved from https://research.google/pubs/pub45569/

Konietschke, F., Bathke, A. C., Harrar, S. W., & Pauly, M. (2015). Parametric and nonparametric bootstrap methods for general MANOVA. *Journal of Multivariate Analysis*, *140*, 291–301. https://doi.org/10.1016/j.jmva.2015.05.001

Kraatz, M. S., & Block, E. S. (2008). Organizational implications of institutional pluralism. *The Sage Handbook of Organizational Institutionalism*, *840*, 243–275.

Krippendorff, K. (2004). Reliability in content analysis. *Human Communication Research*, *30*(3), 411–433. https://doi.org/10.1111/j.1468-2958.2004.tb00738.x

Larsen, K. R., & How, B. C. (2016). A tool for addressing construct identity in literature reviews and meta-analyses. *MIS Quarterly*, *40*, 529–551. https://doi.org/10.25300/MISQ/2016/40.3.01

Lee, M., Ramus, T., & Vaccaro, A. (2018). From protest to product: Strategic frame brokerage in a commercial social movement organization. *Academy of Management Journal*, *61*(6), 2130–2158. https://doi.org/10.5465/amj.2016.0223

Lumpkin, T., & Dess, G. G. (1996). Clarifying the entrepreneurial orientation construct and linking it to performance. *Academy of Management Review*, *21*(1), 135–172. https://doi.org/10.5465/amr.1996.9602161568

Madon, S., & Sharanappa, S. (2013). Social IT outsourcing and development: theorising the linkage. *Information Systems Journal*, *23*(5), 381–399. https://doi.org/10.1111/isj.12013

Majchrzak, A., Markus, M. L., & Wareham, J. (2016). Designing for digital transformation: Lessons for information systems research from the study of ICT and societal challenges. *Management Information Systems Quarterly*, *40*(2), 267–277.

Mimno, D., Wallach, H. M., Talley, E., Leenders, M., & McCallum, A. (2011). Optimizing semantic coherence in topic models. In *Proceedings of the Conference on Empirical Methods in Natural Language Processing* (pp. 262–272). Stroudsburg, PA: Association for Computational Linguistics.

Moss, T. W., Short, J. C., Payne, G. T., & Lumpkin, G. T. (2011). Dual identities in social ventures: An exploratory study. *Entrepreneurship Theory and Practice*, *35*(4), 805–830. https://doi.org/10.1111/j.1540-6520.2010.00372.x

Nambisan, S. (2017). Digital entrepreneurship: Toward a digital technology perspective of entrepreneurship. *Entrepreneurship Theory and Practice*, *41*(6), 1029–1055. https://doi.org/10.1111/etap.12254

Nambisan, S., Lyytinen, K., Majchrzak, A., & Song, M. (2017). Digital innovation management: Reinventing innovation management research in a digital world. *MIS Quarterly*, *41*(1), 223–238.

Neuendorf, K. A. (2002). *The Content Analysis Guidebook*. Cleveland State University, USA: SAGE.

Nicholson, B., Sahay, S., & Heeks, R. (2018). Global sourcing and development: New drivers, models, and impacts. *Information Systems Journal*, *28*(3), 532–537. https://doi.org/10.1111/isj.12188

Nikolenko, S. I., Koltcov, S., & Koltsova, O. (2017). Topic modelling for qualitative studies. *Journal of Information Science*, *43*(1), 88–102. https://doi.org/10.1177/0165551515617393

Pache, A.-C., & Santos, F. (2012). Inside the hybrid organization: Selective coupling as a response to competing institutional logics. *Academy of Management Journal*, *56*(4), 972–1001. https://doi.org/10.5465/amj.2011.0405

Pearce, J. A., & David, F. (1987). Corporate mission statements: The bottom line. *Academy of Management Executive*, *1*, 109–116.

Phillips, B. D., & Kirchhoff, B. A. (1989). Formation, growth and survival; Small firm dynamics in the U.S. Economy. *Small Business Economics*, *1*(1), 65–74. https://doi.org/10.1007/BF00389917

Pratt, M., Schultz, M., Ashforth, B. E., & Ravasi, D. (2016). *The Oxford handbook of organizational identity*. Oxford: Oxford University Press.

Sambamurthy, V., Bharadwaj, A. S., & Grover, V. (2003). Shaping agility through digital options: Reconceptualizing the role of information technology in contemporary firms. *MIS Quarterly*, *27*(2), 237–263. https://doi.org/10.2307/30036530

Sandeep, M. S., & Ravishankar, M. N. (2016). Impact sourcing ventures and local communities: A frame alignment perspective. *Information Systems Journal*, *26*(2), 127–155. https://doi.org/10.1111/isj.12057

Santarelli, E., & Vivarelli, M. (2007). Entrepreneurship and the process of firms' entry, survival and growth. *Industrial and Corporate Change*, *16*(3), 455–488. https://doi.org/10.1093/icc/dtm010

Santos, F. M. (2012). A positive theory of social entrepreneurship. *Journal of Business Ethics*, *111*(3), 335–351. https://doi.org/10.1007/s10551-012-1413-4

Scarlata, M., Zacharakis, A., & Walske, J. (2016). The effect of founder experience on the performance of philanthropic venture capital firms. *International Small Business Journal*, *34*(5), 618–636. https://doi.org/10.1177/0266242615574588

Schmiedel, T., Müller, O., & vom Brocke, J. (2019). Topic modeling as a strategy of inquiry in organizational research: A tutorial with an application example on organizational culture. *Organizational Research Methods*, *22*(4), 941–968. https://doi.org/10.1177/1094428118773858

Shane, S., & Venkataraman, S. (2000). The promise of entrepreneurship as a field of research. *The Academy of Management Review*, *25*(1), 217–226. https://doi.org/10.5465/amr.2000.2791611

Short, J. C., Payne, G. T., Brigham, K., Lumpkin, G. T., & Broberg, C. (2009). Family firms and entrepreneurial orientation in publicly traded firms: A comparative analysis of the S & P 500. *Family Business Review*, *22*, 9–24.

Sidorova, A., Evangelopoulos, N., Valacich, J. S., & Ramakrishnan, T. (2008). Uncovering the intellectual core of the information systems discipline. *MIS Quarterly*, *32*(3), 467–482. https://doi.org/10.2307/25148852

Sieger, P., Gruber, M., Fauchart, E., and Zellwegerd, T. (2016). Measuring the social identity of entrepreneurs: Scale development and international validation. *Journal of Business Venturing*, *31*(5), 542–572.

Smith, B. R., Knapp, J., Barr, T. F., Stevens, C. E., & Cannatelli, B. L. (2010). Social enterprises and the timing of conception: Organizational identity tension, management, and marketing. *Journal of Nonprofit & Public Sector Marketing*, *22*(2), 108–134. https://doi.org/10.1080/10495141003676437

Smith, M. L., Reilly, K. M. A., & Benkler, Y. (2014). *Open development: Networked innovations in international development*. Cambridge, MA: MIT Press.

Srivastava, S. C., & Shainesh, G. (2015). Bridging the service divide through digitally enabled service innovations: Evidence from Indian Healthcare Service Providers. *MIS Quarterly*, *39*(1), 245–268. https://doi.org/10.25300/MISQ/2015/39.1.11

Stevens, R., Moray, N., & Bruneel, J. (2015). The social and economic mission of social enterprises: Dimensions, measurement, validation, and relation. *Entrepreneurship Theory and Practice*, *39*(5), 1051–1082. https://doi.org/10.1111/etap.12091

Tracey, P., Phillips, N., & Jarvis, O. (2011). Bridging institutional entrepreneurship and the creation of new organizational forms: A multilevel model. *Organization Science*, *22*(1), 60–80. https://doi.org/10.1287/orsc.1090.0522

Trauth, E., Joshi, K. D., & Yarger, L. K. (2018). ISJ editorial. *Information Systems Journal*, *28*(6), 989–994. https://doi.org/10.1111/isj.12201

Yoo, Y., Boland, R. J., Lyytinen, K., & Majchrzak, A. (2012). Organizing for innovation in the digitized world. *Organization Science*, *23*(5), 1398–1408. https://doi.org/10.1287/orsc.1120.0771

Yoo, Y., Henfridsson, O., & Lyytinen, K. (2010). Research commentary—The new organizing logic of digital innovation: An agenda for information systems research. *Information Systems Research*, *21*(4), 724–735. https://doi.org/10.1287/isre.1100.0322

Zeyen, A., Beckmann, M., Mueller, S., Dees, J. G., Khanin, D., Krueger, N., … Zacharakis, A. (2013). Social entrepreneurship and broader theories: Shedding new light on the 'bigger picture'. *Journal of Social Entrepreneurship*, *4*(1), 88–107. https://doi.org/10.1080/19420676.2012.725422

How to cite this article: Bonina C, López-Berzosa D, Scarlata M. Social, commercial, or both? An exploratory study of the identity orientation of digital social innovations. *Inf Syst J*. 2020;1–22. https://doi.org/10.1111/isj.12290