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The meaning of a brand? An archetypal approach

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Abstract

Purpose – The purpose of this paper is to analyze customers’ perceptions about brand personality in different cultural environments, checking if the archetypal framework of Mark and Pearson (2001) applies to different brands across countries.

Design/methodology/approach – The authors measured consumers’ perceptions in different cultural contexts through a survey, and received 537 valid questionnaires from Portugal, Brazil, Colombia and Peru, countries that have some similar indicators of cultural proximity. The authors wanted to verify if the words and sentences that respondents related to each brand were coherent with the archetype/brand, and the homogeneity of the results in different cultural contexts.

Findings – Empirical evidence shows that there is proximity between the literature review and the associations – words and sentences – that consumers from different countries make with those brands. This consistency of results is significantly higher for word associations.

Originality/value – Regardless of the results, the perceptions of consumers expressed through the selected words were often diverse and heterogeneous among countries. This could possibly indicate insufficient efforts from global brands toward a coherent brand personality/global-archetypal approach. Therefore, managing brand personality deserves more attention and marketers must understand consumer behavior patterns in different markets.

Keywords Brand personality, Brand, Brand identity, Archetypes, Customer perception

Paper type Research paper

Introduction

Consumers identify themselves with specific brands, not for their promises, but rather for the purpose that the brand embodies (Adi et al., 2015). Strong brands are much more than a product or service, are a unique set of companies’ promises and customers’ perceptions, interactions and experiences, which affect long-term relationships. Large corporations must focus on brand reputation and the legitimacy of the purpose they serve (Crisan and Bortunj, 2017). And brand managers must track the impact of increased brand interactions and experiences across consumers, cultures and countries on customers’ brand perceptions, especially those that relate to brand identity and personality, since consumers may not necessarily notice brand personality as intended (Malär et al., 2012).

A strong brand identity comprises the conceptualization and operationalization of a very sophisticated brand strategy that meets the challenges of the different environments where
brands are present, particularly global brands. The approaches to define identity consider the personality traits of a brand, similar to those of a “person,” as one of its components (Aaker, 1990), or as “Brand Identity Prism” (Kapferer, 1995).

Brand archetypes are part of brand personality. Marketing managers may use an archetypal approach to brand personality in order to define what a brand is, what it stands for, and the relationship with its consumers, thus providing a real meaning associated with their customers’ desires and motivations (Mirzaee and George, 2016; Mark and Pearson, 2001). In an archetypal approach, the focus is on the customer’s brand experience and brand meaning, and the products are merely secondary means to achieve the expected brand meaning (Högström et al., 2015). Consumers’ individual brand perceptions are influenced not only by their exposure to a marketer’s brand stories, and to the media and pop culture, but also by personal experiences and word of mouth (Adi et al., 2015). These external influences lead to different consumers’ perceptions across cultures.

We conducted a quantitative research to examine brand archetype perceptions of three global brands – Facebook, Apple and Amazon – in four countries – Portugal, Brazil, Colombia and Peru. We analyzed: if consumers’ perceptions of the archetypes of international brands are homogeneous in different countries; if the characterization of brands through words and archetypes is homogeneous and accepted by consumers; and whether the existing brand/archetype designations in the literature are still accurate, given the degree of innovation and growth of these brands and consumers’ perceptions across countries. To reach these objectives we checked the words and sentences that respondents related to each brand, as well as the coherence of the associations with the archetype/brand and the homogeneity of the results in different cultural contexts. This analysis has a clear managerial and academic contribution, in the research areas of brand identity and brand personality, leading managers and researchers to a deeper understanding of consumer behavior patterns through brand archetypes, to a more effective marketing strategy and to new research tools. The study of consumers’ perceptions of brand personality is a major research topic (Lam et al., 2013; Sichtmann and Diamantopoulos, 2013).

**Literature review**

A brand is not just a product or a company name, but rather a complex entity that shows the organization’s commitment to the customer. It is the promise that a company makes to the customer, regarding what the product will provide and how it will fit into the customer’s business (Campell, 2002). A company’s products should have a unique identity. In the eyes of consumers, brands communicate their own identities to society, to specific groups and/or to individuals (Strizhakova et al., 2008). Consumers may associate them with different meanings – such as perceived quality, self-identity, group identity, values, family traditions, national traditions, which may affect their functional, experiential and symbolic benefits (Siamagka et al., 2015). Not all brands develop a symbolic approach and try to tell a story. Consumers unconsciously prefer to tell and to hear stories, as they give life to others’ experience or to their experience with the brand (Woodside, 2006). Compelling stories raise expectations about the brand, which will likely increase the positive emotion when trying it, especially if the relationship between the brand and the stories seems authentic (Hwang, 2017).

International firms may have a portfolio of local, international or global brands: local brands are present in just one country or region, international brands have global elements of their marketing strategy or mix, and global brands use the same marketing strategy or mix in all target markets (Schuiling and Kapferer, 2004). Although a global brand approach has important potential advantages – such as economies of scale, of communication costs and speed of new products’ innovations – the use of centralized marketing strategies may lead to less intimate relationships with local markets, with the local competitive environment and with specific customers’ needs (Schuiling, 2001).
Brands can be a source of organizational differentiation and value creation for companies and customers. Regarding competitive advantage, a company can develop a consistent brand strategy, making sure that the brand keeps the promise, due to the relationship established with the customers. A successful brand provides a unique added value that meets customers’ needs, such as familiarity, reliability, risk reduction and personality (Strizhakova et al., 2008). Added value provides intangible benefits, such as feelings, ideas and effects to the brands (Rodrigues, 2008). Brands are an important attribute of consumers’ culture, not only for the utility value of the commodity, but also for its symbolic strength. It helps consumers to sustain their identity projects and symbolic meaning (Bengtsson, 2006; Elliott and Wattanasuwann, 1998).

The consumer-brand relationship involves processes of brand identification and product categorization, as well as sensorial, affective and cognitive experiences. These inputs will integrate the brand concept through individual and cultural signaling, and develop an attitude and a relationship (Schmitt, 2012). In addition, the centralization of organizational efforts and marketing teams is also important to reach a greater consensus and create synergies within the organization (Ceballos and Juliana, 2014). Therefore, archetypes mediate between products and customers’ motivation, providing an intangible meaningful experience.

A company develops its brand identity from different assets and competencies, which leads to the creation of brand value through customers’ unique experiences, and the creation of a brand-specific meaning. Ideally, brand identity is a valuable and unique experience that competitors cannot imitate. Therefore, brand can become a competitive advantage and the expression of an intention (Urde, 1999).

Brand identity is a central issue in marketing research, with two major approaches: Aaker (1991) proposed a preliminary approach that analyzes it under four different perspectives: the brand as a human, a product, a symbol and an organization. Kapferer (1995) claimed that the essence of brand identity is the organizational answer to central questions regarding brand’s individuality, consistence, values and signs. This allows companies to specify their brands’ meanings (Louis and Lombart, 2010).

Brand personality and brand archetypes
Brand personality is one of the main components of brand identity frameworks, and it is mandatory for brand managers to develop a systematic process to manage this central brand identity dimension. Although Aaker’s brand personality scale has been successfully used in many studies, it has some relevant limitations in an international context and in some industries (Escobar-Farfán et al., 2016). In Chile, Rojas-Méndez et al. (2004) could not validate this scale in the automobile industry, and Ahmad and Thyagaraj (2014) called attention to validation problems of certain dimensions, in some countries. This led to the development of brand personality scales in local markets, such as in France (Ferrandi et al., 2000), USA (Austin et al., 2003), Germany (Hieronimus, 2003), and Russia (Supphellen and Grenhaug, 2003), among others.

As an alternative to Aaker’s (1997) brand personality scale, some brand and marketing executives adopted the platform of archetypes to represent brands. In a marketing perspective, we use archetypes to interact with consumers’ deepest motivations and give meaning to the products and brands associated with their conscious and unconscious desires (Mark and Pearson, 2001). The unconscious is divided in personal unconscious – images and impulses from an individual’s life experiences –, and a collective unconscious that includes a big variety of shared cultural images and impulses, known as archetypes (Zehnder and Calvert, 2004). Marketing will further advance by understanding the collective unconscious, and how it affects consumers’ perceptions and actions (Dominici et al., 2016).
Archetypes are universal topics of human existence, which are evident in the common traits of characters and storylines in myths, fairy tales, novels, and films (Faber and Mayer, 2009; McPeek, 2008). Societies do not exist without communication and representation, and, to a certain extent, they share their cultural archetypal articulations (Zehnder and Calvert, 2004).

Many brands are representations of “modern myths,” containing cognitive elements, emotional elements, and unconscious processes. Brand archetypes and myths are considered allegories that support the construction of brand-consumer relationships (Muniz and Woodside, 2015). In this context, specific brands may play a pivotal role in enabling consumers to achieve the proper pleasures that facilitate an implicit brand recognition and consumer-brand relationships and experiences (Woodside et al., 2008). The growing interest in archetypes indicates a major transformation in the attitudes of marketing professionals with respect to the unknown regions of the unconscious, and the search for increasingly sophisticated ways to attract, retain, and remain relevant to the brand community.

To access these patterns, we examined the verbal vehicles that consumers use to communicate this archetypal theme: their own stories. Brands can capture the essential meaning of the category to which they belong and communicate their messages in subtle and refined manners (Mark and Pearson, 2001). Thus, consumers’ memories associated to brands often materialize into stories through which patterns of archetypes can be identified.

The use of archetypes allows creating a spiritual and mystical identity for brands, helping to establish a deeper and more significant connection with consumers regarding their unconscious aspirations (Siraj and Kumari, 2011). Archetypes mediate between products and customer motivations, providing an intangible experience of meaning.

Mark and Pearson (2001) used Carl Jung’s archetypal model and proposed a business application (Figure 1) that is frequently used. In their model, 12 archetypes are classified into four human main drivers: “belonging and enjoyment,” “independence and fulfillment,” “stability and control,” and “risk and mystery.” According to Bosley (2017), Mark and Pearson’s research is the groundbreaking work that links archetypes to brands (Table I).

Although each archetype is autonomous in terms of personality traits, Mark and Pearson (2001) proposed a two-axis framework to group archetypes into clusters. The framework considers their common attributes, according to the four major human drivers (see Figure 1): the x-axis links the need to belong and enjoy with independence and fulfillment; the y-axis links the need for stability and control with risk/mystery. These motivations are deep, and pull customers in different directions, so they should be included in marketing and brand strategies.

Source: Adapted from Mark and Pearson (2001)
<table>
<thead>
<tr>
<th>Archetype</th>
<th>Description</th>
<th>Characteristic</th>
<th>Examples of brands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caregiver</td>
<td>They want to protect others from harm, to help, to take care</td>
<td>Caring, compassion and generosity. Protecting, devoted, sacrificing and maternal/parental. Benevolent, friendly, helping and trusting</td>
<td>Nivea</td>
</tr>
<tr>
<td>Regular guy</td>
<td>They have the basic desire of connection with others; want to belong, to fit in</td>
<td>Working class or common person, the neighbor, ordered, sometimes fatalistic and self-deprecative, realistic, and disappointed humanist. Having the basic desire of connection with others, want to belong, to fit in</td>
<td>GAP, Visa</td>
</tr>
<tr>
<td>Innocent</td>
<td>Desire for simple purity, goodness, happiness, faith and optimism</td>
<td>Pure, faithful, naive, child-like character; humble, tranquil, looking for happiness and simplicity</td>
<td>Coke, Disney</td>
</tr>
<tr>
<td>Explorer</td>
<td>Desire to be free, to find out who they are by exploring the world. Long to experience a better, more authentic and rewarding life</td>
<td>Independent, adventurer. Seeks discovery and fulfillment. Often solitary and indomitable. They want to discover who they are, seeking to explore the world and have an authentic and fulfilling life</td>
<td>Amazon, Starbucks</td>
</tr>
<tr>
<td>Sage</td>
<td>They want to find the truth. Use their intelligence and analysis to understand the world</td>
<td>Value enlightening and knowledge, truth and understanding; a bit pretentious. They use their intelligence to understand the world, to discover the truth</td>
<td>McKinsey, Harvard</td>
</tr>
<tr>
<td>Hero</td>
<td>They want to prove their own worth through courageous and difficult action. Aim to exercise mastery to improve the world</td>
<td>Courageous, impetuous, rescuer, crusader. Wants to prove his/her own value through courageous and tough action. Triumphs over adversities. Their skills are persistence, strength, determination, discipline, challenge and ability</td>
<td>Nike</td>
</tr>
<tr>
<td>Outlaw</td>
<td>Their basic desire is revenge or revolution: They want to destroy what does not work for them or to society</td>
<td>Represented by the rebellious iconoclast, the survivor and a rule-breaker. Can be wild, destructive and a struggler. Revolutionary</td>
<td>Harley Davidson, Apple</td>
</tr>
<tr>
<td>Magician</td>
<td>They want to know the fundamental laws and functioning of the world or the universe and realize dreams</td>
<td>The visionary, the alchemist. Focused on natural forces, transformations and metamorphoses. They want to know how the world works and influence its transformation</td>
<td>Vanish, Pantene</td>
</tr>
<tr>
<td>Lover</td>
<td>They want to achieve intimacy and experience sensual pleasure. Aim to maintain a relationship with people</td>
<td>Intimate, romantic, sensual and especially passionate. Seductive, delighted, tempestuous and whimsical. Warm, playful, erotic and enthusiastic partner</td>
<td>Victoria’s Secret, Godiva</td>
</tr>
<tr>
<td>Creator</td>
<td>They want to create something valuable and lasting, participate in forming a vision</td>
<td>Represented as innovative, artistic, self-driven, inventive, a dreamer. Often non-social. Focused on quality living for fun. Usually ironic and mirthful. Sometimes irresponsible. Live in the moment</td>
<td>LEGO</td>
</tr>
<tr>
<td>Jester</td>
<td>They want to live in the present with full joy and entertain the world</td>
<td>Represented by a strong sense of power and control. The leader, the boss, and the judge. Influential and stubborn. High level of dominance</td>
<td>American Express, Microsoft</td>
</tr>
<tr>
<td>Ruler</td>
<td>They want to control, raise a family, and/or build a successful company or community</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Sources: Adapted from Mark and Pearson (2001), Faber and Mayer (2009)*
The creator, caregiver and ruler archetypes are associated to those who intend to organize the world, helping individuals to feel more secure. These people’s main concerns regard financial aspects, health and loss of control.

The lover, jester and regular guy archetypes refer to the need to connect to others and to be accepted, to belong, but not to change the world. These archetypes focus on people who relate to others and on love/community. Their concerns are exile, orphaning, abandonment, and engulfment (submission/destruction).

The hero, outlaw and magician archetypes represent those who want to change and improve the world, make dreams come true. These are brave protagonists, capable of facing challenges, taking risks, breaking the rules, and changing their realities. They fear impotence, powerlessness and ineffectiveness (the disinterest of others).

The innocent, explorer and sage archetypes relate to the pursuit of happiness. They focus on independence and autonomy, rather than belonging. These archetypes help people to pursue happiness, mainly dealing with the fear of entrapment, conformity, and inner emptiness.

A systematic and strong management of all the components and related items for different stakeholders is mandatory, in order to build a strong brand identity. Companies must monitor stakeholders’ insights on how the brand is sensed in their perspective, whether or not they are customers (Urde, 2016).

The perceived brand archetype, and how it relates to the desired brand identity, is a relevant topic to study across market segments and countries: individual perceptions and purchasing patterns are partly determined by the collective values of the local community, including Hofstede’s indicators of cultural proximity (Hofstede Centre, 2017). Furthermore, usage patterns and motivations may vary across countries and affect customer’s perceptions (Pentina et al., 2016). According to Chau et al. (2002), we may expect that people with different cultural backgrounds will respond differently to a global generic website.

**Methodology and field research**

The empirical research focused on the analysis of customers’ perceptions regarding three leading global brands – Facebook, Apple and Amazon –, which are among the largest brands, with high growth rates (Interbrand, 2015) in the four countries. We measured the intensity of the brand-archetype associations by identifying the sentence and number of words that the respondents mentioned, among the three that describe each archetype, and to which they associated the brand. We used the software SPSS 21 to analyze data.

There is theoretical support for associating the three brands to specific archetypes and clusters. Apple is included in the creator archetype and the “stability and control” cluster (Haddad et al., 2015; Muniz and Woodside, 2015); Facebook can be included in the “Regular Guy” archetype and in the “belonging and enjoyment” cluster (Roberts, 2010); and Amazon can be included in the explorer archetype and the “independence and fulfillment” cluster (Mark and Pearson, 2001; Hwang, 2017). For each archetype, it is possible to associate specific sentences and words. We did not assign words to the “risk and mastery” cluster because we did not use any brand previously included in that cluster. Nevertheless, we kept the corresponding sentences, as detailed in Table II.

In relation to each archetype specifications, Mark and Pearson (2001) proposed a major sentence, as detailed in Table II. They also highlighted a list of major attributes, closely related to each archetype. In this study, we chose to use multiple items (three words for each archetype) to represent these theoretical concepts, as a means to reduce measurement errors and get a better concept estimation (Hair et al., 2009). Based on an extensive bibliographical research, including a detailed analysis of Mark and Pearson’s (2001) framework, three academic researchers with multi-cultural backgrounds carried out autonomous analyses of the different archetypes, and proposed a list of words/personality traits to characterize each
archetype. These lists were shared and debated, in order to achieve a final 27-item scale to apply in a multi-cultural survey, where participants were asked to make a link between the brand and each word. For each personality trait, respondents had to say if it was related (Yes or No) to each brand: we used three brands, each one included in a different cluster of three archetypes: $3 \times 3 \times 3 = 27$ words.

We measured consumers’ perceptions in the different cultural contexts through a survey conducted in two Spanish-speaking countries, namely, Colombia (CO) and Peru (PE), and two Portuguese-speaking countries, Brazil (BR) and Portugal (PT). According to the Hofstede Centre (2017), these countries have very similar indicators of cultural proximity in terms of power distance and uncertainty avoidance, but indicators such as individualism and indulgence show very different results (see Figure 2). It seemed relevant to study how three brands with a global approach behave in this diverse cultural contexts.

We conducted an online survey between March and May 2016, with a young population, mostly undergraduates. There were 537 valid questionnaires, from participants between

<table>
<thead>
<tr>
<th>Archetype</th>
<th>Sentence</th>
<th>Word</th>
<th>Cluster</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sage</td>
<td>“The truth will set you free”</td>
<td>Learning, Expert, Credibility</td>
<td>Independence and Fulfillment</td>
</tr>
<tr>
<td>Innocent</td>
<td>“Free to be you and me”</td>
<td>Optimism, Simplicity, Goodness</td>
<td></td>
</tr>
<tr>
<td>Explorer</td>
<td>“Don’t fence me in”</td>
<td>Freedom, Adventure, Independence</td>
<td></td>
</tr>
<tr>
<td>Ruler</td>
<td>“Power isn’t everything. It’s the only thing”</td>
<td>Power, Control, Authority</td>
<td>Stability and Control</td>
</tr>
<tr>
<td>Creator</td>
<td>“If it can be imagined, it can be created”</td>
<td>Creativity, Innovation, Vision</td>
<td></td>
</tr>
<tr>
<td>Caregiver</td>
<td>“We live to serve”</td>
<td>Friend, Care, Protection</td>
<td></td>
</tr>
<tr>
<td>Regular</td>
<td>“Love they neighbor as yourself”</td>
<td>Democracy, Regular, Empathy</td>
<td>Belonging and Enjoyment</td>
</tr>
<tr>
<td>Guy</td>
<td>“I only have eyes for you”</td>
<td>Sensuality, Pleasure, Intimacy</td>
<td></td>
</tr>
<tr>
<td>Lover</td>
<td>“A life without fun is a life half-lived”</td>
<td>Enjoyment, Humour, Relaxation</td>
<td></td>
</tr>
<tr>
<td>Jester</td>
<td>“Where there’s a will, there’s a way”</td>
<td>Not considered</td>
<td>Risk and Mastery</td>
</tr>
<tr>
<td>Hero</td>
<td>“It can be done!”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Magician</td>
<td>“Rules are meant to be broken”</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table II. Archetypes-related sentences and words

Source: Adapted from Mark and Pearson (2001)

Figure 2. Cultural proximity indexes

Source: Adapted from Hofstede (2017)
17 and 40 years old, with an average value of 27.2 years, and 41 percent were women. The distribution among countries was 116 valid questionnaires in Portugal, 130 in Brazil, 190 in Peru and 101 in Colombia.

Results from apple

Apple was founded in 1976 and its predominant archetype nowadays is the “Creator.” According to their corporate statement “Apple designs the best personal computers in the world […] leads the digital music revolution […] reinvented the mobile phone and is defining the future of mobile media and computing devices” (Apple, 2013). For this brand, we observed a significant coherence regarding the archetype mentioned in the literature (creator) and consumers’ perceptions, through words and sentences. As shown in Table III, the most commonly words used in all countries were associated with the creator archetype.

The word Innovation is the most cited (between 85 and 95 percent along the countries), followed by creativity and vision. By analyzing the words that respondents associated with the Apple brand, the dominant archetype was creator (22 percent of all words mentioned), followed by Sage (15 percent) and Ruler (13 percent). On average, respondents associated 2.58 (out of 3) of these words with the Apple brand; among the countries, we confirmed that Brazil is the one where the association of the brand with the Creator archetype was more evident: 80 percent of the respondents mentioned the three words.

Answers regarding the sentences associated with the Apple brand were also very consistent: 61 percent of the respondents associated it to the sentence “If it can be imagined, it can be created.” The second most mentioned sentence was associated with the Ruler archetype, which belongs to the same cluster and received only 8 percent of the answers.

We conducted a χ² test to analyze the independence of the observation of archetypes (sentences and words), with respect to the countries of origin. We concluded that in the case of the most present archetypes for this brand – Creator (p-value = 0.000) and Sage (p-value = 0.000) –, consumers’ perceptions were not independent of the country of data collection, with a significance level of 0.05. However, considering only South American countries, the most present archetype for this brand (Creator) reached a p-value = 0.025. That is, in these three countries, individuals’ perceptions toward Apple are independent of their place of origin, as observed in Table IV.

The analysis of the chosen words showed that the most relevant clusters of archetypes are Stability and Control (44 percent), Independence and Fulfillment (30 percent) and Belonging and Enjoyment (26 percent), as shown in Table V.

By analyzing the results from the literature review and respondents’ associations, expressed through words and sentences, we concluded that all associations are very clearly related to the reference cluster (Stability and Control), which is consistent with the literature.

<table>
<thead>
<tr>
<th>No.</th>
<th>Word</th>
<th>Portugal (%)</th>
<th>Brazil (%)</th>
<th>Peru (%)</th>
<th>Colombia (%)</th>
<th>Total (%)</th>
<th>Archetype Cluster</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Innovation</td>
<td>95</td>
<td>95</td>
<td>85</td>
<td>93</td>
<td>91</td>
<td>Creator Stability and control</td>
</tr>
<tr>
<td>2</td>
<td>Creativity</td>
<td>85</td>
<td>90</td>
<td>82</td>
<td>92</td>
<td>87</td>
<td>Creator Stability and control</td>
</tr>
<tr>
<td>3</td>
<td>Vision</td>
<td>64</td>
<td>85</td>
<td>73</td>
<td>73</td>
<td>75</td>
<td>Creator Stability and control</td>
</tr>
<tr>
<td>4</td>
<td>Expert</td>
<td>72</td>
<td>70</td>
<td>63</td>
<td>71</td>
<td>68</td>
<td>Sage Independence and fulfillment</td>
</tr>
<tr>
<td>5</td>
<td>Power</td>
<td>76</td>
<td>72</td>
<td>58</td>
<td>56</td>
<td>65</td>
<td>Ruler Stability and control</td>
</tr>
<tr>
<td>6</td>
<td>Credibility</td>
<td>49</td>
<td>76</td>
<td>57</td>
<td>68</td>
<td>62</td>
<td>Sage Independence and fulfillment</td>
</tr>
<tr>
<td>7</td>
<td>Enjoyment</td>
<td>53</td>
<td>44</td>
<td>44</td>
<td>49</td>
<td>47</td>
<td>Jester Belonging and enjoyment</td>
</tr>
<tr>
<td>8</td>
<td>Optimism</td>
<td>50</td>
<td>53</td>
<td>47</td>
<td>34</td>
<td>47</td>
<td>Innocent Independence and fulfillment</td>
</tr>
<tr>
<td>9</td>
<td>Pleasure</td>
<td>40</td>
<td>55</td>
<td>40</td>
<td>51</td>
<td>46</td>
<td>Lover Belonging and enjoyment</td>
</tr>
<tr>
<td>10</td>
<td>Independence</td>
<td>37</td>
<td>43</td>
<td>43</td>
<td>36</td>
<td>40</td>
<td>Explorer Independence and fulfillment</td>
</tr>
</tbody>
</table>

Table III. Apple – the ten most mentioned words
As shown in Figure 3, most of the sentences are associated with the Stability and Control cluster (72 percent). The same happens with the words (46 percent), although, in this case, the dispersion is larger, especially in the cluster of Independence and Fulfillment (33 percent).

**Results from Facebook**

Facebook was associated to the words Enjoyment, Friend and Humor, which belong to the Jester and Caregiver archetypes (see Table VI).

The analysis of the words that respondents associated with the Facebook brand shows that the Jester archetype is the most relevant: 64 percent of the respondents associated at least two of the words, and 34 percent associated all three words with this archetype. Then, the Regular Guy (41 percent) and Ruler (38 percent) archetypes were associated with

<table>
<thead>
<tr>
<th>Archetype</th>
<th>PT</th>
<th>BR</th>
<th>CO</th>
<th>PE</th>
<th>BR</th>
<th>Words global archetype share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creator</td>
<td>0.000</td>
<td>0.025</td>
<td>0.000</td>
<td>0.000</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>Sage</td>
<td>0.001</td>
<td>0.001</td>
<td>0.651</td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ruler</td>
<td>0.013</td>
<td>0.013</td>
<td>0.725</td>
<td>13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caregiver</td>
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<td>0.001</td>
<td>0.960</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lover</td>
<td>0.004</td>
<td>0.079</td>
<td>0.107</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Innocent</td>
<td>0.013</td>
<td>0.324</td>
<td>0.001</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Explorer</td>
<td>0.342</td>
<td>0.173</td>
<td>0.878</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Jester</td>
<td>0.046</td>
<td>0.026</td>
<td>0.905</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regular guy</td>
<td>0.013</td>
<td>0.187</td>
<td>0.107</td>
<td>5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:** The significance level used for italic values was 0.05

**Table IV.**

Apple $\chi^2$ test in the countries – three words

**Table V.**

Apple – association of words to the cluster of archetypes

<table>
<thead>
<tr>
<th>Archetype</th>
<th>Portugal (%)</th>
<th>Brazil (%)</th>
<th>Peru (%)</th>
<th>Colombia (%)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stability and control</td>
<td>45</td>
<td>47</td>
<td>45</td>
<td>46</td>
<td>46</td>
</tr>
<tr>
<td>Independence and fulfillment</td>
<td>35</td>
<td>32</td>
<td>33</td>
<td>31</td>
<td>33</td>
</tr>
<tr>
<td>Belonging and enjoyment</td>
<td>20</td>
<td>21</td>
<td>22</td>
<td>24</td>
<td>22</td>
</tr>
</tbody>
</table>

**Figure 3.**

Scatter diagram: Apple
two and three words, respectively; on average, the respondents associated 1.83 of the words of the Jester archetype with Facebook brand, 1.22 words of the Regular Guy archetype and 1.21 of the Ruler archetype.

A $\chi^2$ test analyzed the independence of the most relevant archetypes from the countries of origin, as shown in Table VII. We concluded that the observations were independent of the country of origin for the Regular Guy archetype ($p$-value = 0.059), for all countries. For the Jester archetype, this independence did not occur in any of the analyses ($p$-value = 0.000). Moreover, in the Ruler case, it happened only among the respondents of Portugal and Brazil ($p$-value = 0.522). The analysis of the independence of the archetypes in relation to gender generated high $p$-values (greater than 0.1), thus confirming this independence.

The analysis of the Facebook brand affiliation to clusters of archetypes, made through word associations, showed a clear predominance of the Belonging and Enjoyment cluster, as stated in the literature, in all countries, especially in Peru. The most relevant archetype cluster is Independence and Fulfillment, and there are important differences in consumers’ perceptions among the countries, especially in the Belonging and Enjoyment cluster, where Portugal and Brazil present a level of perception very different from Peru and Colombia (see Table VIII).

<table>
<thead>
<tr>
<th>No.</th>
<th>Word (%)</th>
<th>Portugal (%)</th>
<th>Brazil (%)</th>
<th>Peru (%)</th>
<th>Colombia (%)</th>
<th>Total (%)</th>
<th>Archetype Cluster</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Enjoyment</td>
<td>62</td>
<td>79</td>
<td>82</td>
<td>67</td>
<td>74</td>
<td>Jester Stability and control</td>
</tr>
<tr>
<td>2</td>
<td>Friend</td>
<td>79</td>
<td>53</td>
<td>76</td>
<td>61</td>
<td>68</td>
<td>Caregiver Stability and control</td>
</tr>
<tr>
<td>3</td>
<td>Humour</td>
<td>75</td>
<td>60</td>
<td>68</td>
<td>50</td>
<td>65</td>
<td>Jester Stability and control</td>
</tr>
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<td>4</td>
<td>Power</td>
<td>53</td>
<td>58</td>
<td>48</td>
<td>52</td>
<td>53</td>
<td>Ruler Independence and Fulfillment</td>
</tr>
<tr>
<td>5</td>
<td>Pleasure</td>
<td>51</td>
<td>55</td>
<td>57</td>
<td>42</td>
<td>52</td>
<td>Lover Stability and control</td>
</tr>
<tr>
<td>6</td>
<td>Control</td>
<td>49</td>
<td>67</td>
<td>41</td>
<td>46</td>
<td>50</td>
<td>Ruler Independence and Fulfillment</td>
</tr>
<tr>
<td>7</td>
<td>Regular</td>
<td>48</td>
<td>40</td>
<td>49</td>
<td>54</td>
<td>48</td>
<td>Regular guy Belonging and enjoyment</td>
</tr>
<tr>
<td>8</td>
<td>Relaxation</td>
<td>53</td>
<td>16</td>
<td>71</td>
<td>35</td>
<td>47</td>
<td>Jester Independence and Fulfillment</td>
</tr>
<tr>
<td>9</td>
<td>Freedom</td>
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<td>52</td>
<td>50</td>
<td>32</td>
<td>46</td>
<td>Explorer Belonging and enjoyment</td>
</tr>
<tr>
<td>10</td>
<td>Empathy</td>
<td>28</td>
<td>40</td>
<td>51</td>
<td>36</td>
<td>40</td>
<td>Regular guy Independence and Fulfillment</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Archetype</th>
<th>PT BR CO PE 4 countries</th>
<th>BR CO PE 3 countries</th>
<th>PT BR 2 countries</th>
<th>Words global archetype share (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jester</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>18</td>
</tr>
<tr>
<td>Regular guy</td>
<td>0.059</td>
<td>0.031</td>
<td>0.533</td>
<td>13</td>
</tr>
<tr>
<td>Ruler</td>
<td>0.002</td>
<td>0.001</td>
<td>0.522</td>
<td>12</td>
</tr>
<tr>
<td>Explorer</td>
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<td>0.001</td>
<td>0.056</td>
<td>11</td>
</tr>
<tr>
<td>Creator</td>
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<td>0.075</td>
<td>0.038</td>
<td>11</td>
</tr>
<tr>
<td>Lover</td>
<td>0.002</td>
<td>0.000</td>
<td>0.533</td>
<td>10</td>
</tr>
<tr>
<td>Caregiver</td>
<td>0.000</td>
<td>0.015</td>
<td>0.000</td>
<td>10</td>
</tr>
<tr>
<td>Innocent</td>
<td>0.008</td>
<td>0.139</td>
<td>0.030</td>
<td>8</td>
</tr>
<tr>
<td>Sage</td>
<td>0.002</td>
<td>0.004</td>
<td>0.602</td>
<td>7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Archetype Cluster</th>
<th>Portugal (%)</th>
<th>Brazil (%)</th>
<th>Peru (%)</th>
<th>Colombia (%)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stability and control</td>
<td>33</td>
<td>34</td>
<td>30</td>
<td>35</td>
<td>32</td>
</tr>
<tr>
<td>Independence and fulfillment</td>
<td>29</td>
<td>27</td>
<td>27</td>
<td>24</td>
<td>27</td>
</tr>
<tr>
<td>Belonging and enjoyment</td>
<td>38</td>
<td>39</td>
<td>44</td>
<td>41</td>
<td>41</td>
</tr>
</tbody>
</table>

Note: The significance level used for italic values was 0.05
By comparing the results of the literature with the answers, the words clearly relate to the Belonging and Enjoyment cluster. Furthermore, the chosen sentences were more dispersed, with a slight predominance of references to the Jester archetype and the cluster Independence and Fulfillment (see Figure 4).

In the case of Facebook, there is a relevant homogeneity with respect to the words and clusters of the archetype present in the literature, even though some relevant disparities are apparent regarding the mentioned sentences and the depth of the associated words. The word/archetype associations are more dispersed regarding the Facebook brand, and there is less independence in the countries.

Results from Amazon
Although Amazon does not have a specific webpage, nor stores and offices in Portugal, Peru or Colombia, native consumers use the international webpage with local delivery for several categories of products.

The words associated to Amazon brand were Credibility, Expert and Learning, that is, all of the Sage archetypes belonging to the Independence and Fulfillment cluster. The Sage archetype was the most mentioned in all countries, although its relative importance ranged from 38 percent in Portugal to 55 percent in Colombia.

Amazon’s associations with the words for Caregiver, Creator and Ruler archetypes belonging to the Stability and Control cluster are also very important. Hence, in global terms, these two clusters are very significant (see Table IX). On the other hand, the literature associates Amazon with the Explorer archetype, while in our study it was not often mentioned.

The collected data supported the conclusion that Sage archetype is the most relevant for Amazon brand: of the four words more often mentioned, the three defined words were among them. In total, 61 percent of the respondents associated the Amazon brand with at least two words of the Sage archetype. The second most relevant archetype (Creator) had a much lower association rate (36 percent), and the Ruler and Caregiver archetypes achieved a level of association (two or more words) of 33 and 32 percent, respectively. In terms of clustering, Independence and Fulfillment was also prominent, but Stability and Control had a very close result (see Table X).

The most selected sentences relate Amazon brand to the Caregiver archetype “We live to serve” (29 percent) and the Hero archetype “Where there’s a will, there’s a way” (21 percent). There was no consistence between the words and sentences, in terms of the archetypes and
clusters, of the chosen archetypes. As shown in Figure 5, there is a predominance of word associations regarding the Independence and Fulfillment cluster (as indicated in the literature review), followed by the Stability and Control cluster, whereas in the case of sentences, there is some emphasis on the Risk and Mastery cluster.

A $\chi^2$ test led to the conclusion of interdependence between the Sage archetype ($p$-value = 0.001) and the Creator archetype ($p$-value = 0.001) in the countries. When we analyzed the three South American countries, we got $p$-values from 0.04 for Sage and 0.343 for Creator (see Table XI). For both archetypes, we noticed independence from gender observations (all $p$-values registered values above 0.005).

We concluded that Amazon closely relates to the Sage archetype, especially in South American countries. However, no alignment exists regarding consumers’ perceptions in the four countries, probably due to different insights about the brand value or communication strategy.

<table>
<thead>
<tr>
<th>No.</th>
<th>Word</th>
<th>Portugal (%)</th>
<th>Brazil (%)</th>
<th>Peru (%)</th>
<th>Colombia (%)</th>
<th>Total (%)</th>
<th>Archetype Cluster</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Credibility</td>
<td>47</td>
<td>77</td>
<td>55</td>
<td>63</td>
<td>67</td>
<td>Sage Independence and Fulfillment</td>
</tr>
<tr>
<td>2</td>
<td>Expert</td>
<td>34</td>
<td>48</td>
<td>49</td>
<td>55</td>
<td>45</td>
<td>Sage Independence and Fulfillment</td>
</tr>
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<td>Vision</td>
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<td>36</td>
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<td>42</td>
<td>Creator Stability and control</td>
</tr>
<tr>
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<td>46</td>
<td>42</td>
<td>47</td>
<td>42</td>
<td>Sage Independence and Fulfillment</td>
</tr>
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<td>38</td>
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<td>Independence</td>
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<td>32</td>
<td>35</td>
<td>36</td>
<td>Explorer Independence and Fulfillment</td>
</tr>
<tr>
<td>7</td>
<td>Innovation</td>
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<td>32</td>
<td>38</td>
<td>36</td>
<td>Creator Stability and control</td>
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<tr>
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<td>32</td>
<td>33</td>
<td>24</td>
<td>34</td>
<td>Innocent Independence and Fulfillment</td>
</tr>
<tr>
<td>9</td>
<td>Control</td>
<td>34</td>
<td>30</td>
<td>46</td>
<td>41</td>
<td>34</td>
<td>Ruler Stability and control</td>
</tr>
<tr>
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<td>Pleasure</td>
<td>29</td>
<td>39</td>
<td>20</td>
<td>34</td>
<td>33</td>
<td>Lover Stability and control</td>
</tr>
</tbody>
</table>

Table IX. Amazon – the ten most mentioned words

<table>
<thead>
<tr>
<th>Archetype Cluster</th>
<th>Portugal (%)</th>
<th>Brazil (%)</th>
<th>Peru (%)</th>
<th>Colombia (%)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stability and control</td>
<td>32</td>
<td>36</td>
<td>41</td>
<td>40</td>
<td>38</td>
</tr>
<tr>
<td>Independence and fulfillment</td>
<td>42</td>
<td>41</td>
<td>41</td>
<td>40</td>
<td>41</td>
</tr>
<tr>
<td>Belonging and enjoyment</td>
<td>26</td>
<td>24</td>
<td>18</td>
<td>19</td>
<td>21</td>
</tr>
</tbody>
</table>

Table X. Amazon – associated words

A $\chi^2$ test led to the conclusion of interdependence between the Sage archetype ($p$-value = 0.001) and the Creator archetype ($p$-value = 0.001) in the countries. When we analyzed the three South American countries, we got $p$-values from 0.04 for Sage and 0.343 for Creator (see Table XI). For both archetypes, we noticed independence from gender observations (all $p$-values registered values above 0.005).

We concluded that Amazon closely relates to the Sage archetype, especially in South American countries. However, no alignment exists regarding consumers’ perceptions in the four countries, probably due to different insights about the brand value or communication strategy.
Discussion and conclusions

The extensive literature review highlighted the importance of customers’ perceptions, interactions and experiences, and their consequences regarding sensorial, affective and cognitive relations with a specific brand. In this context, brand managers must focus on developing and monitoring an appropriate brand identity framework, managing customers’ brand perceptions, especially the ones related to their identity and personality, across countries and cultures. Brand personality can be achieved through a platform of archetypes, which was developed by Swiss psychologist Carl Jung in the 1940s, and applied to brand management by Mark and Pearson (2001).

The overall analysis of consumers’ associations relating to Apple, Facebook and Amazon brands supports the conclusion that there is a proximity between the associations observed in the literature and those of consumers of different countries about these three brands. This proximity is much more relevant in the case of clusters, as shown in Table XII.

We also showed that the consistency of results in the analyzed brands is significantly higher for word associations – that is, archetypes are more similar –, than in the sentences which Mark and Pearson (2001) used to characterize the different archetypes. We found the biggest differences in Facebook and Amazon brands, while for Apple the consistence of perceptions is significant (see Table XII).

These three brands are very recent and have a global approach or at least important global elements in their marketing strategy. Moreover, most of these brands do not have a direct presence (offices) in some of the chosen markets (except in Brazil, for some of them). The centralized and global approach may lead to a less accurate monitoring of local customers’ brand perceptions, due to different cultural and value traits, consumer behavior patterns, brand experiences and social influences (social groups, social networks, word of mouth).

<table>
<thead>
<tr>
<th>Archetypes</th>
<th>Cluster</th>
<th>PT BR CO PE 4 countries</th>
<th>BR CO PE 3 countries</th>
<th>PT BR 2 countries</th>
<th>Words global archetype share (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regular guy</td>
<td>0.352</td>
<td>0.294</td>
<td>0.845</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>Creator</td>
<td>0.001</td>
<td>0.340</td>
<td>0.000</td>
<td>27</td>
<td></td>
</tr>
<tr>
<td>Sage</td>
<td>0.001</td>
<td>0.040</td>
<td>0.000</td>
<td>41</td>
<td></td>
</tr>
<tr>
<td>Jester</td>
<td>0.000</td>
<td>0.000</td>
<td>0.181</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Ruler</td>
<td>0.352</td>
<td>0.074</td>
<td>0.824</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>Caregiver</td>
<td>0.171</td>
<td>0.204</td>
<td>0.926</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td>Explorer</td>
<td>0.134</td>
<td>0.057</td>
<td>0.303</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>Lover</td>
<td>0.033</td>
<td>0.054</td>
<td>0.524</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Innocent</td>
<td>0.007</td>
<td>0.324</td>
<td>0.195</td>
<td>22</td>
<td></td>
</tr>
</tbody>
</table>

Table XI.
Amazon – $\chi^2$ test in the countries and clusters of countries – three words

<table>
<thead>
<tr>
<th>Archetypes</th>
<th>Cluster</th>
<th>Words (2 or more words)</th>
<th>Archetypes</th>
<th>Cluster</th>
<th>Sentences</th>
<th>Cluster</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple Creator</td>
<td>Stability and Control</td>
<td>Stability and Control</td>
<td>Creator (89%)</td>
<td>Ruler (8%)</td>
<td>Stability and Control</td>
<td>Independence and Fulfillment</td>
</tr>
<tr>
<td>Facebook Regular guy</td>
<td>Belonging and Enjoyment</td>
<td>Belonging and Enjoyment</td>
<td>Sage (63%)</td>
<td>Jester (23%)</td>
<td>Belonging and Enjoyment</td>
<td>Jester (23%)</td>
</tr>
<tr>
<td>Amazon Explorer</td>
<td>Independence and Fulfillment</td>
<td>Independence and Fulfillment</td>
<td>Sage (61%)</td>
<td>Caregiver (32%)</td>
<td>Stability and Control</td>
<td>Hero (25%)</td>
</tr>
</tbody>
</table>

Note: The significance level used for italic values was 0.05
Although global brands have a global strategy and positioning, they can foster consumers’ experiences and expectations locally. For example, in South American countries, technological products (Apple) are very exclusive and expensive, due to local taxes and lower average salaries. Companies’ portfolios may vary across countries, and so do the perceptions of consumers: in some markets, Amazon mostly sells books and technology, but in others, they also sell new products and services, as FMCG, Convenience Stores (AmazonGo), and even new categories, as Amazon Alexa. In addition, social networks, such as Facebook, may offer different uses, according to specific cultural items, such as indulgence.

In our research – and aligned with Interbrand Report – we concluded that the three brands are very relevant in these countries: they all have a high level of brand awareness and brand associations. We also found that consumers’ perceptions differ substantially, at least for the two most recent brands: Facebook and Amazon. The reason for these differences relates to the specific local usage patterns and motivations, cultural and social issues, and possibly a lack of marketing research on specific programs for each country. The consolidation of perceptions can be a slow process, unless there is a focus of brand owners on subjects related to the perceptions of brand personality in these countries.

By comparing our results with the literature, we noticed a clear coherence of the Apple brand in all countries (Creator Archetype); as for Facebook, literature places it into the Regular Guy archetype, but our results showed a prior allocation in the Jester, followed by the Regular Guy (both archetypes belongs to Independence and Fulfillment cluster). In the case of Amazon, literature allocates the brand in the Explorer archetype, and empirical results placed it in Sage (both archetypes belong to the Independence and Fulfillment cluster). For all brands, the \( \chi^2 \) test did not show significant differences in the results of the four countries. We also noticed that the classification of brands by words and sentences is homogeneous, given the \( \chi^2 \) test results and the “word scores” in Tables III, VI and IX. Respondents’ acceptance of the words is a fact, observed by the high number of fully answered questionnaires, in all countries.

The study has a significant theoretical contribution, mainly about the importance of using multiple variables for each dimension in order to perform a more accurate analysis – instead of a single sentence –, for measuring consumers’ perceptions of brand archetypes. This conclusion matches the concepts of Hair et al. (2009) toward a more accurate analysis and the possibility to use exploratory and confirmatory factor analysis. To develop and test a list of words that characterize each archetype is another significant theoretical contribution to the study of brand archetypes. The majority of related studies focus on intended brand archetype (from the perspective of the brand manager), while ours deals with customers’ perceptions regarding major global brands in distinct countries. The differences found in consumers’ results prove the importance of this methodology.

This study has also a significant practical contribution. Marketing managers must carefully analyze the existence of such different customers’ perceptions regarding brand archetype. We provide a tool for monitoring brand performance, in domestic and international markets, through the application of surveys and other research tools.

Implications for academics, brand managers and future research
The theory of brand archetypes describes the value of implementing a specific brand personality approach to brands. The model suggests a monitoring system of consumers’ perceptions of brand archetypes in various countries. In fact, from literature review, we conclude that this area was not appropriately studied, especially regarding global brands and international comparisons.
We tested the methodology developed by Mark and Pearson (2001), and we extended its scope in order to include the observed variables along with the proposed sentences; hence, we carried out a deeper measurement of consumers' perceptions to include local attributes.

Most of the research on brand archetypes is based on semiotic and content analysis of the brand communication (the sender's perspective). In this study, we measured consumers' perceptions of brand archetypes in different countries, affected by all brand communication, experimentation and contact with other consumers, and through cultural, competitive and personal aspects, which are most relevant under the impact of social networks and brand storytelling (word of mouth). This research is the first step of a larger process that focuses on the development of better branding tools, that may include brands from different size industries, in different locations, with different cultural approaches.

For future research, we suggest applying other methodological alternatives for cultural and industrial diversification. This might bring more knowledge about the brand personality component and better methodologies and tools for academics and marketers.

From a methodology standpoint, future research studies should use sophisticated quantitative methods with a numerical scale (Likert-type scales). This would allow a stronger data analysis with exploratory and confirmatory tests and scale validation. Similarly, researchers may link this issue to a deeper perspective of global branding systems, thus providing better understanding and monitoring systems.

By knowing consumers' perceptions of individual brands in different countries, managers may create more sophisticated or effective marketing strategies for their brands. They could make decisions regarding their brand personality traits, according to the similarities between countries and their specifications. Monitoring consumers' associations related to brand personality traits might help in the evaluation of marketing and brand strategies and their local and global performance.

Frequently, companies do not use a brand personality systematic methodology to allocate their brands to these archetypal brand identity components, which is critical for establishing emotional associations of consumers with a brand. An archetype can be an appropriate choice in many situations. In fact, this research shows how consumers' perceptions vary across countries, even for top brands, and how important it is to monitor them.

References


Further reading

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Problem-based learning

A proposal for structuring PBL and its implications for learning among students in an undergraduate management degree program

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Abstract

Purpose – The purpose of this paper is to present a proposal for structuring the use of problem-based learning (PBL) as an active teaching strategy and assess PBL’s implications for student learning in the undergraduate management degree program of a federal university in Northeastern Brazil. PBL can turn students into active subjects in their own learning and promote the development of decision-making abilities through the identification and analysis of real problems.

Design/methodology/approach – The study follows the assumptions of qualitative research and uses the action research approach. The data were collected through reflective reports (texts freely written by students describing their experiences in a course) and through interviews. The collected material formed the basis for analysis and discussion of the results using content analysis.

Findings – The results indicate that the PBL teaching strategy has positive implications for student learning in that it promotes the integration of theory and practice, which enhances the motivation to learn. The students perceived the practical aspect, teamwork and presence of an entrepreneur/manager in the PBL classes as factors facilitating learning. By contrast, teamwork and the time involved were seen as factors limiting learning.

Practical implications – The use of PBL demonstrates its potential for learning through the integration of students’ cognitive, behavioral and social dimensions, fostering closer integration with the context of professional activity. The presence of entrepreneurs/managers who present real problems to be analyzed by the students in the classroom can contribute significantly to the promotion of learning and reflection by undergraduate management students.

Originality/value – The results of this study reveals its originality and value to management education in Brazil because it defines a framework for the implementation of PBL as an active learning strategy in a management program, it indicates the potential of PBL for the development of students’ competencies, it increases the potential for integrating theory with professional practice and it can aid the process of training teachers as they assess the implications of PBL for student learning.

Keywords Problem-based learning, Management degree programme, Active learning strategy

Paper type Research paper

1. Introduction

Problem-based learning (PBL) is an active teaching strategy that allows the student to take the lead and become responsible for his or her learning process (Egido Gálvez et al., 2007); it also provides learners the opportunity to work collaboratively and develop the ability to learn under their own direction (Hmelo-Silver, 2004; Gwee, 2009) as well as, over the course of their lives (Woods, 2006), solve problems through an investigative process, analyze data...
and propose solutions (de Souza and Verdinelli, 2014). In the PBL context, the teacher acts as a facilitator of collaborative learning (Graaff and Kolmos, 2003). PBL aims to encourage students to use their prior knowledge to make decisions with a focus on problem solving (Egido Gálvez et al., 2007), which helps make them more reflective and responsible for their own learning (Hmelo-Silver, 2004).

Silva (2016) proposes a system of learning through action for management education in Brazil and suggests five dimensions that should be considered in teaching and developing leadership: the learning environment, the experience of the teacher and students, learning styles, reflective practice and active teaching strategies.

PBL is one of the active teaching strategies proposed by Silva (2016) to make management students’ learning more meaningful, as it helps students reflect on their own needs (Egido Gálvez et al., 2007) and enhances their ability to develop independence as learners (Hmelo-Silver, 2004; Gwee, 2009).

This paper came out of the research agenda of a project under the Universal Call for Proposals by the Brazilian National Council for Scientific and Technological Development (Conselho Nacional de Desenvolvimento Científico e Tecnológico – CNPq). This project aims to develop and disseminate innovative teaching strategies in the management program of a federal university in Northeastern Brazil, in the context of the Center for Research and Practice in Management (Observatório de Pesquisa e Prática em Administração – OPPA), which was established in 2014 to create a learning environment for undergraduate and graduate students through “teaching-based research” or “research-based teaching.” The OPPA has a 100 m² physical space that can be characterized as a hub for dynamic and innovative learning, as it fosters the creation of a learning environment that values the physical, behavioral, social and technological aspects that bring teachers and students closer together, as well as facilitates the learning process, as shown in the study by Silva and Santos (2015).

This study is motivated by the need to assess how the adoption of an active teaching methodology enhances the learning process among management students. Thus, this paper aims to present a proposal for structuring the use of PBL as an active teaching strategy and to assess PBL’s implications for student learning in two classes of an elective course in a management degree program. The study can help instructors to use PBL as a teaching strategy in a more structured manner. It achieves this by presenting the perceptions of students who experienced PBL in classes that combined theory with practice (Freitas, 2012) and reflection with action through a more experience-based approach. According to Gosling and Mintzberg (2003), the management field needs to break with more technically oriented education approaches so that students can develop the ability to adapt under contexts marked by uncertainty (Vasconcelos et al., 2013).

In addition to this introduction, the paper is structured into five parts. Section 2 covers the theoretical framework, presenting some specific details about PBL and indicating the elements that make up its structure. The next section addresses the methodology used to understand the phenomenon being studied. Section 4 presents the proposal for structuring PBL in the context of the OPPA, which can aid its dissemination in other programs and institutions. Section 5 assesses the implications of PBL for student learning and identifies the factors that facilitate and limit its adoption as a teaching strategy. The last section includes some final reflections on the study.

### 2. Theoretical framework

PBL is considered to be an active teaching strategy, as PBL students are encouraged to take the lead in their own professional training and education. Its use in a teaching context allows the student to move beyond a passive role, to be exposed to a problem and to develop a sense of self-direction in search of the knowledge required to solve it (de Souza and Verdinelli, 2014). It is an educational strategy that takes into account the
complex nature of learning (Savin-Baden and Major, 2004) and values the practical experience of learning because, as noted by Hmelo-Silver (2004), it is based on the educational approaches of William Heard Kilpatrick and John Dewey.

PBL was disseminated in the medical school of McMaster University, Canada, in 1969, under the coordination of Howard S. Barrows (Gwee, 2009; Borges et al., 2014), as an innovative, radical strategy that ultimately became an educational trend. Gwee (2009) emphasizes that PBL aims to improve and optimize educational outcomes because it is student centered, collaborative, contextual, integrated and self-directed, and it promotes more reflective learning. According to Savin-Baden and Major (2004), the use of PBL can be affected by the structural and pedagogical environment in which it occurs, as it involves factors such as the subject matter, students, teachers and organizations.

In their analysis of the definitions of PBL, Graaff and Kolmos (2003) distinguish among three levels: the central theoretical principles of learning, specific models based on PBL and various practices that follow the guidelines of traditional educational models but incorporate elements of PBL in their theories, models and practices. In terms of theoretical perspectives, PBL can be associated with an educational approach that takes a problem as the starting point for the learning process, which is based on perspectives such as student-centered learning, experience-based learning, activity-based learning, interdisciplinary learning, a focus on practical examples, and collaborative group learning.

As a model, PBL includes the following components: the structure of the program curriculum, group-based learning and evaluation. Other models are based on project-based learning and whether the projects are associated with a task, a subject matter or a problem. The discussion of PBL as a practice involves the manner in which the strategy is implemented, with an emphasis on its goals, motivation, student engagement, the relationship between teaching strategy and the depth and complexity of learning, and the manner in which a student develops a more complex level of analytical understanding through a problem-based assignment. There are several paths to the practice of PBL, and teachers can empower students to develop more inductive or more deductive thought by relating their goals to a project on three levels: general structure, themes and types of problems or the formulation of proposals (Graaff and Kolmos, 2003).

By understanding these levels of distinction within PBL, one perceives that they are integrated rather than unrelated, and therefore, teachers must understand the theoretical bases of PBL and how the strategy can be implemented in the context of teaching, as well as be clear about the roles of the participants. Some of these points are highlighted in Section 2.1.

In their discussion on the basic principles of PBL grounded in an analysis of studies on the subject, Savin-Baden and Major (2004) indicate that PBL can be understood as a general educational strategy, as a philosophy or as an approach to teaching. The authors present the following parameters to aid in understanding, which they describe as broad areas of differentiation:

1. PBL’s essential characteristics include the organization of integrated curricula and classes around problems, in addition to an emphasis on cognitive skills;
2. certain conditions facilitate PBL, such as small groups, tutorial instruction and active learning; and
3. PBL emphasizes results, such as the development of skills and the motivation to continue being a life-long learner.

PBL requires the student to integrate various areas of knowledge, and it seeks to present real problems (Araújo and Sastre, 2009) to promote the development of skills for self-directed learning (de Souza and Verdinelli, 2014). According to Egidio Gálvez et al. (2007), the method allows the student to be the center of learning, facilitates the development of self-awareness,
The use of PBL in management education is a way to allow the student to experience the context of professional life by solving problems related to the issues that arise in the course of a manager’s professional activity. Hmelo-Silver (2004) believes that educators are interested in PBL because of its potential to motivate students, as well as its emphasis on active and collaborative learning (Escrivão Filho and Ribeiro, 2008) and the development of lifelong learning skills, management changes, teamwork, conflict resolution and problem solving (Woods, 2006). Identifying which skills or competencies are to be developed must be part of planning PBL activities, that is, the teacher should explain to the students what they can learn by using the PBL strategy. Thus, it is important to discuss the elements involved in the use of PBL.

2.1 The elements that constitute the use of PBL

There are several ways to use PBL in teaching, and this paper will describe the implementation of one way that can be employed in undergraduate and graduate programs in management. Table I shows various types of PBL based on Woods (2006), emphasizing that although it is an extremely effective environment for learning specific knowledge, it is not well known, which affects decisions about which PBL type best fits a learning objective.

Although they indicate different paths for teachers to plan for their use, these variations of PBL describe the strategy’s basic elements in terms of guidelines for learning. In this paper, we develop a structured PBL approach drawing on prior knowledge as a point of reference, but focusing on the creation of an action-oriented learning environment that encourages the development of collective learning. The following are some aspects considered central to the PBL strategy and that facilitate the understanding of its use in management education, given the specific needs of that field.

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Challenge</th>
</tr>
</thead>
<tbody>
<tr>
<td>PBL</td>
<td>It is a learning environment in which the problem is presented before the students obtain new knowledge</td>
<td>To provide students a more effective opportunity to develop problem-solving skills</td>
</tr>
<tr>
<td></td>
<td>Helps students create knowledge structures that will help them apply what was learned to future situations</td>
<td>To facilitate the development of suggestions or clues and a more appropriate knowledge structure</td>
</tr>
<tr>
<td>Self-directed PBL</td>
<td>Empowers students through learning tasks. They choose the topics, create the learning objectives and criteria, contact members of the group to learn and teach parts of an unknown activity, teach others, develop and self-assess their learning progress</td>
<td>To make students more responsible</td>
</tr>
<tr>
<td></td>
<td>Empowers students by allowing them to share in the assessment process</td>
<td></td>
</tr>
<tr>
<td>Small-group PBL</td>
<td>Uses a learning environment in which students are active and cooperative. There is a clearly defined deadline for tasks, with rapid feedback, as well as catalysis of the student’s learning style</td>
<td>To develop students’ self-assessment skills and provide an opportunity for the teacher to monitor and conduct the assessment</td>
</tr>
<tr>
<td></td>
<td>Incorporates principles of self-directed PBL and a process of self-assessment to create an environment for more in-depth learning</td>
<td>To create a small-group learning environment that actually incorporates the elements that describe it</td>
</tr>
</tbody>
</table>

Source: Prepared by the authors based on Woods (2006)

Table I. Description of the types of PBL
2.1.1 The studied problem. Discussing a problem is the central focus of PBL, given that the search for possible solutions to a problem can contribute to the development of students' skills. Macdonald and Savin-Baden (2004) reflect on the use of the term “problem” because, in addition to its meaning being associated with the search for a solution, the word can also have a negative connotation; for this reason, many use alternative terms such as “concept-based,” “investigation-based,” “topic-based” or “context-based” learning; however, they recognize that a problem is at the center of the curriculum and offers the student a sharper focus and stimulus to learn.

In the context of management education, problems consist of a description of a real situation (or a close approximation of reality) that requires a solution. According to Egido Gálvez et al. (2007), the student takes an inventory of his or her knowledge about the subject, analyzes it, reflects upon it and exchanges information with classmates, teachers and tutors to brainstorm ideas, form hypotheses and obtain solutions.

The main goal is to generate productive discussions (de Souza and Verdinelli, 2014). To this end, the studied problem should have the following characteristics (Hotchkiss, 2002; Sakai and Lima, 1996): it should be simple and objective to avoid confusion in identifying the main goal; it should be motivational for the student; it should include a neutral description of the case; it should be capable of elucidating the information required for its resolution; it should not include procedures for its resolution; it should allow students to make unique decisions; it should focus on a few learning items; it should contain elements about which the students have prior knowledge; and it should set a limit of approximately 16 hours for independent study.

2.1.2 Curriculum. The curriculum for PBL can be structured in a way that integrates with other disciplines, grouped by thematic blocks (Mamede, 2001). Graaff and Kolmos (2003) underscore that such thematic blocks involve a semester of approximately six weeks that focuses on a specific topic. Planning the cases is crucial to a learning process geared toward professional practice.

In the context of management programs, PBL can be implemented in an interdisciplinary manner in various courses during the same period or semester; however, it can also be used in a specific course, as is the case with the proposal presented in this paper.

The professor or instructor of a certain course that employs the PBL strategy can collaborate with teachers from other courses to enrich the problem with information drawn from true-to-life professional situations (Borochovicius and Tortella, 2014).

2.1.3 Students and teachers. Unlike conventional teaching strategies, in which the student is a passive recipient of information that emanates from the teacher, PBL involves a change in these roles. The strategy requires the student to take an active role in his or her education. The teacher assumes the role of tutor and moderator, facilitating the group’s work and communication among its members (Graaff and Kolmos, 2003).

de Souza and Verdinelli (2014) believe that the tutor should take an active role in stimulating students, encouraging them to reflect on the problem and to connect their prior knowledge to new concepts. In addition, the teacher should help students develop their communication skills, critical thinking, professional behavior and ability to assess themselves and their colleagues (Mennin et al., 2003; Woods, 2006).

With regard to the students, creativity and reflection outside the classroom, as well as critical thinking, are crucial to solving the studied problems (de Souza and Verdinelli, 2014; San Tan and Frank Ng, 2006). Within the student groups, there are two main roles (Iochida, 2001): the discussion leader and the secretary who records the discussions and prepares the report. These group members should work cooperatively so that no single person monopolizes the assignments and discussion.

A third role can be integrated into the process – the ambassador, a tutor who is active in the business world and involved in the studied activity. Such tutors are generally employees
who work directly in areas related to the proposed problem and can provide useful information about the topic (Pinto et al., 2015).

2.1.4 Process. Although there may be several ways of implementing the PBL strategy, the philosophical foundations of the strategy consider it a student-centered approach that encourages students to develop their independent research skills and draw a direct connection between what they learn and their needs as learners (Macdonald and Savin-Baden, 2004). With the goal of aiding the process of implementing PBL and drawing on various authors who have studied the PBL strategy (Woods, 2006; Schmidt, 2001; Moust et al., 2005), the following main phases are proposed:

- describing the problem and its terms, considering the steps discussed above;
- forming groups of students with, on average, six members;
- researching the problem, proposing hypotheses, creating questions to guide the learning and laying out the goals expected from this case-study;
- perceiving gaps in the existing knowledge, which are noticeable as the difference between the students’ current knowledge and potential future knowledge that may be needed;
- identifying the sources that contain the theoretical or practical information needed;
- setting goals and allocating resources within each group;
- describing each team member’s duties and role within the group;
- sharing knowledge to facilitate the development of the learning process and the resolution of the problem;
- applying new knowledge to the problem in an attempt to solve it; and
- presentation, assessment and reflection on the process and solution.

2.1.5 Assessment. For a program that uses PBL to train students or in specific courses that employ PBL as an active learning strategy, assessment should be planned as part of the curriculum structure, and the assessment process should reflect the goals and skills to be developed, as suggested by Silva (2016).

In PBL, assessment “gives students a responsible role in analyzing their own progress and that of classmates in their group, rather than focusing only on the teacher’s assessment” (Pinto et al., 2015, p. 15). Moreover, it is crucial to tailor the assessment process to the type of learning desired, which requires great care and attention to the relationship between teaching and learning (Macdonald, 2005). When using this strategy, the teacher should define a system of teaching focused on professional practice, considering broader principles, based on student performance according to well-defined criteria and relevant evidence (Macdonald and Savin-Baden, 2004; Macdonald, 2005; Woods, 2006).

According to Macdonald and Savin-Baden (2004), the purpose of assessment is to support students in their learning by engaging them in activities through feedback, to measure learning progress and to set the standards by which those who are being assessed can be distinguished. PBL aims to help students develop skills that are applicable in the workplace and identify their own learning needs for the acquisition of knowledge and skills, with the understanding that learning is a holistic process.

These reflections reveal the complexity of the PBL assessment process, which is closely connected to its potential for competency development. To minimize ambiguity in the assessment process, Woods (2006) suggests that clear definitions be established for the following aspects: goals (what will be assessed?); criteria (what are they, and how will they be assessed?);
types of evidence (is the evidence supported by the assessment criteria?); resources (how are the goals and evidence observed over time using available resources?); assessment process (how are students assessed? what is the purpose of the assessment? how will feedback be given to the students, and who is responsible for such consideration?); and training for assessment (has any prior training been given in how to conduct the assessment process?).

There are several assessment methods in PBL, including group or individual presentations, multiple assessments among group members and the group, an individual report on the case being studied, the resolution of a real-life situation, development of a portfolio, triple-jump exercise (presenting the issue, gathering information and posing hypotheses, and writing a report on one’s findings), self-assessment, peer assessment, open group assessment, online reflections written weekly and assessed at the end of the semester, written assessments and patchwork assessment in which group members work together to submit a shared written report containing their observations and remarks.

More specifically, Woods (2006) highlights certain forms or resources for assessment, including a student-written synthesis of the quality of the knowledge acquired; the group’s solution to the problem; concept maps of the knowledge acquired; individual tests or examinations about the knowledge, which may be developed by the teacher, peers, groups, people or the students themselves; individual teaching grades and learning contract; and peer evaluations of the quality of knowledge acquired during the teaching activity.

One can see a close relationship between the methods proposed by Macdonald and Savin-Baden (2004) and the forms and resources proposed by Woods (2006), which show that the assessment process in the PBL strategy has several alternatives, and it is up to the teacher to define the most appropriate one for the nature of the program and the course. The next section describes the methods used in the study.

3. Methods
This study’s methodology was guided by the assumptions of qualitative research (Merriam, 2009) and used the strategy of action research proposed by Cousin (2009) that is associated with the teacher-as-researcher movement. Action research can be used to investigate changes in daily routine in natural settings as well as in controlled environments such as the Center for Research and Practice in Management (OPPA), where the study was conducted and which promotes the practice of “teaching with research” or “research with teaching.”

The processes of action research proposed by Cousin (2009) involve the following steps: recognition of the problem, planning, action, observation and reflection. Section 4 describes the teaching strategy institutionalized in the management program in an elective course for students in their final year of study at a federal university in Northeastern Brazil in morning and evening classes. The participants included 90 regularly enrolled students in the decision making and managerial development course (35 in the morning section and 55 in the evening section), in which a PBL format is being introduced with the presence of a business leader or manager who describes a problem to the students and later returns to the Center to review the proposed solutions that the students have developed under the guidance of their teachers, which fosters a process of reflection about the applicability of the proposed solutions.

Two teachers, a master’s degree student and a research assistant were involved in the implementation of the strategy, and they are also considered subjects of this action research, in addition to the 90 students involved. The teachers planned the implementation of the strategy and assumed the role of moderators throughout the process. The graduate student and the research assistant supported the implementation of the PBL strategy through direct observations of the entire process and by assisting and guiding the students with the preparation of their reports.
After the activity concluded, the students were invited to participate in individual interviews to assess the implications of the PBL teaching strategy for their learning. As participation was voluntary, only six students from the two classes volunteered to participate in the interview, which was conducted in a suitable setting, and the interviews were recorded with the students' consent. The interviews followed a semi-structured script with 13 questions. The questions ranged from the understanding of the PBL implementation process and its implications for student learning to perceptions of how the strategy contributes to the integration of theory and practice and the ways in which PBL facilitated and limited students' learning. The interviews were transcribed in their entirety for analysis.

As a complement to the data analysis, some of the reflective reports written by the 90 students at the end of the course were considered. The purpose for using these reports was to study PBL's effects on the students' learning.

The reflective report is an activity that was developed based on Jennifer Moon's (2004) reflections in a book about the development of reflection. Based on a reading of the book and the proposed activities, a framework was developed to encourage students to assess the implications of using active teaching strategies incorporated into a course for learning through a process of reflection. Writing is understood as a mental process of reflection that involves a systematic first-person account of an experience involving ideas and feelings, going beyond a description of facts and points of view to promote a deeper and more critical examination of the writer's ideas. As this activity was new to the students, a description was developed that entailed a brief presentation about the report's purpose and broader reflective questions to spark the students' reflective thought, as well as specific standards for the format of the activity.

This activity was conducted at the conclusion of the course and served as a source of data on which the teachers were able to base their assessments of the learning process. In the course, The Decision-Making Process and Managerial Development, several reports assessed the implications of the student's experience with PBL as an active teaching strategy and the most positive aspect of their learning. The most significant aspects have been included in this paper. Thus, the qualitative data were collected not only from interviews but also from the students' reflective reports, adding consistency to the analytical process.

The analysis of the data collected from the interviews followed the three stages of content analysis proposed by Bardin (2007), specifically, pre-analysis, exploration of the material and treatment of the results and, finally, inference and interpretation.

Pre-analysis consisted of organizing the material collected, which was carried out in an intuitive manner but aimed to systematize the initial ideas. In this first stage of content analysis, it is important that the researcher undertake a free-floating reading (Bardin, 2007) of all the material collected in the field. Thus, following the author's recommendations, the transcripts of the interviews and the reflective reports were read. Next, the passages most relevant to this study's aims were chosen from the interviews and written reflections to make up the body of material necessary for the researchers to obtain a general overview of the data. In the study's findings, spoken passages from the interviews are designated by the letter “I,” while passages from the reflective reports are designated with the letter “R.” The number following the letter identifies the student.

The second stage, again following Bardin's (2007) recommendations, consisted of exploring the material in light of the researchers' decision to focus on two categories considered relevant to demonstrating the implications of applying the PBL strategy with undergraduate management students. The analytical categories and subcategories were identified in this phase.

The final stage of content analysis involved the treatment and interpretation of the results. This stage consisted of codifying the corpus of the study through data processing,
grouping it into units (categories and subcategories) in a way that made it possible to represent the content of the corpus of analysis.

Finally, Bardin (2007) emphasizes that when the analyst finds significant results, he or she can make inferences and advance interpretations with regard to the objectives established or to other unexpected discoveries. The results of the analysis are presented in the next sections.

4. Structuring PBL as an active teaching strategy

Several modes of PBL are mentioned in the literature; however, in the context of the Center for Research and Practice in Management, it was decided that a form of PBL would be developed in which students interact with an entrepreneur or professional manager to make the process more realistic, leading students to experience professional practice through the use of theoretical concepts.

The strategy was implemented in the morning class with the participation of a small-business entrepreneur who sells gourmet sandwiches from a food truck, and the problem to be solved by the students was as follows: “How can public awareness of the company’s product be improved in the city of João Pessoa, Paraíba state?”

The students in the evening class worked on a problem presented by an executive of a private college in the capital of another northeastern state, located approximately 140 km from the university where the study was conducted. The executive presented two problems, and the groups of students chose to solve one of the two problems: “How does the college attract potential clients who ride public transportation to a campus that is located one kilometer from the closest bus stop on a steep slope?” or “Since the college’s current facility accommodates only 2,500 students and is surrounded by a six-kilometer radius of land traditionally used for public purposes, how can the institution plan for its intended future growth, given that legislation does not permit expansion or remodeling of the current building?”

The fact that the business that was to be the object of the PBL exercise was located in another state worried the teachers, as the students were far from the company; however, the students used Google Earth and other technology to take virtual tours of the site, examine the surrounding economic environment and gather information on buildings that might be leased by the business.

The proposed PBL process involves four stages, and its application occurs in four phases. The first consists of the definition of the problem by the teacher/tutor and the choice of an entrepreneur/manager who will attend the first PBL class meeting to present the problem to the students. The second phase also occurs in the classroom and involves choosing the groups of students who will share the initial reflections following the manager’s presentation of the problem. The third phase occurs outside the classroom and involves a process of research to gather academic and non-academic information that will aid the groups in solving the problem. The fourth and final phase involves shared understanding and occurs during the second PBL class meeting when the solutions to the problem are presented, with the participation of the manager. Figure 1 shows the stages of PBL in the context of the Center for Research and Practice in Management.

Each stage is described below for the purpose of sharing the process and helping disseminate the active teaching strategy in the context of management education, as most studies of PBL do not describe its implementation in detail.

4.1 First stage: definition of the problem

Considering the PBL approach chosen for the course, after the entrepreneur/company manager is chosen, the teacher/tutor should discuss the problem to be presented to the students with him or her. The initial conversation should explain the strategy and request
the entrepreneur/manager’s cooperation because it is hoped that the results of the PBL exercise will also benefit companies in the area. The planning stage also requires the teacher/tutor to prepare informative material for the students, especially in programs and courses where the strategy is not yet well known.

During this stage, the entrepreneur/manager presents a real problem that requires a solution and is able to generate a productive discussion. The problem should be objective and specific and, in the case of the course in which this PBL was implemented, can involve topics related to any area of the organization, as the students are enrolled in the final year of the undergraduate management program.

It is recommended that in describing the problem, the entrepreneur/manager contextualize the company, the sector in which it operates and its products and/or services or other points considered relevant, culminating with the presentation of the problem.

4.2 Second stage: initial diagnosis
The initial diagnosis occurs during the first PBL class meeting and should be carried out after the student groups are formed and the discussion leader and secretary of each group have been chosen. The discussion leader’s role is to facilitate the process of solving the problem posed by the entrepreneur/manager and to act as the group leader. The secretary’s role is to organize the information and take notes on the discussion. It is also the secretary’s job to organize the final PBL report with the support of the group.

At this stage, discussion of the problem posed by the entrepreneur/manager begins. At this time, the students are expected to begin the search for information through casual conversation, and it is believed that the active and reflective attitude of the group with respect to the problem posed by the entrepreneur/manager will be crucial to the search for a solution to the problem. In this stage, the teacher/tutor can also help the class by posing reflective questions to the entrepreneur/manager and to the students.

4.3 Third stage: research
The process of conducting research to solve the problem is one of the most important steps in PBL. This stage is usually conducted by groups outside of the classroom and consists of a more detailed analysis of the problem posed by the entrepreneur/manager.

At this stage, the groups of students should connect theory to practice, drawing on academic sources (books and journals) to help them understand the problem. They should also seek information in the business community that can help the group make decisions. If the entrepreneur/manager is amenable to the idea, a visit to the company may be organized, or information can be exchanged using technological resources (telephone, e-mail, text messaging, Facebook and Instagram).
Based on the research process, information should be organized to prepare the group’s report, which should contain information on the following aspects:

- Description of the problem.
- Definition of the problem’s causes and hypotheses to help understand the problem’s causes.
- Definition of a plan to solve the problem (a number of techniques can be used for the definition of the plan, such as the 5W2H or CANVAS method).
- Reflections of the group about the proposed solutions. In this section, the group can mention the difficulties encountered in the course of solving the problem. The reflection should discuss the factors that facilitated and hindered the group activity and answer the question “What did the group members learn from the activity?”

4.4 Fourth stage: shared understanding
The stage of shared understanding occurs in the second PBL class meeting in the classroom, and it includes the participation of the entrepreneur/manager who presented the problem in the first stage. Each group presents its report to reflect on the solutions proposed, with the participation of the business representative, which makes it possible to consider the connections between theory and practice, reflection and action.

Although the groups may present different solutions, the exchange of experiences through the discussions can help them reflect on the implications of decision making in managerial activity.

The teacher/tutor is responsible for coordinating the session and can contribute with questions and comments to the groups about their proposed solutions.

5. Implications of PBL for student learning in a management program
To identify the implications of PBL for learning, six students from an undergraduate course in management, including both morning and evening classes, were interviewed. All the interviewees were male. At the time of the interview, all were in their final or penultimate semesters of the program. In addition to the interviews, the reflective reports written by students as the final project and described in the methods section were analyzed. The activity counted for two points in the third unit of the course. However, the teacher promised top marks to all who submitted the assignment, which would only be read after the conclusion of the course so that students would feel free to express their thoughts regarding the experience during the course, The Decision-Making Process and Managerial Development.

Analysis of the interviews revealed two categories that stood out as the most significant for presenting the implications of PBL in the learning of the students interviewed, which are presented in this section. They are integrating theory and practice and the factors that facilitated and limited learning through PBL. What stands out from analysis of the reports are students’ comments that the use of PBL in that course allowed them to bring together organizational practice with the theory learned not only in that course but also in previous courses.

5.1 Integration of theory with practice
The students described the importance of PBL as it is used in the OPPA, that is, with the participation of a manager and a small-business entrepreneur who presented real problems to be solved by the students, reporting that this allowed them to integrate the theory studied during the program with organizational practice. Not only was this combination mentioned
by the students in their interviews, it was also noted by the teachers in the reports about possible solutions that students submitted both to the entrepreneur/manager and to the teacher for assessment. This was especially true because the students were encouraged to integrate theory with practice in stage 3, the research component, by using academic sources (books and journals) to help them understand the problem and propose viable solutions grounded in theory:

It’s like this, it’s crucial because the problem is a practical one but it requires theory to be solved, so PBL provided a way to connect theory and practice, because we took that practice there and had to resort to theory, […] (I2.9)

[…] through PBL, starting with the possible solutions and the challenges facing the businessman, we were able to reconcile it with the theory that we had been seeing in various classes over the course of the program, […] (I3.9)

I liked the participation of company managers sharing what they experience in their organizations, bringing their problems to the classroom. From there, students try to understand the problems posed, figure out and analyze their causes […] The students act sort of like consultants, putting the wealth of knowledge into practice. (R1)

[…] I strongly believe that the debate about real-world problems experienced by managers of companies was the most productive activity, and also the one I most enjoyed getting involved with. Recounting experiences allows students to see all the theory they have been studying in the classroom applied to practice. (R6)

The link between theory and practice is still taboo for management programs at both the undergraduate and graduate levels. The use of an active learning approach such as PBL can help enhance student learning, as the students reported, based on the integration of theory with practice, that they are able to acquire or expand their ability to understand reality of the field and come up with innovative solutions to transform it.

Assessing their first six years of experience with the International Master’s Program in Practicing Management, Gosling and Mintzberg (2003) state that management classes should be taught in settings where students can reflect deeply on their experiences. Moreover, there is an obvious need for changes in the way students are currently trained, as noted by Vasconcelos et al. (2013) in their study of a Brazilian Business School. According to these authors, there is a transition underway, and the role of management today goes beyond the typical administrative duties such as planning, organization, leadership and control to enter the realms of influence, adaptation to different contexts and unpredictability.

The respondents also reported that the PBL strategy made them see that theory is not divorced from practice, as teachers of undergraduate management courses usually hear from their students, who are always eager to see organizational practice ahead of the range of theoretical content that goes into the training of a bachelor in management, as can be observed in the comments of I4 and the report of R14:

[…] the main thing we learned is to try to think about how theory applies to a specific practice, because it’s like we talked a lot about in class, there’s theory and there’s practice, sometimes people make a distinction, “uh, it’s different and all”, but it’s not that theory is different from practice, it’s just that theory has to be adapted to different realities. So, with this activity that we just did […], it has its target audience, so we have to adapt the logic of marketing, for example, to that reality […]. (I4.1)

[…] it made several concepts we had studied more applicable, the PBL practice allowed us to make use of a lot that we had seen in several other classes […] This was very valuable, not only for developing skills in problem solving, conflict management, etc. but also to understand some concepts that were taught in other classes, but before, without a real-life
The fact that students highlighted the relationship between theory and practice corroborates the observation by Freitas (2012, p. 407) that PBL “helps overcome the much-criticized separation between academic training and concrete reality, between theory and practice.” In a study by de Souza and Verdinelli (2014, p. 45) that assessed the use of PBL, the students stated that “it is much better to learn by combining theory with practice.”

In their work, Escrivão Filho and Ribeiro (2008) claim that students learn how to learn collaboratively and autonomously by working on the problems presented in the PBL method. According to these authors, the main point is learning to solve the problems by researching management concepts.

An analysis of report R14 also confirms the opinion of Hmelo-Silver (2004) and Woods (2006) regarding PBL’s potential for developing conflict resolution and problem-solving skills, in addition to its potential for interdisciplinary learning (Graaff and Kolmos, 2003).

Regarding the relationship between theory and practice, interviewee I1 stated that the PBL strategy used at the OPPA should be applied in other courses of the program, even starting with introductory courses. His comments indicate a certain eagerness for practical applications of the theories studied:

[…] Yeah, there should be more of that during the entire program starting from the beginning, because we see lots of theory, a whole lot of theory, and sometimes forget to combine it with practice, and in my opinion, out of this whole program, I think this activity did the best job of giving us some practice, because we didn’t just watch the practice, we practically became part of the company to find the solution for it. (I1.9)

It was also possible to observe that the implementation of PBL increased student motivation, as noted by I5. This finding corroborates the conclusions of Graaff and Kolmos (2003), Savin-Baden and Major (2004) and Egido Gálvez et al. (2007). The student’s motivation for learning can come from the implementation of a conventional PBL exercise that consists of real or fictitious problems; however, the opportunity to present the solutions directly to the entrepreneur/manager also seems to arouse greater interest in contributing to the business being studied. Moreover, I6 states that the implementation of PBL allowed students to experience reality, drawing together the various concepts that had been studied during the program and unifying them in a single activity, which he considered important to the training of a competitive, capable and competent professional. In report R30, the student states that PBL provides an opportunity to encounter real-life situations that until then he had only heard about, saying that the activity was engaging precisely because it allowed him to experience reality:

The application of theory to a problem, you know it’s real, you know that the person will take it to his company and possibly really apply it, that this will help, makes us more motivated to contribute. […] so this alignment between the theory that we see and practice that will really go to market, because it’s one thing for us to do a case study where we make suggestions and give opinions and know that it might help us in our learning but won’t be implemented because it’s a made-up study, but it’s a very different thing to know that you’re really helping a business, you’re affecting somebody’s business, and this could really help someone, that’s very rewarding. (I5.9)

During the program, we rarely had the experience of putting something into practice, of applying what we see in the classroom, I think PBL is all about this issue of reality, about the world out there and it is important to train a competitive, capable, competent professional […]. For me, theory turned out to be really applicable to practice when you get started, you see some concepts, you see how you can apply finance here, you see concepts of marketing where you have to keep some visual issues in mind, and such, you can do this, you can’t do that, you have concepts
of logistics [...] different courses come together there on the spot, and this is extremely important to a professional who’s being trained [...]. (I6.9)

PBL put me into situations I had only heard about, just in theory, so thinking of a way to act in the face of a challenge to a real company, that helped me see and think differently about aspects that were covered, you know, it was really real, I experienced it and I kept wondering if I were that manager, what would I do, what’s the solution, is there a solution? [...] I think that was the most reflective part of the course for me and the most engaging because it was real. (R30)

These findings corroborate the observations of several authors covered in the theoretical framework, such as Graaff and Kolmos (2003), Hmelo-Silver (2004), Savin-Baden and Major (2004); Woods (2006); Egidio Gálvez et al. (2007) and Freitas (2012), by indicating that problem-based teaching can situate the subject matter in meaningful contexts of action (or professional work), motivating students and cultivating in them a sense of responsibility for solving problems, managing conflicts and thinking in broader and more interdisciplinary terms. The study participants also cited the factors that facilitate and limit the use of the PBL strategy.

5.2 Factors that facilitate and limit learning in the adoption of PBL

The students were asked to describe the factors that facilitated and limited their learning through the use of the PBL strategy. The reports showed that the use of this strategy was viewed positively by the interviewees with regard to three facilitating factors: the practical aspect, the presence of an entrepreneur/manager and teamwork. The research conducted by de Souza and Verdinelli (2014) involving the application of questionnaires to 107 students who had participated in a PBL learning experience revealed that 77 percent of the respondents approved of the method, of whom 25 percent considered the method very effective and 52 percent considered it moderately effective.

Consistent with what had already been indicated by the students with regard to the importance of integrating theory and practice in the adoption of the strategy, the practical aspect was one of the main factors that facilitated learning cited by the students, as seen in the remarks of I2 and I3:

What I think was most effective for me was the practical aspect, I always get very involved with what I learn through practice, so the fact that we were right there experiencing a real problem of a real person who was right there in front of us, we could talk with him, have him answer our questions, that we had the opportunity to visit the company that was having the problem, for me, that was one of the factors that helped me learn better. (I2.3)

I think because of my own learning style, it was the practical aspect, you know, the practice itself brought me more [...] made me more, how can I say it, more interested in discussing it in more detail. In the case of PBL what I could [...] it’s not something very theoretical, it’s more practical and I was more interested in participating. (I3.3)

Another facilitating factor mentioned by the students was the presence of the entrepreneur and/or manager in class to present the problem and later to hear the solutions proposed by the teams of students:

"[...] I think the fact that the businessman came and provided a context for the company, a context for the whole problem, that got us involved with the company and with the issue, so I think that made it a lot easier for us to make suggestions to improve the problem. (I1.3)

[...] the first thing is to have the person present whose problem I’m solving, you know, listening and arguing back, or building on the face-to-face discussion [...]. And so the fact that he’s there and he’s considering your ideas, that makes the learning happen [...]". (I4.3)
Teamwork was the third facilitating factor that emerged from the analysis of the corpus of the interviews. The statement by I5 confirms Woods' (2006) opinion that PBL contributes to the development of the skills needed for working as a team:

It was the teamwork that made it a lot easier and also the presentation of the problem, how the problem was presented to us, the participation of the entrepreneur helped a lot during the reflection and the description of the problem. (I5.3)

Escrivão Filho and Ribeiro (2008) report that when they used PBL with engineering students, the students rotated their roles within the groups, acting alternately as group leader, secretary, spokesperson and participating member. Thus, they were able to experience realistic, though simulated, situations from professional life. The authors used two strategies to form the groups: during the first part of the course, the students were allowed free choice in forming their groups, which were based on friendship and affinity; however, during the second part of the course, they were encouraged to form groups that would achieve the best possible performance.

Students also mentioned some of the limiting factors of PBL. Teamwork emerged as both a facilitating factor and a limiting factor. Its most significant limiting aspects were said to be the passive role taken by some students and the difficulty of arriving at consensus on the solutions to be presented, as is evident in the remarks of I1 and I3:

Yeah, I don't know if the learning process, but the main difficulty with forming the groups is that not everyone participates, there are people who come just to criticize the others who are trying, but they don't contribute anything, that's the only thing [...]. (I1.4)

I think in the case of PBL, I don't think I had much difficulty. I was really interested in the case, I think the only difficulty was getting the team to agree on an idea, just because of this divergence of thought, but after we reached a consensus, everything went smoothly. (I3.4)

Teamwork was also identified as a challenging factor in a study on the use of PBL by Pinto et al. (2015). The authors found that some groups had problems with leadership, as some members were resistant to respecting the established hierarchy, including the roles and responsibilities of each member, which overburdened the members who were more responsible and committed to the course.

Time was another limiting factor cited by interviewees, as observed in I2 and I5:

Look, for me, the only difficulty I had was the issue of time, that I didn't have much time to go visit the company, to get to know it in more depth, but just the fact that he came here made up a little for the problem I had. (I2.4)

Yeah! The time factor, as a student, to dedicate myself to this activity made it a little difficult, and the fact that I still haven't gone to visit the company; Wagner presented the problem well, but to give more relevant suggestions, it would be better if we knew it in more depth, since I didn't have time to go visit his business, my assessment was kind of superficial. (I5.4)

de Souza and Verdinelli (2014) also cited time as a limiting factor. According to these authors, students do not have sufficient time for PBL. The implementation of PBL by de Souza and Verdinelli (2014) had some features in common with this study, especially the implementation of the strategy at the end of the semester. One difference is that in the case of this study, the problem was presented by the entrepreneur/manager, while in their study, the problem was written up and presented to the students. The authors even suggest that PBL activity be implemented at the beginning of the semester. This suggestion was supported by the teachers who had been involved in implementing of the learning strategy, especially because the course had been one of the last ones in the program, and the students were involved with writing their final projects.
6. Final considerations

The use of PBL as an active teaching strategy demonstrates its potential for learning through the integration of students' cognitive, behavioral and social dimensions, fostering closer integration with the context of professional activity.

The development of a framework for the dissemination of the PBL strategy reinforces the uniqueness and contribution of this paper as an innovative teaching strategy, as well as an opportunity to reflect on the implications of using PBL in the education of students in a management program.

The dissemination of student-centered learning strategies promotes interdisciplinary learning and the integration of theory and practice, as well as provides added motivation for learning and teamwork through practical experience with professional activity, which can make learning more meaningful. The results of this study confirm PBL’s contribution to the students who experienced it in the context of the Center for Research and Practice in Management.

The study’s results showed that teamwork is considered both a facilitating factor and a limiting factor. This indicates the complexity of student relationships in the educational context, which involves both behavioral and social aspects and should be taken into consideration by the teacher responsible for applying the strategy in the classroom. Factors such as passivity, lack of commitment from some group members and the difficulty of arriving at a consensus on the proposed solutions may hinder a group’s ability to solve the problem, and it is the duty of the teacher or tutor who sees evidence of these factors to suggest ways to minimize them.

In addition to teamwork, the time factor was identified as another challenge to learning. In a content-focused curriculum, in which the teacher is seen as the central figure and transmitter of knowledge, it is more difficult to introduce strategies that give the student an active role in learning. Moreover, the culture of self-directed learning is not yet incorporated into the behavior of many students in higher education. Thus, one of PBL’s contributions is to encourage the student to become familiar with a more experience-based learning process, through action, with emphasis on the development of a sense of self-directed development.

The use of active teaching strategies in management programs has increased in recent years; however, it is still in its infancy. Similarly, the use of the PBL strategy, especially as proposed in this work, with the presence of entrepreneurs/managers who bring real problems to the classroom, can contribute significantly to the promotion of learning and reflection among undergraduate management students. It is hoped that the presented structured process of implementing PBL in an undergraduate management program may help and motivate teachers to introduce this strategy to an ever greater number of students enrolled in higher education in Brazil.

An analysis of the results of this study reveals its potential contribution to management education in Brazil because it defines a framework for the implementation of PBL as an active learning strategy in a management program, it indicates the potential of PBL for the development of students’ competencies, it increases the potential for integrating theory with professional practice and it can aid the process of training teachers as they assess the implications of PBL for student learning.

Future studies can address themes related to PBL’s contribution to the development of professional skills and its relationship to interdisciplinary learning and students' academic performance.

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Further reading

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Critical thoughts on advanced manufacturing: the experiences of Germany and USA

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Abstract

Purpose – The purpose of this paper is to analyze the conventional approach to advanced manufacturing initiatives. Buzzwords like smart manufacturing or industrie 4.0 are directly linked to the discussions about the future of industrial activity. Little is said, however, about developed countries actively reinforcing their bets on the relevance of manufacturing.

Design/methodology/approach – This study opted for analyzing academic papers and governmental white papers. Somehow similar to those studies on compared experiences, here the US and German initiatives are put into perspective.

Findings – The critical interpretation of several works allows us to state that advanced manufacturing experiences consist in a set of policies aiming at industrial and technological leadership in a scenario of fierce competition. The initiatives seek to strengthen manufacturing activities by means of a mission-oriented approach, fostering enabling key technologies.

Originality/value – This paper fulfills an identified need to critically study the advanced manufacturing initiatives. Away from conventional approaches, the paper puts into perspectives the main ongoing initiatives on advanced manufacturing and interprets them as deliberated national efforts to strengthen manufacturing activities by means of enabling technologies. The paper also points out preliminary recommendations for Brazil.

Keywords Industrial policy, Advanced manufacturing, Industrie 4.0

1. Introduction

Worldwide, topics like advanced manufacturing or industrie 4.0 are being deeply discussed. In Brazil, this subject has been widespread by large multinational companies. The debates come with high expectations around several technologies that could transform manufacturing, although hardly ever accompanied by due considerations.

Therefore, it seems appropriate to take a step back and make a critical reflection on the broad "advanced manufacturing" issue. The topic is intertwined with national efforts to revitalize manufacturing and pursue technological leadership. Thus, advanced manufacturing is part of a framework that translates this perception and originates policies based on each country’s specificities.

For organizational purposes, besides this introduction, this paper presents four sections. The second discusses the most widespread approach to the "fourth industrial revolution". The third states that advanced manufacturing must be discussed from a broader industrial policy perspective. The fourth section intends to analyze the American
and German plans for strengthening their own manufacturing activity. Finally, the last section proposes a brief reflection on the subject and point out some preliminary recommendations for Brazil.

2. The future of manufacturing and the bazaar of technologies

Normally the specialized literature emphasizes that the world is facing a new industrial revolution. This revolution takes place in a new era in which the internet plays a leading role, contributing to the convergence of various technologies, now being introduced in all industries and reaching machinery and equipment. The essential elements would be the “merging” of the virtual and real world; the use of cyber physical systems; and supply chain flexibility, with real-time information available to suppliers and customers (Schwab, 2016).

As the digital base is incorporated into the shop floor, it becomes possible for production to take place with more flexibility and to make use of less labor requirements, allowing a customized manufacturing. The benefits to employment and productivity are usually exalted as the new production techniques will be more automated and require more skilled workers[1].

This interpretation is part of a wider discussion on the future of manufacturing, having McKinsey Global Institute (MGI, 2012) and Organisation for Economic Co-operation and Development (OECD, 2015) as representative works. Both highlight the constraints imposed by the ongoing global changes, their implications for the advanced economies and the consequences for manufacturing activity.

In fact, MGI (2012, p. 9) pronounces the arrival of “an exciting new era of global manufacturing.” Somehow more cautiously, OECD (2015, p. 10) points in the same direction: “[t]here is a growing debate that the world is on the brink of similar industrial revolution(s) and a reshuffling of production will take place in the next 10-15 years.”

According to MGI (2012), some elements are notably relevant: demand reorientation toward developing countries, due to their higher growth rates; products proliferation and fragmented consumer’s demand; increased value-added services; greater pressure on the supply of natural resources; and more efficient and sustainable processes.

The reorientation toward developing countries and demand’s fragmentation are especially relevant. These new markets are presumed to be made up of consumers that require different products to satisfy their preferences, pushing producers to offer a greater variety of products. At the same time, in established markets there is also demand for variety, given faster production cycles, reinforcing the tendency toward fragmentation. In addition, there is a tendency toward increased value-added services. Companies would produce a “bundle” in which services are inseparably from the product. Also, there are major advances in regard to information and communication technologies, advanced materials and robotics, enabling efficiency gains and flexibility in production. According to MGI (2012), these trends modify how firms seek new markets and expand production and R&D.

From a microeconomic standpoint, firms shall adopt new business models if they are to benefit from many of the opportunities posed by new technologies. Thus firms would be able to respond quickly to consumers’ demands and supply’s conditions, as the digital...
production allows a more flexible organization and also because of reductions in product
design cycles.

Several authors, such as Schwab (2016), emphasize that the world is on the brink of a big
wave of technological advances and profound systemic transformations. It is often treated
as an inexorable (positive) wave for job creation, output value, new processes, and so on.

The conventional approaches correctly identify a series of global trends. Also, they
somehow reaffirm manufacturing’s special role for long-term development. However, it seems
misleading, among other things, in interpreting how nations absorb technological progress.
The conventional underlying view is based on the idea that technological advances are
exogenous, as if there was a “bazaar” of technologies – a term coined by Sinn (2006). Also, it would be enough (for nations) if firms simply choose the best way of incorporating the new technologies into their productive processes.

Instead, the paper’s underlying idea is that technical progress is embodied in specific products and processes. It should also be clear that it is something far from spontaneous; technological advances are stimulated by policies that combine effective demand with instruments that support scientific and technological development. Attention must be drawn to the fact that “advanced manufacturing” experiences were originated in developed countries as part of their strategies for the next decades. These strategies have not yet been fully implemented and cover areas to be developed in at least 15-20 years.

The next sections cover the two main ongoing initiatives for implementing advanced manufacturing. From our perspective, it is important to understand the theoretical features that led them to “rediscover” the importance of manufacturing (and industrial and technological policies).

3. We need to talk about industrial policy
According to O’Sullivan et al. (2013, p. 432), “there is renewed interest in ‘industrial policy,’” especially in the aftermath of the 2008 crisis. This renewal reflects changes in the global nature of manufacturing, such as the declining share of manufacturing activity in many developed countries, the growing competition from emerging economies and the accelerating pace of technological change. Besides national peculiarities, an essential dynamic shaping current industrial policy is the growing fragmentation of production (Milberg and Winkler, 2013).

Many analysts advocate that the world has entered a postindustrial phase in which selling services and becoming a “knowledge economy” is better than making “stuff”[2]. Others, like Chang (2009), challenge this pseudo-consensual view and argue that the manufacturing companies are responsible for the relevant sources of demand for services.

Indeed, historically there have been several attempts to foster industrial development, given its centrality to economic development traditional arguments in favor of manufacturing are encapsulated in Kaldor’s laws, which highlight its relevance for economic growth and the benefits on productivity and employment (Kaldor, 1981). Rosenberg (1963) argues that manufacturing – more specifically, the capital goods segment – is a major diffuser of technological innovations. Besides, manufacturing drives demand for high productivity activities in others sectors and is also fundamental for the relief of external constraints, mitigating balance of payments crisis.

Less highlighted, though, are the synergies enhanced by the proximity of shop floor activities to others such as engineering. Some authors conclude that when several firms offshore their activities, it contributes to weakening the country’s overall economic position (Pisano and Shih, 2009). Splitting certain activities ends up undermining national innovative capacity.

Technological development is strongly related to production, and the proximity of R&D teams to the shop floor is extremely important for innovation. The authors refer to these collective capabilities as industrial commons, which may include the know-how related to R&D, engineering and other skills related to specific technologies.

This finding has been raised while discussing development strategies and public policies have been redesigned under denominations like advanced or digital manufacturing. As mentioned by Andreoni and Gregory (2013, p. 35): “The crisis situation has led many analysts to ask: ‘Has off-shoring gone too far?” and, more importantly, ‘Does manufacturing still matter for the wealth of advanced nations?’

4. Main international experiences
From our perception it is fundamental to investigate which policies the leading countries are pursuing. Indeed, the experiences here alluded were mainly motivated by political wills to
take industrial leadership. This perspective brings up interesting issues, such as
the recognition that technological developments do not consist of “exogenous” trends. Quite
the contrary, they benefit from specific actions established by countries that seek to
stimulate industrial development.

4.1 US’ advanced manufacturing

4.1.1 A bird’s eye view. Throughout the American history, it is clear that the federal
government plays a substantial role in regard to industrial policy (Andreoni, 2016,
pp. 14-15). The USA has always used a broad spectrum of policies and is particularly
recognized for its support on the military industrial complex. Also there exists a strong
institutional structure to stimulate technological innovations. This institutional structure
combines support to R&D with several other measures, including trade policies, local
content requirements and public procurement. The US National System of Innovation (NSI),
often singled out as a major contributor to the country’s industrial strength, was
traditionally articulated around a wide network of universities and laboratories, as well as
public agencies and federal departments.

However, in recent decades, manufacturing as a share of GDP and employment has
decreased in both low and high-tech industries. The fall in employment is not only related
to production; there are also concerns on losing the lead in R&D-related employment.
More recently, academic papers and governmental white papers reveal many concerns with
the implications of American deindustrialization.

Many of them suggest that US leadership is threatened and even draw attention to the
country’s current account[3]. The trade balance in high-tech manufacturing products
currently shows a deficit, shifting from a surplus in the 1990s to a circa US$100 billion
deficit in 2011. Also, by now the USA has already been surpassed by Germany and China as
world’s largest exporter (President’s Council of Advisers on Science and Technology
(PCAST, 2011). In addition, the USA is losing to foreign countries some R&D activities
related to manufacturing. For years, American firms’ expenditures in R&D outside the USA
have grown three times higher than domestic spending (see Tassey, 2010).

In this sense, Pisano and Shih (2009) draw attention to the fact that relevant activities
were relocated to other countries. This is an important finding, contrary to the
conventional wisdom that usually states that possible harms are restricted to lower
value-added tasks, as assembly[4].

Offshoring harms not only the firms that offshored their activities but also the
capabilities of other firms, so it is important to be geographically close to the commons.
According to Tassey (2010), examples can be found in the personal computers industry,
semiconductors, electronic displays and others. As emphasized by PCAST (2011,
pp. 11-12): “[w]hen different aspects of manufacturing […] are located in the same region,
they breed efficiencies in knowledge transfer that allow new technologies to develop and
businesses to innovate.”

Furthermore, Pisano and Shih (2009) deconstruct the myth that the relocation of certain
(mature) industries is part of a natural process, allowing resources to be reallocated to
higher value-added activities. One should not ignore that modern products can depend on
the commons of mature industries, as the authors’ example of the semiconductor foundries
and the capabilities related to thin-film-deposition.

Hence the separation between production and innovation is far from simple. Indeed, there
is a blurry boundary between these activities and separating them can negatively impact
the feedback interactions of the innovation process.

4.1.2 The American approach. As already mentioned, the USA aims at reconquering
their fading industrial leadership. In this context, a set of white papers emphasizes the
synergies between different activities and the importance of cutting-edge enabling technologies. As stated by PCAST (2011), “[…] technology innovation is closely tied to manufacturing knowledge. We cannot remain the world’s engine of innovation without manufacturing.”

Following PCAST (2011), the crucial part of the American strategy is an initiative for supporting research related to new and generally applicable enabling technologies. Their key recommendation is that the federal government launches the advanced manufacturing initiative, combining several institutions, notably the commerce, defense and energy departments (see also National Science and Technology Council, 2012 and President’s Council of Advisers on Science and Technology, 2012, 2014).

Thus, as precondition to boost advanced manufacturing, massive investments are needed both to ensure that new technologies are developed nationally and to create infrastructures to support technology-intensive firms[5]. Such investments involve strong support for applied research programs whose impacts are potentially transformative. Such an effort would be complemented by parallel academia and industry initiatives.

What’s more, investments in shared infrastructure help a number of companies. PCAST (2011) reasonably assume that smaller companies will not (individually) invest in the entire infrastructure needed to promote advanced manufacturing.

The recommendations gave birth to the National Network for Manufacturing Innovation (NNMI), formed by regional research institutes called Innovative Manufacturing Institutes (IMI). Inspired by the German Fraunhofer, the NNMI is a network of research institutes that accelerates the development and deployment of advanced manufacturing technologies. They all have common goals, such as develop advanced manufacturing technologies, as well as undertake research activities and stimulate the supply of skilled workers.

Despite common goals, each institute has a specific focus, functioning as a regional hub. Each institute operates through public-private partnerships between the triple helix. In addition to the participation of several universities, it is worth mentioning the joint participation of several companies (e.g. GE, Lockheed Martin, Boeing, IBM, etc.). The vast majority is US-owned with strong global insertion and commanding robust supply chains.

Currently, 45 institutes are planned for a period of ten years. Created in 2012, the pilot IMI is called National Additive Manufacturing Innovation Institute (NAMII). To enable the NAMII, five government agencies (DOD, DOE, DOC, NASA and NSF) were brought together and a consortium was selected to co-invest the necessary resources. With the establishment of the first seven IMIs[6], the federal government invested up to US$500 million whilst other parties amounted up to US$1 billion (see www.whitehouse.gov/the-press-office/2015/08/28/fact-sheet-obama-administration-announces-new-flexible-hybrid).

Though analyzing each institute would be out of scope, we should sum up some common features: federal agencies play a key role (as well as US-owned firms); they all deal with enabling technologies; and they contribute to future reduction in the costs of acquiring technologies, energy consumption, etc.

4.1.3 Conclusion. By now we must emphasize some valuable aspects. Also they may be relevant for comparing USA and Germany, and to point out preliminary recommendations for Brazil.

It is worth mentioning that the American white papers assign an explicit role to the government in boosting the development of advanced manufacturing. In particular, the defense, energy and health departments work together with the institutes to provide effective demand, enabling the IMIs.

Clearly the Department of Defense has a major role. Currently, the DOD accounts for half of the federal spending on R&D and operates through major programs and agencies. Obviously, the USA has huge concerns with national security and it permeates several
initiatives (advanced manufacturing being one of them). Given their unique implications, DARPA and DOD are strategical to the success of the advanced manufacturing initiative:

Historically, Federal technology investment […] has been crucial to the creation of many technologies that have created new industries in the United States. Such investments, commonly supported by the Department of Defense, Department of Energy, National Institutes of Health, NASA, and National Science Foundation, have helped spawn entire industries. (PCAST, 2011, p. 17)

In light of this it is difficult to argue against the proposals to increase the funding of several departments and agencies as they intend to support solutions to the challenges imposed by the advanced manufacturing initiative. Complementary measures include incentives for private R&D, financial incentives, and support for education/training. We may also note that the US’ ability to succeed is enhanced by a strong industrial base and the strengthening of high-tech segments. Certainly, already having national (large and mid-sized) companies paves the way.

In analyzing the American approach, one must note that, besides ensuring stable effective demand, the government also plays a particular role in coordinating and mobilizing agents and resources. One can also identify many measures toward a mission-oriented problem solving approach, stimulating specific projects that benefit the American industrial sector.

4.2 Germany and industrie 4.0

4.2.1 A bird’s eye view. It is well known that for almost two decades after the Second World War, the German economic growth was carried by massive investment in strategic industries. O’Sullivan et al. (2013) recall that the German manufacturing sector accounts for more than a fifth of the country’s total value added. More recently, Germany also emerged as a leader in new technologies.

As Andreoni (2016) recalls, some renowned companies are world leaders in various segments, but there is also a dense network of relatively smaller companies which is extremely relevant to the economy. In fact, many Mittelstand companies are technology-intensive and market leaders in their niche, although they remain completely unknown to the general public[7].

Historically, German industrial development has benefited from some key elements. Following Chang et al. (2013) and O’Sullivan et al. (2013), the industrial sector is traditionally backed by a highly organized institutional infrastructure. Many of them have historical roots and are actively supported by public resources. Among others, one can point out the wide network for R&D support, initiatives for improving technical capabilities, access to credit, the vocational system and the role of foreign trade agencies.

Andreoni (2016) highlights the special role of Fraunhofer, a post-war network of institutes, being one of the major pillars of German industrial policy. The institutes are widely known for addressing relevant technological challenges for the industrial system. A second pillar consists of the financial infrastructure composed of public banks focused on financing the industrial sector. This network is not only made by federal actors – länder also play a relevant role – and is essential to the Mittelstand. Finally, the author highlights some regulations on the industrial relations (Hancke and Coulter, 2013).

Although these traditional elements have been present for a fairly long time, German capitalism underwent relevant changes since the 1990s. Until the beginning of the 2000s, the country was considered the “sickman of Europe” but then became a successful model. As stated by Bastasin (2013, p. 2):

[…] the entire German production system had to and was able to strengthen its export orientation, while facing the major geopolitical changes that have directly involved the country; the German reunification, the european monetary unification, eastern Europe opening to international trade and, finally, the entrance into the markets of large areas of the world up to the full development phase of globalization.
There is a rather long debate about the reasons for the German success, from market reforms to technological superiority coupled with outstanding export performance. According to Cesaratto (2010), there are a number of reasons for the recent external performance. Among others, we must name the European macroeconomic environment and Germany’s integration with the peripheral countries of Eastern Europe. Exports, especially within Europe, appear as the most dynamic component of demand. These are essential aspects, especially considering the restrictions on fiscal policy (Maastricht Treaty) and the low dynamism of domestic consumption (wage compression and growing inequality).

Indeed, wage compression and also the fact that the German exchange rate (since the implementation of the Euro) is devalued vis-à-vis other European countries make German exports more competitive than their European competitors. Nonetheless, Storm and Naastepad (2014) and Dauderstädt (2012) argue that the products with the best export performance are those whose competitiveness is not mainly related to prices.

In this sense, Germany’s industrial capacity guarantees the exports’ competitiveness, especially within Europe, which happens to be its major market. According to Bastasin (2013, p. 5):

German competitiveness derives from the acquisition of comparative advantages in a rather large number of specialized categories of products. In capital goods, durable consumer goods and pharmaceutical products, German firms hold large shares of the world markets. Germany has thus increased exports to the rest of Europe, maintaining its traditional European subcontracting chains, especially in non-euro Visegrad countries.

As mentioned above, Germany’s leading position is a result of various elements, especially since the formation of the European Union. The legislation on the European single market imposed unique standards for products and services exported under the common market. What used to be “only” a non-tariff barrier has become a huge advantage for exports because of its technological superiority and the ever since strengthened ability to set standards.

Another important structural change was the transformation of German companies into large global groups. Since the 1990s many companies started to acquire facilities and firms in the neighboring countries, setting up their “European value chains” – as opposed to the so called “global” value chains. Taking advantage of its central position in Europe, its excellent infrastructure of ports/airports and its tradition on trade promotion, the country has turned itself into an intra-European hub. Large companies began to import more intermediate goods, concentrating the assembly’s final steps in Germany and exporting final goods with strong technological content.

Another relevant factor was how Germany benefited from changes in the patterns of global demand. Originated basically from the ongoing process of income concentration, both in Europe and globally, these changes favored the German industrial structure, also encouraging the demand for “luxury” consumer goods.

Dauderstädt (2012) argues that the pursuit for international competitiveness is almost an “obsession” for Germany. Nevertheless, it is worth emphasizing that the economic policies do not add up as a deliberate and coherent strategy. There is not precisely a strategic actor, but instead a common effort of the state, companies and unions[8].

Therefore, to comprehend the “new” industrial strategy, one must first understand Germany’s overall context. It is in this context that the German strategy takes place, and aims to deepen the country’s leading industrial position – by stimulating and expanding the technological competitiveness of its firms and by strengthening its non-price competitiveness.

4.2.2 The German approach. In light of the above, there are ongoing initiatives aiming at Germany’s industrial future. The background for the German initiative is composed of a series of general concerns translated into the ambition to reinforce global (primarily European) leadership.
Andreoni (2016) points out that the German economy underwent some transformation cycles. The first recent cycle occurred in the early 2000s and emphasized environmental issues, energy efficiency and stimulus to renewable sources. Since mid-2000s, Germany underwent three major cycles, whose guidelines can be found in the High-Tech Strategy. The translation of this general plan into specific measures encompasses the federal government, Länder and European institutions in several levels.

Bundesministerium für Bildung und Forschung (BMBF, 2010, 2014) states that the High-Tech Strategy was built on a national consensus sharing a common vision on the innovation process and the need to create new technologies, consolidating global leadership and opening new possibilities for the industrial sector. The initiative is coordinated by the government and has the participation of important companies (e.g. Siemens, Volkswagen, Bosch, etc.), mainly German-owned.

The strategy aims to solve challenges posed by globalization (“Germany cannot compete on cost”, as Andreoni, 2016, pp. 23-24 recalls) and is designed to explore opportunities posed by specific segments and cross-technologies. The High-Tech Strategy emphasizes the need to secure new markets through a mix of mission-oriented projects and export promotion initiatives.

Germany intends to present itself as a solution provider for many global challenges – either opening/creating markets or deepening the existing/dynamic ones. Several actions are derived from major themes (fields of action), and both the development of enabling (key) technologies and measures to improve the “general conditions” for innovation are encouraged[9].

Figure 3 illustrates the proposed framework.

Currently, the priorities are: digital economy and society; sustainable economy and energy; health living; intelligent mobility; and civil security. As summarized by Figure 3, both key technologies and the general conditions are cross-cutting issues that span all fields of action. A central issue of the strategy is to direct research and innovation policies to solve specific “missions.” To this end, specific (forward-looking) projects are associated with the major themes.

Of course, there are many specific examples, but whether achieving or not the targets, BMBF (2014) highlights that each of them looks for “systematic solutions that enhance our quality of life, protect our bases for life and give our industry competitive advantages in important lead markets” (BMBF, 2014, p. 50). Figure 4 illustrates some projects.

Let us now turn briefly to the topic of the digital economy, which deals with the integration of digital technologies with industrial applications. Such integration is seen as a decisive factor for the competitiveness of the German economy. Only underneath this broad topic we find the industrie 4.0.
Acatech (2013) recognizes that Germany’s industrial strength derives from its specialization in innovative technologies. The document states that the accumulated capabilities in engineering, manufacturing and information technologies allow the country to be a leader in the manufacturing engineering industry. Generally speaking, Acatech (2013, p. 5) emphasizes cyber physical systems which, in the manufacturing environment, comprise smart machines, sensors, storage systems and facilities capable of autonomously exchanging information and triggering other actions. Among other things, industrie 4.0 is associated with the resolution of important problems and aims to increase productivity at the firm level.

A key element of the strategy is the adoption of a “dual” strategy by Germany (Acatech, 2013, p. 29). Dual in the sense that: the utilization of cyber physical systems brings efficiency to domestic production and the development of cyber physical technologies represent an opportunity for companies to export. Therefore, the country can benefit from its strong industrial base and excellent research environment.

Rather than understanding each and every detail, it is important to understand the general framework as well as its mission-oriented feature. BMBF (2014, p. 36) underlines the relevance of key technologies “due to the economic leverage they can develop” (BMBF, 2014, p. 36) and include the digital technologies as critical. Also, BMBF (2014) makes explicit reference to the relationship between these key technologies and the maintenance of the German leading position as the factory of the world.

4.2.3 Conclusion. Within the conceptual and institutional frameworks, the initiatives are materialized in the forward-looking projects, of which industrie 4.0 is “merely” one of them. Similar to the American case, such projects can be seeing as mission-oriented, and the development of key technologies are “the drivers of innovation and the basis for new products, processes and services” (BMBF, 2010, p. 9).

At first glance, one could argue that the proliferation of “smart” factories and the adoption of these technologies would be driven by the domestic industry itself. Indeed, embracing new technologies can bring efficiency gains and Germany has numerous modern companies that may be able to absorb new technologies. However, the German economy does not show exuberant growth and traditionally relies on exports. The latter is the component of effective demand that can truly enable and scale up the German strategy. This interpretation appears to be in line with the country’s excellent export performance and its link with European value chains. In addition, it is directly related to the aforementioned explicit orientation of seeking new markets, even in emerging countries.

Source: Adapted from BMBF (2014)
Moreover, a possible new feature is that Germany will not only place itself as a product and technology exporter, but also as a “producer” (or EPC contractor) of smart factories. EPC contractors commonly have a special role defining from which companies will be demanded the equipments/solutions. We can recall Simon (2009, p. 108) as: “(w)e often hear that China will become the ‘factory of the world,’ an assertion that will probably come true. But hardly anyone asks the ensuing question, ‘Who builds this factory of the world?’”

Although Germany’s federal government does not act exactly like its American counterpart, it still plays a prominent role. This is a fact both with regard to the coordination of a diversity of agents and the provision of effective demand. In fact, the High-Tech Strategy launched in 2006 committed itself to about €4 billion per year for the development of enabling technologies; the revised 2010 High-Tech Strategy allocated more than €8 billion for the recent period of 2012-2015 (see www.gtai.de/GTAI/Navigation/EN/Invest/Industries/Smarter-business/smart-solutions-changing-world, t=high-tech-strategy-2020-action-plan, did=575914.html).

In addition, the German innovation ecosystem strengthens the industrial sector with numerous supports for R&D, skilled labor and highly ranked research institutes. Similarly to the USA, Germany benefits from its robust industrial base, the current international insertion and the ability to set standards, securing markets and establishing barriers.

5. Final remarks

5.1 What’s really new? Is there anything old?
Away from the prevailing views, the present paper brings a different approach. Definitely, it would be a misconception to view the advanced manufacturing debate as a global strategy jointly undertaken in a coordinated manner. In fact, it is precisely the opposite of the latter (naïve) position: they consist of national policies aiming at industrial leadership – which, after all, intend to maintain the global preponderance of those countries.

By means of our interpretation, it is clear that there is no “exogenous” tendency for technological evolution, neither autonomous nor unavoidable. Instead, we find deliberate policies to create new markets and build the future by incorporating enabling technologies. Thus, the non-spontaneous nature of the technological progress is emphasized.

Having addressed the general motivations and two particular experiences, we can list some similarities between the USA and German initiatives. Table I summarizes the main points.

Generally speaking, the initiatives consist in a set of policies that brings innovation in its core. As already mentioned, they support and stimulate the emergence of new enabling (key) technologies, a crucial element of both strategies. These technologies are at the basis of

<table>
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<th>Main common features</th>
<th>USA</th>
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<td>Drivers</td>
<td>Government</td>
<td>Exports</td>
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<tr>
<td>Enabling (key) technologies</td>
<td>Additive manufacturing, nano and biomanufacturing, composite and lightweight materials, wide-bandgap semiconductors, photonics, next generation electronics, etc.</td>
<td>(Reinforce) Institutes like Fraunhofer</td>
</tr>
<tr>
<td>Innovation infrastructure</td>
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<tr>
<td>Fields of action</td>
<td>Defense (dual), energy, health, etc.</td>
<td>Renewables, health, mobility, security and communication, etc.</td>
</tr>
<tr>
<td>Industrial base</td>
<td>GE, Boeing, Lockheed Martin, IBM, Honeywell, etc.</td>
<td>Siemens, VW, Kuka, Bosch, Festo, etc.</td>
</tr>
</tbody>
</table>

Table I. Common features (USA x Germany)
similar initiatives from several mature economies. These technologies may enable new economic activities or revitalize traditional ones.

Loural (2014) associates these technologies with platforms, “technologies on which other technologies, processes and products can be developed” (Loural, 2014, p. 12, our translation). Following Tassey’s (2008) concept of generic technologies, which provide “a knowledge base from which particular sets of applications and other technologies can be developed” (Loural, 2014, p. 14, our translation).

Secondly, it is clear that there are massive investments involved, especially by the federal government – though to a greater degree in the USA. These initiatives call for a special role for specialized institutes dedicated to the development of enabling (key) technologies and stimulate the industrial commons.

Moreover, the institutional structure related to the innovation ecosystem strengthens the industrial sector. This structure is supported by federal and local authorities and provides an excellent research environment, skilled labor and various forms of R&D support.

Among many things, the federal government plays a particular role in terms of coordinating and mobilizing agents and resources. With regard to the provision of an effective demand that allows the development of key technologies, the US agencies’ role is an unequivocal example. The German federal government also plays a prominent role (together with länder), although reinforcing Germany’s exporting feature is crucial. As already emphasized, one may note that many measures are directed toward problem solving, starting from a mission-oriented approach.

In both cases we can benefit from PCAST’s (2011, p. 9) definition and state that both countries’ efforts aim at developing a “family of activities that (a) depend on the use and coordination of information, automation, computation, software, sensing, and networking, and/or (b) make use of cutting edge materials and emerging capabilities enabled by the physical and biological sciences, for example nanotechnology, chemistry, and biology.”

In addition, it is worth noting that both countries benefit from their international insertion and industrial base – particularly from their national and hidden champions. The capacity to develop high-tech capabilities is boosted by the existence of (large and mid-sized) companies coupled with a strong industrial base – where national ownership is more of a rule rather than the exception.

We can, thus, emphasize once more that the identification and development of enabling technologies acquire a relevant role. Relevant, also, as part of the strategy to create and/or command new markets.

Let us now consider on what can be truly new. In this sense, what could distinguish the current period of technological progress is the convergence/combination of enabling (key) technologies to generate new products and processes that could lead to more disruptive changes.

Nevertheless: is there anything “old”? In light of the current global competition and changes in the nature of production, several countries adopted repositioning strategies. In this sense, we are once more facing another manifestation of the old debate on industrial policy – now revisited in order to stimulate reshoring. Clearly, mature economies themselves have rehabilitated industrial policy bringing together: a mission-oriented view; emphasis on the combination of enabling technologies; and strengthening of collective capabilities.

Indeed, given the dynamics stressed in this paper, the idea of a “new” revolution deserves a skeptical view. One may admit that it is premature to categorically claim for a (fourth industrial) revolution. Obviously, the future is full of uncertainties and it is difficult to predict the maturity of this or that approach. It is clear, however, that there is still a long transition and that the future is under construction. Although we recognize that significant changes are on the way, it is possible that they represent a new step of a long process already in progress – made possible by information technologies. Thus, it may be wiser to interpret this as part of
an evolutionary process, full of incremental innovations and characterized by a combination of technologies. Actually, many of them are already known or, as OECD (2015, p. 10) puts it, “have been around for a while”[10]. Many technologies will coexist in a hybrid form, coupling new and traditional products/processes and mature and emerging technologies. Some of these hybrid technologies themselves are still close to their infancy.

5.2 Some preliminary recommendations for Brazil

The present study focused on exploring the main international experiences. By exploring these cases we may also gain perspective for a future Brazilian strategy. Considering the elements summarized in Table I, we now list analytical questions that could guide a possible incursion. Only general questions will be elaborated, in order not to escape from the original scope. Evidently, future work may further explore these questions.

First, it is critical to identify which enabling technologies are the most relevant to Brazil. Though acknowledging that several technologies are naturally transversal and may span the whole economy, we must consider that the opportunities may be greater in some “niches” than in others. In this way, which sectors or activities could anchor a Brazilian strategy? What are the specific forward-looking problems that could be responsible for boosting demand?

Briefly, and not exhausting the topic, it should be noted that Brazil is particularly well positioned in the oil and gas sector and has a huge potential when it comes to pre-salt oil reserves. Similarly, the country has a “natural” vocation for agriculture and also owns a unique asset such as the Amazon biome. Renewable energies can turn the country to new technologies and markets. As is well known, Brazil has huge social deficits in, e.g. health and mobility and these are also issues that could guide national challenges.

Second, where would the effective demand come from? In the USA, public procurement is crucial and the domestic market may assume an important role. In Germany, crucial is its export orientation associated with its role within Europe. Clearly, the Brazilian international insertion is different, but it is somewhat basic to analyze the regional role that it can assume and has assumed – in some cases a global role could also be feasible. In addition, it is worth asking: is it necessary to structure a medium/long-term procurement policy that stands behind the challenges to be addressed? In the long term, would there be an economic “will” for this? Most important, would there be political cohesion to sustain the necessary actions (and effective demand) in the long term?

It is worth recalling that something has been done in the recent past, e.g. with Inova Empresa and with the Programa Nacional de Plataformas do Conhecimento – PNPC. The first involved public calls for supporting priority sectors and technologies. The second had among its goals to create knowledge platforms in selected areas, using public procurement and strengthening research institutions.

On the latter, one must compare what ideally could be done vis-à-vis how the country can benefit from the existing structure. In light of what has been explored by now, we can encourage the creation and strengthening of commons in Brazil. As example, we should highlight the ongoing initiative consisting of the creation of a series of regional institutes with specific focus – the Senai Institutes of Innovation (ISI) and the Senai Institutes of Technology (IST). Conceptually, we could argue that initiatives such as PNPC and ISIs/ISTs are “baby steps” measures willing to place Brazil at a level similar to that of the mature economies. In addition, Brazil has a variety of traditionally important institutions and instruments, such as Embrapa, Cenpes/Petrobras, ITA, Finep, etc.

In any case, stimulating the development of enabling (key) technologies involves mapping the relevant institutions and companies. In this respect, the role of the local entrepreneurial base should also be examined, considering its fragility and heterogeneity. In particular, given that foreign multinational firms accounts for a significant part in
Brazilian industrialization, it should be asked whether this puts Brazil in a different position from Germany or the USA. Whatever the answer, one cannot but question: do the characteristics of our industrial base matter in any particular way?

Of course a Brazilian strategy would be a deliberate effort, which obviously could go right or wrong; there are many cases where industrial policies have failed. Part of its success depends on political support for essential measures. As Chang (2009) recalls, without it, little progress will be made in regard to effectively promote the industrial sector. Furthermore, the relationship between classes and institutions is relevant, but one must be careful about the risk of being “captured” by the interests of specific groups. In this line, Chang, Andreoni and Kuan (2013) rescue Peter Evans’ famous notion of embedded autonomy, warning about the risks of the government becoming just an executive committee of the bourgeoisie.

Finally, it remains to be seen if this will be one of those situations in which the industrially most developed nation only shows the least developed image of its own future and if, paraphrasing Chang (2004), mature economies will kick away the ladder of the others.

Notes

1. This view prevails, even though there is a long-standing controversy in the economic literature about the relationship between technology and employment. Recently, Frey and Osborne (2013) highlighted that computerisation may affect many jobs.


3. It is worth noting that permanent deficits are not a major macroeconomic problem for the USA, as it can finance deficits in its own currency (see Serrano, 2008).

4. Take the software industry, for example, many companies outsourced simple tasks to India in order to reduce the costs of software development; but then Indian companies have developed skills related to software engineering and now can handle much more complex tasks.

5. To say the least, PCAST (2011)/s “business environment” is a vague expression, but they understand that tax incentives will be needed to attract investments in innovation. Another related topic is the quality enhancement of the workforce.


7. See Simon (2009) for an interesting incursion on the hidden champions.

8. As the author points out, German industrial policy finds external and internal limits. The former refer to restrictions imposed by the European treaties (limiting subsidies, tariffs and non-tariff barriers) and the latter being a strong ideological opposition to state intervention.

9. We may also note that the strategy was explicitly built “with the aim of tapping emerging markets” (BMBF, 2010, p. 5).

10. For a similar interpretation, see Loural (2014) and Kupfer (2016).

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Further reading


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Factors and characteristics that influence consumers’ participation in social commerce

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Abstract

Purpose – The popularity of social networks has created business opportunities to the electronic commerce environment, being recently named as social commerce. The purpose of this paper is to analyze – from the perspective of the consumer – the main factors and characteristics (personal or related to the products bought) that have influenced consumers to participate in social commerce buying, recommending, comparing and sharing information about products and services in online marketplace and communities.

Design/methodology/approach – The study is characterized as an exploratory descriptive research, operationalized through a survey, applied to 229 participants of the social network Facebook. The research involves a qualitative stage for identifying potential variables that influence the participation of consumers in social commerce, followed by a quantitative one, including data collection procedures, validation and data analysis.

Findings – The results show trust, perceived usefulness and information quality as the factors that most influence consumer participation in social commerce, being trust in the website the main predictor. Concerning the characteristics, the findings also show that more expensive products and products classified as computers and electronics use ratings, recommendations and comments online more intensively than books, travel, household appliances and fashion products.

Research limitations/implications – As limitations of the study, the authors highlight the small number of interviews conducted during the qualitative stage, which may have left out other relevant factors of the analysis on consumers’ participation in social commerce. Another limitation refers to the selection of the participants of the study; all members of the social network Facebook are identified by the contact net of the authors – though it has been tried to enlarge this contact list by requesting the respondents to share the questionnaire link with their acquaintances, we should be cautious about the generalization of the results.

Originality/value – The study proposes an instrument to identify factors and characteristics that are taken into consideration by the consumers when participating in social commerce. Such a tool can be replicated by firms included in this type of commerce, in order to evaluate the behavior and perception of their customers about their performance in the online environment. This study also highlights trust, information quality and perceived usefulness of the website as the most influencing factors of the consumers’ participation in social commerce. In addition, the authors identified that more expensive products and products classified as computers and electronics seem to use more intensively ratings, recommendations and comments online provided by other people. This fact supports the research literature that (positive or negative) online recommendations influence the consumers purchase behavior, reducing uncertainties about the products and increasing credibility and trust.

Keywords Social media, Participation, Social commerce, Electronic commerce, Social networking sites (SNS)

Paper type Research paper
Introduction
During the last few years, the growing popularity of social networking sites (SNS) has generated several changes, both socially and electronically, originating a new type of e-commerce, which has been changing the way online shopping has been done, called social commerce or s-commerce (Zhou et al., 2013, Chen and Shen, 2015). Social commerce promotes transactions with the support of a large network of online peers (formed by friends, colleagues, acquaintances or unknown people) who share electronic shopping experiences related to products and services information. In this environment, social media (represented by SNS and social shopping, blogs, Wikipedia, as well as content-sharing sites like the YouTube) combine different content generated by users through many social network resources to create, initiate and spread information within online networks (Tang et al., 2012). Social commerce is related, then, to the use of social media to perform business transactions and commercial activities driven mainly by social interactions and users contributions (Liang et al., 2011; Wang and Zhang, 2012).

The option for social commerce is given many times due to the amount of trustworthy information on certain products and services which are exchanged by their own members and that reflects mainly at obtaining the best prices in purchasing (Kim and Park, 2013). Social media users are encouraged to participate of social commerce, selling, comparing, recommending and sharing information about products and services in both online and offline marketplaces, and in communities. They can also exchange information with their friends and communities about product factors and characteristics that can help in purchasing decisions (Zhou et al., 2013). Nowadays, more than 90 percent of Brazilian internet users are connected to at least one social network, being Facebook the most used (Secretaria de Comunicação Social, Presidência da República, Brasil, 2015). According to Rakuten (E-commerce News, 2014), a company specialized in electronic commerce, 66.1 percent of people evaluate and recommend products regularly on social media sites, which shows the growing use of social media in the community interactions and electronic commerce activities (Hajli, 2015). The same report has identified, though, that some markets have seen “social fatigue” set, term used to indicate a drop in the number of people recommending products that they have bought on social networks (Lee et al., 2016).

From the perspective of the organizations, social commerce has a great potential to generate value from online social interactions between consumers (Stephen and Toubia, 2010). According to Burson-Marsteller (2013), 87 percent of the world’s major companies are in at least one social network. In the academic field, social commerce has been identified as a relevant research theme, especially because of the potentially income generation for organizations (Turban et al., 2010). However, several companies that participate in the electronic commerce market are still trying to find out which factors influence consumers to participate in social commerce (Turban et al., 2010; Zhou et al., 2013; Zhang et al., 2014), either buying, recommending, comparing or sharing information about products and services in online markets or communities. Overall, the majority of publications on this phenomenon appeared in commercial magazines, blogs, posts, industry reports and publications of practitioners, concerning the academic field at conducting studies dealing with its theoretical foundations, concepts and features, evolution and applied business models (Liang and Turban, 2011; Rosa et al., 2014; Friedrich, 2016; Busalim and Hussin, 2016).

Although some studies have empirically explored the main reasons of adopting social commerce by consumers, the literature does not present a clear understanding of which factors have influenced consumers to participate in social commerce, suggesting that new studies on this theme are needed (Turban et al., 2010; Zhou et al., 2013; Friedrich, 2016). Thus, assuming social commerce as a new and promising theme for future studies in
business, as well as in the field of information systems, marketing and consumer behavior, we propose the following research question:

*RQ1.* What factors do influence consumers to participate in social commerce?

The research aims to analyze – in the consumers’ perspective – the main factors and characteristics (personal or related to the purchased products) that influence consumers on their participation in social commerce, either by purchasing, recommending or continuing to use the website.

**Literature review**

This section provides an overview of social commerce, contextualizing its evolution, as well as the factors that have been highlighted in the literature as potential consumers’ influencers in social commerce.

**Social commerce**

Recent advances in IS area and the emergence of the Web 2.0 technologies have brought new opportunities to electronic commerce (Hajli, 2015). The social connections and people interactions on the internet, especially in social networks, have developed e-commerce to social commerce, which has enabled companies to reach consumers with greater efficiency than traditional retail outlets by integrating user-generated content (Zhou *et al.*, 2013).

Current literature provides a variety of social commerce definitions. Stephen and Toubia (2010) define it as a way of social media based on internet that allows people to actively participate in the marketing and selling of products and services in online markets and communities. The social networks on the electronic commerce are presented by the diversity of communication channels and available social features, such as products rating, feedback, forums, discussion groups, participant communities (in games) and rating about quality, reliability and approval, as the bottom Like on Facebook.

According to Liang and Turban (2011), the social commerce websites have three major attributes: the presence of social media technologies, community interactions and commercial activities, making possible the information exchange about products before the actual purchase. According to Rosa *et al.* (2014), there are two main forms of social commerce. The first one is characterized by sites of social networks that offer space for advertisement and transactions such as buying and selling products and services, opening its interfaces to facilitate this process, like Facebook, LinkedIn and YouTube. The second is characterized by traditional e-commerce websites that use social networking capabilities to take advantage of its power of reach and trust, like Amazon.com, Netshoes, Ponto Frio, Americanas, etc.

**Factors that influence the participation of consumers in social commerce**

Social commerce is closely related to e-commerce. In this sense, the basic theories used to explain the e-commerce adoption are also used to explain the participation of the consumers in social commerce (Liang *et al.*, 2011; Wang and Zhang, 2012). Based on the IS literature, the participation in electronic commerce can be defined as “the consumers engagement in online exchange relationships with Web vendors” (Pavlou and Fygenson, 2006, p. 115).

In the case of social commerce, the participation of consumers includes both direct and indirect commercial transactions. Direct transactions refer to the consumer’s buying behavior during the purchase phase of his/her decision-making process. On the other hand, indirect transactions include electronic word-of-mouth (e-WOM) referral activities within the defined purpose, information search, selection process and after-sales of customer decision-making process, being characterized by requests and business information sharing on social media (Zhang *et al.*, 2014).
Aiming at identifying factors that influence consumers in the participation of social commerce, we found different studies addressing several aspects associated with this theme. In our search, we found a systematic review elaborated by Friedrich (2016), who identified in 61 academic publications a list structured by factors related to the adoption of social commerce by consumers (Figure 1). We also revised other studies, which completed the list of variables with those aspects not found on Friedrich's (2016) study.

One of the factors that have received most attention in the literature about social commerce is trust. Gundlach and Murphy (1993) suggest that the variable trust is the most accepted as basis for the human interaction and for the exchanging relations, making the person believe that the other part will perform their obligations without acting badly. In this sense, social commerce by including social interactions of the consumers can act as a tool to increase the trust on companies. Thus, it is understood that trusting a website can be an important factor that motivates the consumer to participate in social commerce.

The social commerce components are another relevant factor, being defined by Hajli (2013) as the presence of comments, ratings and reviews about products – that are referred by many authors as the word-of-mouth. Berger (2014) defines word-of-mouth as an informal communication directed to other consumers about the purchase, use, characteristics of certain products and services or their sellers. This communication involves the exchange of information done directly between individuals, being positive or negative, not requiring any other means. The advances of the internet has extended consumer’s options for collecting product information from other consumers and provides new opportunities for consumers to offer their own consumption-related advice by engaging in e-WOM (Hennig-Thurau et al., 2004). In this sense, Grund and Gürler (2008) suggest that the system of recommendation comes up as an important instrument for the construction of the sellers' reputation, aiming to reduce the consumers' uncertainty about the products. So, companies should identify and encourage buyers and opinion influencers to provide positive information about their products through their SNS (Tubenchlak et al., 2015).

The perceived usefulness of the website is also identified as a relevant factor of social commerce. Its concept was introduced in the IS field for the first time by Davis, in 1989, and has been tested and validated by several researchers since then. Davis defined that people tend to use or not certain technology, as they believe that it will help them perform their activities better. Venkatesh et al. (2003) defined perceived usefulness as performance expectation, that is, the level in which the use of a technology will provide benefits to the users on performing certain activities and as a person believes that the use of a certain system increases her/his performance at work, therefore, being considered a factor that motivates consumers to participate in social commerce.

**Factors**

- Trust
- Usefulness
- Social presence
- Social influence
- Social commerce components
- Website quality
- Ease of use
- Value
- Centrality

**Outcome variables**

- Using intention/behavior
- Buying intention/behavior
- Sharing intention/behavior
- Continuance intention/behavior
- Visiting intention/behavior

**Source:** Adapted from Friedrich (2016)
Another important factor that can motivate the consumer to take part in social commerce is the system or website ease of use. Davis (1989) theorized as perceived ease of use when users notice that it is easy to use a system and does not demand great efforts. Such definition gets close to the one presented by Flavián et al. (2006) that associate the perceived usability of a website or system to the perception of the ease of understanding the structure of a system, the website simplicity of use, the speed users can find what they are looking for and the ability of the user to control what they are doing when surfing in the website.

Kim and Park (2013), on the other hand, suggest that the quality of the information available in the website is also a determining factor of the consumer’s trust in social commerce. The quality of a website, for example, can be related to the relevance, accuracy, comprehension and utility of the information provided by it. So, the consumers tend to trust in websites that provide precise and timely information, motivating them to participate in social commerce.

It is also highlighted in the literature the reputation as another important factor to motivate consumers to participate in social commerce. According to Doney and Cannon (1997), the reputation of a company is defined as the measure in which consumers believe that the company is honest and concerned about its customers. In social commerce, users tend to consider the reputation of a company as an important factor while evaluating their trust in the company and products and services purchasing (Kim and Park, 2013).

Methodology
The study is characterized as an exploratory descriptive research, operationalized through a survey, applied to 229 participants of the social network Facebook. From this total, we excluded five cases of the study for presenting too many questions in blank or using only one point in the Likert scale in all answers, totaling 224 valid questionnaires. We requested to the respondents to select one of their last online shopping or research experiences to answer the proposed instrument. We performed the research in the first semester of 2016, involving a qualitative stage to identify potential variables that influence the participation of consumers in social commerce, followed by a quantitative one, including data collection procedures, validation and data analysis. Next, we present in details both stages of the research.

Qualitative stage
At the qualitative stage we performed in-depth interviews with eight experienced consumers of products and services acquired through electronic commerce websites. We selected the interviewees by convenience, identifying consumers with different sociodemographic profiles (in terms of gender, age, schooling, occupation, income and products bought through internet). The interviews were done individually lasting approximately 20 minutes, aiming at identifying characteristics and aspects taken into account by consumers when participating – or not – in social commerce. For such, we developed semi-structured guidelines, containing questions such as online shopping frequency, the kinds of products they are used to search or buy on the internet, the most accessed websites and the characteristics considered most important to perform the purchasing. We also requested that the interviewee described his/her last searching online experience and which factors influence them when deciding to buy or not a product. Finally, we asked the respondents to analyze if comments and ratings about the products available on the websites and social networks influenced on their purchasing decision. We developed the interview guidelines based on the theoretical background present in the research besides the adaptation of some questions from other instruments applied in earlier studies (Kim et al., 2008; Kim and Park, 2013). We used the categorical analysis technique as
This stage confirmed some of the most frequent factors cited in the literature as those influencing consumers' participation in social commerce. We identified that the majority of the interviewees emphasize the website transaction safety as fundamental when doing their shopping, as well as they first search for complaints about the visited websites, claiming trust in the website as an important requirement to be achieved when purchasing. The fact of the website is a well-known site or does not have many complaints is a way of ensuring the consumer that the purchasing is safe. Regarding the kind of products, the interviewees informed that they buy all sort of products on the internet, such as household appliances, electronics, books, airline tickets, furniture, clothes and beverages. Yet, they highlighted the product price as another elementary factor on the purchasing decision, as well as the importance of delivery time, costs of shipping and means of delivery. In this case, the customer can even abandon the purchase due to a longer delivery time than the concurrent.

The qualitative stage results suggest the following factors as influencers of the consumers' participation in social commerce: price, transaction safety, trust, information quality, ease of use, perceived usefulness, social commerce components, product delivery and reputation.

**Quantitative stage**

From the results obtained on the previous stage, we proceeded to the development of the questionnaire. With exception of the aspects regarding the product delivery construct, all the other influencers were identified previously on the literature review and then could be operationalized from scales already validated (presented on Table I). Concerning the new variable identified (product delivery) all items were proposed based on the interviews and then adapted into question form.

In this study, we decided for the exclusion of aspects suggested by the literature that were not confirmed in the qualitative stage, proposing nine different constructs that have influenced consumers' participation in social commerce, which are: reputation, price, trust, information quality, perceived ease of use, perceived usefulness, transaction safety, social commerce components and product delivery.

First, we translated the items adapted from the other studies from English to Portuguese and then we re-translated to Portuguese (a back translation process). The differences found between the two versions were discussed to minimize any possible inconsistency due to its meaning, being after evaluated by three experts. As the cost of the product certainly influences the purchasing decision of the consumers (Churchill and Peter, 2000) and we did not use a parameter of price comparison with other websites, we decided to use the construct price only comparing it with a higher or lower use of comments, ratings and recommendations on the shopping decision of a certain product.

We operationalized the items referred to the purchasing process or product searching on the internet using a five-point Likert scale ranging from “strongly disagree” (1) to “strongly agree” (5). The same scale was used to evaluate consumer's participation in social commerce, regarding his/her intention to buy on the website, to recommend the website and to keep using the website. We added ten questions related to the profile of the respondent (such as gender, age, schooling, marital status, place of living, family income, social networks that uses, frequency of use, purchasing product category and frequency of shopping on internet) and three more questions related to the product searched and/or bought (type of product – for later categorization – the average price of the product searched/bought and, finally, if the product was bought or just searched).
After the data collecting instrument was previously determined, we conducted a pre-test with six members of our research group focusing on identifying possible formatting problems and/or understanding of the questions on the questionnaire. Furthermore, we made some adjustments on the instrument, and sent messages through the social media platform Facebook inviting different members of the net (from the circle of friends and acquaintances of the researchers) to participate of a study on electronic commerce and social networks requesting them to access the questionnaire through a link and, if possible, to share the invitation with their friendship network. We defined as inclusion criteria that participants should be over 18 years old and have searched or purchased a product on the

<table>
<thead>
<tr>
<th>Constructs</th>
<th>Loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reputation – Kim and Park (2013); α = 0.84</td>
<td></td>
</tr>
<tr>
<td>1. This s-commerce firm is well known 0.816</td>
<td></td>
</tr>
<tr>
<td>10. This s-commerce firm has a good reputation 0.848</td>
<td></td>
</tr>
<tr>
<td>19. This s-commerce firm has the reputation for being honest 0.820</td>
<td></td>
</tr>
<tr>
<td>27. I am familiar with the name of this s-commerce firm 0.816</td>
<td></td>
</tr>
<tr>
<td>Information quality – Kim and Park (2013); α = 0.82</td>
<td></td>
</tr>
<tr>
<td>3. This s-commerce firm provides accurate information about the item that you want to purchase 0.736</td>
<td></td>
</tr>
<tr>
<td>12. Overall, I think this s-commerce firm provides useful information 0.830</td>
<td></td>
</tr>
<tr>
<td>20. This s-commerce firm provides reliable information 0.822</td>
<td></td>
</tr>
<tr>
<td>29. This s-commerce firm site provides sufficient information when I try to make a transaction 0.822</td>
<td></td>
</tr>
<tr>
<td>Trust – Kim and Park (2013); α = 0.81</td>
<td></td>
</tr>
<tr>
<td>2. This s-commerce firm is trustworthy 0.800</td>
<td></td>
</tr>
<tr>
<td>28. I believe in this s-commerce firm 0.887</td>
<td></td>
</tr>
<tr>
<td>33. This s-commerce firm wants to be known as a company that keeps its promises and commitments 0.856</td>
<td></td>
</tr>
<tr>
<td>11. This s-commerce firm, despite having its own interests, takes into consideration what is best for me too (excluded)</td>
<td></td>
</tr>
</tbody>
</table>

| Social commerce components – adapted from Hajli (2013); α = 0.81 |
| 9. I use online forums and online communities for acquiring information about a product 0.811 |
| 18. I usually use people rating and reviews about products on the internet 0.849 |
| 26. I usually use people’s recommendations to buy a product on the internet 0.888 |

| Perceived ease of use – Gefen et al. (2003); α = 0.76 |
| 6. Learning to operate the websites on the internet is easy 0.833 |
| 15. My interaction with the websites on the internet is clear and understandable 0.852 |
| 23. It is easy to become skillful at using the websites 0.706 |

| Product delivery – research authors; α = 0.73 |
| 8. The delivery time defined by the site is attractive 0.846 |
| 25. The shipping (when) charged by the delivery of the product is fair 0.699 |
| 32. The means of delivery of the product is satisfying 0.873 |

| Transaction safety – Kim and Park (2013); α = 0.74 |
| 4. This s-commerce site implements security measures to protect its online shoppers 0.757 |
| 13. This s-commerce site has the ability to verify online shoppers’ identify for security purposes 0.709 |
| 21. This s-commerce site usually ensures that transaction-related information is protected from being accidentally altered or destroyed during transmission over the internet 0.744 |
| 30. I feel secure about the electronic payment system of this s-commerce website 0.769 |

| Perceived usefulness – Hajli (2012); α = 0.68 |
| 7. Searching and shopping in this website is useful for me 0.836 |
| 16. Searching and buy in this website makes my life easier 0.722 |
| 24. This website enables me to search and buy products faster 0.794 |

Source: Research data
internet in the last three months. The sample is classified as non-probabilistic, being the respondents selected by convenience – all members of the social network Facebook.

Following data collecting procedures, we proceeded to the validation of the scales used. Even almost all of them had been validated in previous studies, the fact of being applied in another research context, place or population demands some care and specific validation procedures. To do so, we ran the exploratory factor analysis for each scale individually, freeing the number of extracted factors. The analysis confirmed the unidimensionality of the constructs proposed on the study, once the factor loadings grouped to a single factor. It is important to mention that all constructs are considered as first-order constructs and, not necessarily, present a strong association among them, what justifies why we did not run the factor analysis between blocks – the one in which all items of the instrument are included, aiming to discriminate the factors according to a higher or lower association. We used Cronbach’s \( \alpha \) coefficients to evaluate the reliability of the scales, which scores ranged from 0.68 to 0.84 suggesting a good internal consistence of the scales for exploratory studies (Hair et al., 2005). Next, we present the results of the exploratory factor analysis and Cronbach’s \( \alpha \) for each construct (Table I). We used the statistical package SPSS for Windows 20.0 to perform the validation stages and data analysis, which are presented and discussed in the following section. To evaluate the participation in s-commerce, we used three different measures: purchase intention, recommending intention and continuance intention, being used for each one of these variables three different questions, shown at the end of the instrument (Table AI).

**Results**

First, we highlight the main characteristics of the 224 participants of the study. Concerning gender, 115 (51.3 percent) are men and 109 (48.7 percent) are women. The predominant age range is concentrated between 21 and 30 years (34 percent) and between 31 and 40 years (40.7 percent). As to marital status, single (48 percent) and married (45 percent) represent the majority of the sample. The predominant family income range concentrates between 4 and 8 minimum salaries (16.1 percent), 8 and 20 minimum salaries (39.3 percent) and more than 20 minimum salaries (37.5 percent). In relation to schooling, 25.9 percent have completed superior education and 46.4 percent post-graduation.

Besides these characteristics, we included some questions related to the habits of use and perceptions in relation to the internet and social networks. The majority of the respondents (86.6 percent) accesses SNS more than once a day, taking as a preference the Facebook (99.1 percent) and WhatsApp (93.8 percent). Another relevant information is the high percentage (46.9 percent) of the respondents that make at least one purchase a month on internet, being electronics (77.2 percent), books and magazines (63.3 percent) and products related to travel and tourism (62.9 percent) the main categories of products purchased or searched on the internet. Fashion articles and accessories (23.7 percent), electronics (17.4 percent), books and magazines (12.1 percent) and household appliances (10.7 percent) were the main chosen products evaluated in this research by the respondents – on the other hand, travel and tourism products (5.8 percent), health and beauty (6.7 percent) and domestic utility (7.6 percent) were the least chosen products evaluated by the respondents. In relation to price, 34.8 percent of the evaluated products cost between R$100.01 and R$300.00 and 29 percent cost more than R$700.01. The great majority (94.2 percent) of the respondents bought the evaluated products, while 5.8 percent only searched the product, but did not buy it.

We used descriptive analysis to evaluate the consumers’ experience with the websites where they performed the purchase or search of their products (Table II). First, we identified reputation (4.46) and perceived usefulness (4.39) of the website as the best evaluated factors by the respondents (4.46). They realize that most companies evaluated are well known among them, being familiar with the firm’s names and images. Previous studies
have suggested that a good reputation has a positive effect on the relationship between an e-commerce company and consumers, becoming a key element (Jarvenpaa et al., 2000). Accordingly, Doney and Cannon (1997) suggest that size and reputation influence consumers’ trust in the company.

Regarding perceived usefulness, respondents said that the search or purchase realized on the website has been done in a fast way, with agility, making the people’s life easier. We still found perceived ease of use of the site (4.38) as another point well evaluated by the respondents. These considered the use of the websites visited as quite easy, although the website interaction could be improved. Gefen et al. (2003) mentioned that when electronic sellers configure the websites to be easy to use and browse, they are building a relationship with the clients.

Factors such as information quality (4.35) and trust (4.34) were also highlighted as characteristics of the social commerce well evaluated by the consumers. According to
Delone and Mclean (2004), information quality is associated with the informative content of the website that, besides its relevance to e-commerce, also plays a critical role on the consumers’ adoption to the social commerce. Jaiswal et al. (2010) suggested the quality of the information is a key characteristic that influences the satisfaction of users and the loyalty to e-commerce. Gefen et al. (2003) claimed that the client’s trust is the main reason for the return of the consumers to an online store. Pavlou (2003) found that trust has a direct effect on the online purchase intention and risk reduction on e-commerce websites, putting trust as an elementary aspect in the adoption of the social commerce. Similarly, Chang and Chen (2008) claimed that trust in any kind of e-commerce, including s-commerce, can facilitate the interaction between seller and buyer, providing opportunities to the online companies achieve their objectives.

Factors such as product delivery (4.06) and transaction safety (4.06) appear with less positive evaluations, once they were well evaluated too. The question involving the means of delivery of the product was identified as a strong feature of the online companies researched, while delivery time and cost of shipping should receive more attention by the online sellers. Usually, the payment and the shipping of a product bought on the internet do not happen simultaneously; becoming more usual when the buyer pays for the product or service in advance but receiving it later, without being able to evaluate it before that (Standifird, 2001) – this segregation between payment and delivery can increase buyer’s uncertainty concerning the online shopping. Thus, when we talk about delivery capacity, it is important to emphasize that this is not only related to delivery time, but also to the product delivered. If a received product is not the expected one or if it arrives damaged, consumers expect to be easy and quick to exchange the desired product.

Regarding the transaction safety, we identified that the evaluated websites present different measures to protect their consumers, especially in relation to the electronic payment system. When the consumer chooses a desired product, he/she hopes to end the payment in a fast and safe manner, receiving the product within the scheduled time. These results are consistent with the findings of previous studies by including safety in the electronic transactions as an important component influencing the trust of consumers in social commerce (Kim and Park, 2013).

The social commerce components factor (3.14) presented the lowest evaluation by the respondents when compared to the others. We note that comments, sharing, ratings and opinions coming from other people on the internet were used moderately. Comments and opinions, specially, were accessed more frequently; however, online forums and communities still present a low degree of participation. Online communities, for example, have a great opportunity in the social context for the people to share information and knowledge (Chen et al., 2011). In this sense, they can be used as a source of know-how, where users interact in social commerce platforms in an online collaborative environment (Curty and Zhang, 2011). People ratings are another component of social commerce able to provide valuable information to the consumers; similarly, people’s comments and opinions have the potential to reduce the uncertainty and increase the customer’s trust (Nambisan, 2002).

Aiming at analyzing the influence of these different factors on the participation in social commerce, we defined as dependent variables: purchase intention, recommending intention and continuance intention of using the website. Each of these measures was analyzed individually through a regression model, verifying the effects of the identified factors on the research (independent variables) in the consumers’ participation in social commerce. We still used a general measure, calculated by joining the three previous constructs in a global factor (Table III). The regression analysis measured indirectly the influence of the independent variables on the consumers’ participation in social commerce, enabling to visualize those factors that most strengthen the purchase intention, recommending intention 

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and continuance intention. We verified the unidimensionality and the reliability of each dependent variable, which presented satisfactory values (Table AI).

We identified in all four regression models that variables such as trust, perceived usefulness and information quality appeared as the main predictors of the consumers’ participation in social commerce – being trust the main one. According to Kim and Park (2013), social commerce focuses not only on selling products and services but also in creating trust among its users, which can induce purchase and recommendation intentions, thus generating more sales. The same authors claim that trust is positively related to purchase intention. In this sense, information from the social networks can compensate the uncertainty that online shopping causes, increasing the consumer’s trust on the purchase.

Besides, Chang and Chen (2008) showed that a lack of trust can be an often barrier to the consumers purchase on websites, until they acquire necessary knowledge to develop enough trust to recommend or buy in this website.

In relation to perceived usefulness, Friedrich (2016) points out in his literature review about social commerce that the website usefulness has an important role in the adoption of the social commerce by consumers, reflecting on the purchase intention and use of the website. Hajli (2013) suggests that the perceived usefulness has influence as much on consumers’ trust in s-commerce as on consumer’s purchasing intentions.

Regarding the information quality, consumers are more likely to trust more in social commerce firms that provide accurate, useful, reliable and sufficient information on products and services (Hong and Yang, 2009). In this way, online buyers depend on information provided to them by the website, once they have limited sources of information about products and services (Kim et al., 2008).

The regression models presented a moderate explanatory power, whereof the adjusted coefficient of determination ranged between 46.8 and 53.9 percent. Interestingly, we verified that the reputation of the company influences negatively the website’s recommending intention, suggesting the higher the reputation, the smaller the intention of recommending it – perhaps because consumers understand that the firm is known, they do not see new benefits to indicate it to other consumers. Grund and Gürtl (2008) claim that the recommendation system works as an important instrument to build the seller’s reputation, aiming to reduce the consumers’ perception of uncertainty about the products. A company with a good reputation or image enjoys a higher number of clients (Doney and Cannon, 1997; Jarvenpaa et al., 2000).

Surprisingly, we did not find a significant association between social commerce components and the participation of consumers in social commerce, whereas previous studies suggested that consumers are more likely to giving more value to others’

<table>
<thead>
<tr>
<th>Variables</th>
<th>Model 1 Purchase intention</th>
<th>Model 2 Recommendation intention</th>
<th>Model 3 Continuance intention</th>
<th>Model 4 Participation in s-commerce</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>b</td>
<td>p</td>
<td>b</td>
<td>p</td>
</tr>
<tr>
<td>1. Reputation</td>
<td>−0.04</td>
<td>0.14</td>
<td>−0.15</td>
<td>0.05</td>
</tr>
<tr>
<td>3. Perceived ease of use</td>
<td>0.06</td>
<td>0.43</td>
<td>0.14</td>
<td>0.21</td>
</tr>
<tr>
<td>5. Product delivery</td>
<td>0.02</td>
<td>0.63</td>
<td>0.07</td>
<td>0.26</td>
</tr>
<tr>
<td>7. Transaction safety</td>
<td>0.07</td>
<td>0.34</td>
<td>0.03</td>
<td>0.61</td>
</tr>
<tr>
<td>Adjusted $R^2$</td>
<td>46.8%</td>
<td>51.9%</td>
<td>47.4%</td>
<td>53.9%</td>
</tr>
</tbody>
</table>
information and opinions than traditional advertising when purchasing products or services (Kim and Park, 2013). Online recommendations can influence more the consumer behavior than actions controlled by the companies, establishing more credibility and trust (Ha, 2004). In Zhang et al.’s (2010) study, for example, online opinions given by consumers about a restaurant increased significantly its popularity. Even though, in our study, it was not found any significant association with this construct.

An explanation for the s-commerce components that do not appear as an influence factor in consumers’ participation in social commerce can be associated with the “social fatigue.” Some recent studies (Bright et al., 2015; Lee et al., 2016) have suggested that users can be tired of searching or pronouncing themselves in the social networks, because of the superficiality of the comments posted by other users, the amount of information (some already available and new ones that come up every minute) or to avoid the social exposure, avoiding their contacts to know about their lives. The generalized use of the social networks produces a perpetual obsession and creates expectations that people are forced to answer to the publication of the others in a short period of time. Aiming to attend these expectations, individuals need to pay continuous attention to the social networks, being exposed to a great volume of social demand (Lee et al., 2016), increasing in a considerable way its use (Bright et al., 2015), which causes the “social fatigue.”

In order to verify if different characteristics related to the profile of the respondent or type of product bought or searched could be associated with a higher use of the social commerce components such as ratings, recommendations and online forums by consumers, we proposed two distinct analyses: first, we separated the respondents into two groups, one using intensively the components of the social commerce (which construct averaged above 3.0) and the other presenting low use (which construct averaged under 3.0); and second, we compared the social commerce components’ intensity of use to the profile of the consumers and kind of products bought or searched.

Table IV highlights the comparison between consumers with high use of social commerce components and those with low use. For such, we realized Student’s t test, which identified higher mean scores (at the 5 percent level) on the consumers’ evaluations who used more intensively the social commerce components, especially on product delivery and transaction safety. These findings suggest that the use of online comments and ratings, as well as the participation in forums and communities, increases the perception of the consumer toward the safety of the transactions made electronically and the delivery conditions of the product. De Valck (2005) suggests that consumers, in general, give importance to the others’ opinion; besides, they use these recommendations as the sole source or predominant source of information before the purchase, what can minimize their doubts about the integrity, quality and trust on the online seller. The online environment still generates much doubt on consumers; raising the recommendation systems as a method

<table>
<thead>
<tr>
<th>Constructs</th>
<th>High use of s-commerce components (n = 115)</th>
<th>Low use of s-commerce components (n = 109)</th>
<th>(p)</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Reputation</td>
<td>4.53</td>
<td>4.38</td>
<td>0.09</td>
<td>0.15</td>
</tr>
<tr>
<td>2. Trust</td>
<td>4.40</td>
<td>4.27</td>
<td>0.15</td>
<td>0.13</td>
</tr>
<tr>
<td>3. Perceived ease of use</td>
<td>4.42</td>
<td>4.33</td>
<td>0.32</td>
<td>0.09</td>
</tr>
<tr>
<td>4. Information quality</td>
<td>4.39</td>
<td>4.30</td>
<td>0.28</td>
<td>0.09</td>
</tr>
<tr>
<td>5. Product delivery</td>
<td>4.19</td>
<td>3.93</td>
<td>0.02</td>
<td>0.26</td>
</tr>
<tr>
<td>6. Transaction safety</td>
<td>4.20</td>
<td>3.91</td>
<td>0.00</td>
<td>0.29</td>
</tr>
<tr>
<td>7. Perceived usefulness</td>
<td>4.45</td>
<td>4.32</td>
<td>0.13</td>
<td>0.13</td>
</tr>
</tbody>
</table>

Source: Research data

Table IV. Comparison between consumers with high and low use of social commerce components
that have been used as a way to decrease this uncertainty, providing additional information related to comments and experiences about products searched or sold.

As a complement of this analysis, we identified on the qualitative stage of the research that consumers search for comments and complaints before the purchase decision. In cases where firms and/or websites appear associated with bad comments or have complaints spread over the internet, either related to purchase safety, shipping costs and manner/time of delivery, the consumer can be influenced on the decision to buy or not certain product.

Regarding the second analysis, we used the one-way ANOVA followed by Duncan’s post hoc test, when founding a difference at the 5 percent level of significance. We did not find statistical differences in relation to social commerce components’ intensity of use for gender ($p = 0.46$), age ($p = 0.17$), schooling ($p = 0.28$), income ($p = 0.07$) and frequency of shopping on internet ($p = 0.43$). However, when analyzing the price range of the products bought or searched besides the kind of products, we identified that more expensive products presented higher average use of recommendations, ratings and comments than cheaper products ($p < 0.000$) – Table V. Similarly, we identified that searches and purchases involving computer products and electronics ($p < 0.000$) also used more social commerce components than products like household appliances, health and beauty, as well as books, airline tickets, fashion and domestic utilities. Churchill and Peter (2000) claim that on the purchase of high cost products, consumers tend to evaluate if the chosen alternative was really the best, generating a perception of greater risk involved. So, there is more rationality in the process of purchase decision in this kind of product when compared to another product of lower monetary value.

Due to the inherent nature of the risks associated with online shopping, clients are attracted by lower prices as an effort to avoid risks. Chen and Dubinsky (2003) demonstrated in their study that low prices decrease this perception – being both the risk of quality or financial – showing a positive association between price and risk perception. According to Lee and Lee (2011), when goods or services are offered at a high discount rate or lower price, the risk is lower, so the consumer tends to buy the product with no necessity of searching for rating and comments. Somewhat consistent with our findings, Soares et al. (2015) also confirmed a moderation effect between product or service price with recommendations

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>S-commerce components’ intensity of use</th>
<th>Test Duncan</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean</td>
<td>Duncan</td>
</tr>
<tr>
<td><strong>Price range</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than R$50.00</td>
<td>10</td>
<td>2.47</td>
<td>Subgroup 1</td>
</tr>
<tr>
<td>Between R$50.01 and 100.00</td>
<td>39</td>
<td>2.82</td>
<td>Subgroup 2</td>
</tr>
<tr>
<td>Between 100.01 and 300.00</td>
<td>78</td>
<td>2.86</td>
<td></td>
</tr>
<tr>
<td>Between R$300.01 and 700.00</td>
<td>32</td>
<td>3.38</td>
<td>Subgroup 3</td>
</tr>
<tr>
<td>More than R$700.01</td>
<td>65</td>
<td>3.64</td>
<td></td>
</tr>
<tr>
<td><strong>Class of products</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Books</td>
<td>27</td>
<td>2.34</td>
<td>Subgroup 1</td>
</tr>
<tr>
<td>Travel/Tourism</td>
<td>13</td>
<td>2.64</td>
<td></td>
</tr>
<tr>
<td>Domestic utilities</td>
<td>17</td>
<td>2.71</td>
<td></td>
</tr>
<tr>
<td>Fashion</td>
<td>53</td>
<td>2.83</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>15</td>
<td>3.22</td>
<td>Subgroup 2</td>
</tr>
<tr>
<td>Household appliances</td>
<td>24</td>
<td>3.29</td>
<td></td>
</tr>
<tr>
<td>Health and beauty</td>
<td>16</td>
<td>3.33</td>
<td></td>
</tr>
<tr>
<td>Electronics</td>
<td>39</td>
<td>3.70</td>
<td>Subgroup 3</td>
</tr>
<tr>
<td>Computers</td>
<td>20</td>
<td>4.19</td>
<td></td>
</tr>
</tbody>
</table>

**Table V.**
Comparison between products, price range and social commerce components’ intensity of use

**Source:** Research data
and consumers’ intention of participation in social commerce, indicating that as higher the price the consumer expects to pay, the more he/she will take into account the presence of positive recommendations at the purchasing decision or recommending the website as well as if the product price was lower, the association between using recommendations and participating of the s-commerce will be lower.

Final remarks

In this study, we sought to analyze – from the perspective of the consumer – the main factors and characteristics (personal or related to products purchased or searched on internet) that influence consumers to participate in social commerce. In this sense, we analyzed the influence of eight different factors on consumers’ participation in social commerce: reputation, trust, information quality, perceived ease of use, perceived usefulness, transaction safety, social commerce components and product delivery. In addition, we analyzed the association between consumer’s profiles and characteristics of the products searched or purchased with a higher or lower use of comments and ratings online, as well as participation in forums and communities.

We verified that a high percentage (46.9 percent) of the respondents made at least one monthly purchase on internet, being electronics (77 percent), travel and tourism (62.9 percent) and books and magazines (63.3 percent) the main categories of products purchased or searched on internet. We identified trust, perceived usefulness and information quality as the factors that most influence consumer participation in social commerce, being trust in the website the main predictor. Therefore, we conclude that the more reliable, useful, with relevant and accurate information the website is, the greater the participation of the consumers in social commerce, both in terms of purchase intention, recommending or returning to the website.

Regarding the different characteristics related to the respondent and the kind of products purchased or searched associated with a greater use of online ratings, recommendations and forums by the consumers, we found that consumers who make use of these resources perceive greater security in the transactions made electronically and better delivery conditions of the product. We did not find significant differences in the intensity of use of social commerce components in relation to gender, age, schooling, income and frequency of shopping on internet. However, when we analyzed the price range of the products purchased or searched as well as the kind of products, we identified that more expensive products have higher average use of recommendations, ratings and comments than products with lower price, even researching and purchasing computer products and electronics also seem to use social commerce components more intensively than search for products such as books, airline tickets, fashion and household appliances.

As limitations of the study, we highlight the small number of interviews conducted during the qualitative stage, which may have left out other relevant factors of the analysis on consumers’ participation in social commerce. Another limitation refers to the selection of the participants of the study; all members of the social network Facebook are identified by the contact net of the authors – though it has been tried to enlarge this contact list by requesting the respondents to share the questionnaire link with their acquaintances, we should be cautious about the generalization of the results.

As contributions of the research, we can mention the proposition of an instrument to identify factors and characteristics that are taken into consideration by the consumers when participating in social commerce. Such a tool can be replicated by firms included in this type of commerce, in order to evaluate the behavior and perception of their customers about their performance in the online environment. We also highlight trust, information quality and perceived usefulness of the website as the most influencing factors of the consumers’ participation in social commerce. In addition, more expensive products and products...
classified as computers and electronics seem to use more intensively ratings, recommendations and comments online provided by other people. This fact supports the research literature that (positive or negative) online recommendations influence the consumers purchase behavior, reducing uncertainties about the products and increasing credibility and trust. On the other hand, fashion products, books, travel and household appliances seem to use less online reviews and ratings when consumers are deciding to buy or not such products. Finally, future research could: analyze the main determinants of the consumers’ purchasing intentions in social commerce, identify the reasons that lead users to search certain products on internet, without, however, making the purchase and deepen the studies on “social fatigue,” such as identifying the reasons that have caused certain consumers to decrease their participation or even abandoning social media.

References


Appendix

<table>
<thead>
<tr>
<th>Participation in s-commerce</th>
<th>n</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Purchase intention; α = 0.87</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>01. I am likely to purchase products/services in this s-commerce site</td>
<td>233</td>
<td>4.50</td>
<td>0.78</td>
</tr>
<tr>
<td>07. Given the opportunity, I intend to purchase products on this s-commerce site</td>
<td>224</td>
<td>4.50</td>
<td>0.80</td>
</tr>
<tr>
<td>04. It is likely that I will purchase products on this s-commerce site in the near future</td>
<td>220</td>
<td>4.16</td>
<td>1.03</td>
</tr>
<tr>
<td><strong>Recommending intention; α = 0.89</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>05. I would provide others with information on this s-commerce firm</td>
<td>222</td>
<td>4.50</td>
<td>0.81</td>
</tr>
<tr>
<td>02. I would tell others positive things about this s-commerce firm</td>
<td>222</td>
<td>4.49</td>
<td>0.79</td>
</tr>
<tr>
<td>08. I am like to recommend this s-commerce firm to my friends and acquaintances</td>
<td>223</td>
<td>4.39</td>
<td>0.87</td>
</tr>
<tr>
<td><strong>Continuance intention; α = 0.93</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>03. I intend to return to this s-commerce site in the future</td>
<td>223</td>
<td>4.56</td>
<td>0.76</td>
</tr>
<tr>
<td>06. I intend to keep using this s-commerce site</td>
<td>223</td>
<td>4.50</td>
<td>0.81</td>
</tr>
<tr>
<td>09. I intend to look for information in this site again</td>
<td>224</td>
<td>4.46</td>
<td>0.87</td>
</tr>
</tbody>
</table>

Table AI. Questionnaire items used to measure consumers’ participation in social commerce

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Project management office in non-governmental organizations: an ex post facto study

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Everton Cunha
Faculdade Estácio de Sá de Vila Velha, Vila Velha, Brazil

Abstract

Purpose – The purpose of this paper is to explore the influence of project management offices (PMO) in non-governmental organizations (NGOs), in fundraising linked to projects, under the theoretical lens of the resource-based view.

Design/methodology/approach – Through a longitudinal analysis ex post facto study in a non-profit civil association, the authors examined by Mann-Whitney’s U tests the results before (2003-2008) and after (2009-2014) PMO implementation, to check if the office moderated the relationship between project management and fundraising for projects.

Findings – Mann-Whitney’s U tests showed that PMO had, in those periods, a statistically significant influence in increasing the number of projects and decreasing the mean value of their budgets (p-value < 0.05).

Originality/value – Despite the wide range of studies on the contribution of PMOs to internal project management, there is a lack of empirical evidence on their moderation capacity, especially in NGOs. To fill this research gap, this study investigates the moderating role of PMO in NGOs, by examining their performance on fundraising processes, to contribute to a better understanding of potential PMO effects, particularly as a moderator of the relationship between project management and projects’ fundraising.

Keywords Project management office, Non-governmental organizations, Resource-based view, Ex post facto study

Paper type Research paper

Introduction

Many non-governmental organizations (NGOs) carry out their actions through projects related to their institutional mission (Diallo and Thuillier, 2004). The establishment of organizational units called project management offices (PMOs) has contributed to improve projects’ performance (Golini et al., 2014).

NGOs financing can be considered a “donation market” (Glaeser, 2003, p. 15), with movements similar to those on stock exchanges. Public and private organizations offer resources for the development of NGOs’ projects, usually by examining proposals submitted in response to public notices. These funds tend to be smaller than NGOs’ demands, thus creating competition between these organizations. To deal with this situation, they tried to professionalize their management processes (Silva, 2010; Alvarez, 2009), and PMOs have proved to be a useful unit (Project Management Institute (PMI), 2013), with a central role in the search for resources, since its main objective is to make project management more efficient (Stanleigh, 2006).
Fundraising is a critical stage for NGOs. For instance, the directory Análise Gestão Ambiental shows that 97 percent of the resources for environmental NGOs in Brazil, in (2013), came from donations linked to projects (Análise Gestão Ambiental (AGA), 2015), which demonstrates that NGOs’ operation is mostly guaranteed by fundraising. Thus, a PMO is an organizational resource that supports this operation (Bates, 1998), by enabling the development and implementation of standards, methods, training and team support (Block and Frame, 1998), while providing capabilities (McKelvie and Davidsson, 2009) that are essential in the competition for financial resources.

We can consider a PMO as an internal strategic resource of the organization, more specifically a source of sustainable competitive advantage for fundraising in the donation market, by providing useful organizational skills (Barney and Hesterly, 2007) for its institutional objectives.

Under the theoretical lens of the resource-based view (RBV), an organizational structure perspective described in Barney and Hesterly (2007), resources can create a sustainable competitive advantage when they become organizational competencies. PMOs, as an internal strategic resource, can provide a sustained competitive advantage in the management of third sector projects, by turning this resource into an organizational competence.

Literature on this matter is rich: it shows that project management has a positive influence on project performance (Joslin and Müller, 2015; Liu, 2015; Yazici, 2009); it describes it with different guidelines (Project Management Body of Knowledge, International Project Management Association Competence Baseline, Prince 2, ISO 21,500 Guidance on Project Management, PMD Pro, PM4DEV, etc.); and it analyzes PMOs’ moderating role during ten year-periods (Jalal and Koosha, 2015; Liu and Yetton, 2007). However, we found only a few studies that address NGOs (Lacruz, 2015; Golini et al., 2014; Gomes, 2014).

In addition, we did not find empirical studies on the performance of fundraising processes for projects. Research on third sector projects is a critical issue, especially on this specific stage, since such organizations carry out their actions mainly through projects financed by different donors, in order to accomplish their institutional mission (Lacruz, 2014).

Brazilian studies generally address the discussion of project performance through a triple internal constraint (cost, time and scope), using a cross-section analysis that limits the disclosure of potential PMO moderation capacity, and mainly from studies of private for-profit organizations (Barbalho et al., 2014; Cianfanelli and Pessoa, 2014; Martins et al., 2011).

Despite the wide range of studies on the contribution of PMOs to internal project management (Jalal and Koosha, 2015; Lacruz, 2015; Liu and Yetton, 2007; Dai and Wells, 2004), there is a lack of empirical evidence on their moderation capacity, especially in NGOs. This study seeks to contribute to a better understanding of potential PMO effects, particularly as a moderator of the relationship between project management and projects’ fundraising.

To fill this research gap, this study investigates the moderating role of PMO in NGOs, by examining their performance on fundraising processes. We conducted a longitudinal analysis ex post facto, in order to answer the following question: do PMOs in NGOs affect the performance of projects’ fundraising?

We investigated this hypothetical relationship in a third sector organization, given the lack of public data. Although we could establish causal relations between variables, the purpose of the study was not to explain why or how the facts happened, but rather to explore those facts by pointing out to a possible causal link based on evidence.

The relevance of this study lies in the potential contribution to theory of the analysis of PMO performance, which is a well-researched topic in project management (Joslin and Müller, 2015; Jalal and Koosha, 2015; Golini et al., 2014), from the perspective of fundraising, a typical stage in the life cycle of third sector projects (Lacruz, 2014). It is an open question whether PMO moderates the relationship between project management and fundraising in the third sector. If proved, this relationship may serve as evidence for other studies, with explanatory research designs, to investigate the relationship between PMOs and metrics of fundraising.
Theoretical background

In order to build a theoretical basis for the analyses and discussions, this section approaches the RBV and PMOs in NGOs.

The RBV

RBV can be used to analyze the influence of PMOs on NGO fundraising for projects. This perspective on organizational structure states that organizational resources can create sustainable competitive advantage when they become organizational competencies.

The literature on organizational strategy considers two paradigms that explain a superior sustainable performance. The first rests on the concepts of industrial organization (McGrath et al., 1995), and the second perspective says that companies are essentially idiosyncratic from the standpoint of organizational economics. The latter corresponds to RBV, in which there is a connection between an organization’s internal attributes and its competitive performance (Barney, 1991).

A relevant RBV contribution is that it shows the attributes that allow an organization to achieve superior performance over a long period, since they do not depend on industry conditions. Another benefit of this theory lies in its usefulness for managers that seek to understand, keep or expand their competitive advantage (Peteraf, 1993). Therefore, strategic management under RBV enables organizations to create economic value from heterogeneity, by acquiring and developing resources and capabilities.

The vast diversity of studies reveals that there are subtle but relevant differences in the definition of resources (Amit and Schoemaker, 1993; Daft, 1983; Hoskisson et al., 2009; Wernerfelt, 1984). In this article, according to most studies regarding project management and RBV, we use Daft’s (1983) definition: “resources are understood as assets, capacities, organizational processes, attributes, knowledge, information, etc., that the organization controls and that allow it to create and implement strategies that improve its performance.”

Based on the categorizations of several authors, Barney (1991) divided resources in three classes of capital: human, physical, and organizational capital. Human capital relates to training, relationships, experience, intelligence, critical capacity and contributions from managers and employees. Physical capital comprises the technology used in the organization, its plant and equipment, its geographic location and its access to raw materials and inputs. Organizational capital refers to management, including its structure of formal reports, formal and informal planning, control and coordination systems, as well as the informal relationships between different groups in the organization and between the firm and the external environment.

According to RBV, organizations’ different performances result from the variability of their resources and capabilities (Hitt et al., 2001; Powell, 1995). An organization can outperform its competitors by implementing strategies, but the cost of acquiring/keeping the resources that support such strategies should be significantly less than their economic value, allowing the organization to exploit competitive imperfections in strategic factors’ markets (Barney, 1986).

Several authors (Amit and Schoemaker, 1993; Hitt et al., 2001; Peteraf, 1993) agree that positive returns achieved by organizations are the result of the interaction between their resources and their strategies, and that both strategy and organizational structure affect the organization’s economic performance and the market where it operates. For RBV, organizational success stems from the economic value of resources, inimitable by other organizations, and for which there are no substitutes (Powell, 1995).

Barney (1991, p. 107) stated: “It is not difficult to see that valuable and rare organizational resources may be a source of competitive advantage.” However, as he explains, not all resources of an organization have the potential to create competitive advantage. To do this, a resource must have four attributes: be valuable, rare, imperfectly imitable, and imperfectly substitutable.
This author highlighted two issues that became the axioms of RBV: resources are spread heterogeneously across organizations; and resources are non-transferable between organizations without an additional cost. Based on these axioms, he concluded that valuable and rare resources are capable of creating a competitive advantage, while those that are both inimitable and irreplaceable provide the basis for a sustained competitive advantage.

Barney (1991), together with Hesterly, reviewed the four essential attributes of resources and reshaped them slightly. In the new proposition, they kept the first three attributes practically unchanged (value, rarity, imperfect imitability), while they totally altered the last one (imperfect substitutability) for “organization.” Thus, Barney and Hesterly (2007) propose that the key attributes of resources that create a sustainable competitive advantage are: valuable, rare, costly to imitate and organized to exploit.

Both approaches (Barney and Hesterly, 2007; Barney, 1991) argue that there are competitive advantages that can provide the organization with a superior performance over its competitors, as they build strategies for value creation that are difficult to adopt by other companies without additional costs, thus preventing imitation. If competitors cannot copy such strategies in the short term, the organization will achieve a sustainable competitive advantage.

By comparing the two approaches, there is a subtle distinction regarding resource characterization. Barney and Hesterly (2007) move from the idea of substituting resources to favor their organizations. Despite having valuable and rare resources, as well as capabilities that are difficult to imitate, the firm will only gain competitive advantage if these resources are properly organized. They observe that, among the distinct components of a firm, these organization-related aspects stand out: remuneration policy, hierarchical arrangement, and formal and informal systems of management and control.

There are similarities between the structural focus of Barney and Hesterly (2007) and Nadler’s (1993) proposition of organizational architecture, which considers that business’ processes, structures and strategies are directly related to the behavioral space of action of the individuals that work in the organization (Fernandino and Oliveira, 2010).

Nadler and Tushman (1993) observe that organizational architecture comprises both the formal and informal structure of the organization, and directly relates it to the ability of implementing business strategies. In this sense, it allows the exploration of a resource with potential to create a sustainable competitive advantage. From this viewpoint, Barney and Hesterly (2007) recommend that organizations should evaluate their current or potential resources according to the four attributes, in order to demonstrate their capacity to become a sustainable competitive advantage over their rival companies.

Hence, we can examine PMO through the “Organization” resource attribute, since its primary objective is to provide the company with capabilities that allow it to develop and exploit the potential of its resources. Thus, we can define a PMO as an internal strategic resource of the organization, capable of providing a sustainable competitive advantage in project management, since such a unit allows the organization to differentiate itself through its organizational competencies and add value to its product/service (Jugdev et al., 2007).

Therefore, we assume that PMOs in NGOs enable the organizations to combine their capabilities and resources in an integrated way, providing them with a sustainable competitive advantage in the market of project-related donations.

The third sector and PMO

The third sector in Brazil comprehends civil society activities that do not fall under the first (public administration) or second (for-profit companies) sectors. They include organizations such as political parties, associations and non-profit foundations, unions, professional councils, religious organizations, etc. (Instituto Brasileiro de Geografia e Estatística (IBGE), 2012), which requires a delimitation of these entities. In this study, the objects of interest are non-profit private associations and foundations, which are commonly known as NGOs.
IBGE conducts periodical surveys of these organizations, named the private foundations and non-profit associations in Brazil (FASFIL). The most recent survey, from 2010, revealed the existence of 290,700 private non-profit associations and foundations in the country, which represented 5 percent of the universe of these organizations. Their workforce was composed of more than 2.1 million employees, covering about 7 percent of the salary mass (IBGE, 2012).

Most of their initiatives are implemented through projects (Diallo and Thuillier, 2004) supported by agreements and contracts with private companies, business institutes, family institutes, public and other third sector organizations (Lacruz et al., 2017). Thus, the project, whose conceptual definition is “a temporary effort to generate a specific delivery” (PMI, 2013; Muriana and Vizzini, 2017), refers to the “object” of the contractual relationship between the third sector entity and the donor organization. It regards the venture carried out within a defined period, with defined scope, quality and cost, as a counterpart to the donation, subject to the norms of the contract (or a similar instrument) between the parties.

Grupo de Institutos, Fundações e Empresas Network, which gathers 125 private social investors from Brazil, allocated more than 3 billion reais to projects in 2014. The demands of the supporters have grown gradually, as the volume of resources increased (Golini et al., 2014). The nominal growth rate of the funds offered by this network was 18.5 percent between 2009 and 2014 (Grupo de Institutos Fundações e Empresas, 2015).

NGOs generally raise funds linked to projects, for activities related to their institutional mission, by submitting project proposals to donors; and they also gather resources not related to specific projects, which are expenses of the organization, through commercial processes (sales of products and services), auctions, fundraising dinners, crowdfunding, etc. (Lacruz et al., 2017). In this study, we focused on donations related to projects.

The motivation for NGOs to adopt market management practices (Tenório, 1999) stems partly from the dynamism of the historical trajectory of NGOs’ qualification (Silva, 2010), which made them shift from a fundamentally philanthropic model to a corporate one, in a process named by Salamon (1997) as “marketization.”

As a consequence, the corporate model brings together partnerships that trigger temporary organizational arrangements (Bakker et al., 2016), to coordinate activities resulting from partnerships with organizations, businesses, states, foundations, and associations, as well as other NGOs (arising from fundraising in the donation market). The more intense competition for public and private resources compels NGOs to professionalize their processes and management models (Lacruz et al., 2017), through project management, in general, and PMO in particular, in order to become more competitive.

Organizations have established and integrated units, typically known as PMOs, into their organizational structures. These are considered innovative and highly effective (Alexandrova et al., 2015), in an effort to manage their projects more effectively (Pellegrinelli and Garagna, 2009; Jalal and Koosha, 2015). This has also happened with some NGOs (Golini et al., 2014; Crawford, 2002; Dinsmore, 1999).

In this study, we assumed that the theoretical framework of RBV is appropriate to analyze NGOs’ behavior, and we concentrated on the set of resources and competencies that belong to these organizations, or were externally acquired. In this perspective, we examined PMOs as an internal strategic resource of the organization that can provide a sustainable competitive advantage in project management. We understood that combining the organization’s resources intentionally and rationally (from the perspective of the attribute “resource organization”) is a strategic action that contributes to the achievement of organizational goals in projects of the donation market, thereby attaining a sustainable competitive advantage (Barney and Hesterly, 2007).

Block and Frame (1998) were the first to emphasize the importance of creating a business unit, generally referred to as a project office, to support the formal management of projects in
organizations. According to the Project Management Body of Knowledge guide (PMBOK®), “a project management office (PMO) is a management structure that standardizes the project-related governance processes and facilitates the sharing of resources, methodologies, tools, and techniques” (PMI, 2013, p.10).

This definition sets its central objective in guiding and supporting project managers, allowing the organization to develop its projects in the most efficient and effective way. In general, several PMO concepts address the importance of project management maturity in organizations. The common focus of PMO definitions is that they are business units that coordinate the organization’s project management, providing standardized training, software, and policies (Aubry et al., 2008, 2010; Crawford, 2002; Kerzner, 2003). Thus, by including another business unit, regardless of its level – corporate, divisional, sectoral or departmental, the organization will not add an expense center[1] but rather a cost center to support the revenue centers and contribute to savings in the supply of products or services linked to the projects. Nevertheless, as Barcaui and Quelhas (2004) observed, in a survey conducted with 116 Brazilian companies, most PMOs were created as a reaction to financial losses in the execution of projects.

PMOs’ performance analysis considers the results of projects coordinated by them, or during the phases of project life cycle under their responsibility. Project performance is a well-researched topic in project management, but the meaning of the term “performance” varies substantially. It can relate to a project’s external objectives, measured by stakeholders’ satisfaction, especially in the third sector, from the perspective of beneficiaries, donors and partners; or to project management, measured at the end, through its internal efficiency in terms of cost, quality of delivery, and expectations (Cooke-Davies and Arzymanow, 2003; Golini et al., 2014; Ika et al., 2012). The classic internal management indicators of a project (cost, time and quality) are those for which NGOs are directly accountable to donors (Hermano et al., 2013).

Project performance involves the management processes described under different guidelines, such as PMBOK, International Project Management Association Competence Baseline, Prince 2, ISO 21.500 Guidance on Project Management, among others. Some guidelines were created especially for the management of international NGO development projects, where PMD Pro and PM4DEV are the best known. A comparison between these specific methodologies shows that PMD Pro and PM4DEV tools are very similar to PMBOK guidelines (Hermano et al., 2013), which is the best known guideline in Brazil. Methodologies for the third sector were developed mainly from this reference and from the project’s life cycle (Gomes, 2014; Lacruz, 2014; Xavier and Chueri, 2008).

The tools and techniques proposed for NGO management processes tend to be less complex. Golini et al. (2014) carried out a study on the adoption of PMBOK, PMD Pro and PM4DEV tools and project management techniques, with 496 third sector organizations that prepare international development projects, and they showed that these organizations are more likely to adopt simpler techniques (such as logic matrix and progress reports) than analytical methodologies (such as value-added techniques). In the cluster analysis performed by the authors, four stages of maturity were defined, resulting from the adoption of different levels of tools and techniques by the organizations, which suggest a learning cycle in project management, from the identified stages.

The methodologies adapted for the third sector generally extend the traditional life cycle of projects (initiation, planning, execution, monitoring and control and closure), considering two capital phases for NGOs: fundraising and accountability (Lacruz, 2014), as shown in Figure 1.

The fundraising phase involves identifying opportunities, preparing proposals, negotiating and contracting; while during the accountability phase organizations send reports to the donors regarding project execution, and its physical and financial performance. The Brazilian Accounting Standards (NBC ITG 2002/2012, NBC T 10.19/2000 & NBC T 10.4/1999) define
that the acknowledgment of the expenses and revenues from the activities of these entities, in the income statements, occurs when the donor approves the accountability. Until it happens, they appear in the balance sheet, as a debt contracted at the time of fundraising, which will be settled on accountability.

Many studies show that project management has a positive effect on project performance (Joslin and Müller, 2015; Liu, 2015; Yazici, 2009), and in the last ten years the moderating role of PMOs grew in relevance (Jalal and Kooshka, 2015; Ungar et al., 2012; Liu and Yetton, 2007). A PMO is a center of excellence that implements practices and standardizes project-related governance processes, facilitating the sharing of resources, methodologies, tools and techniques among various projects (PMI, 2013), with the main goal of improving the effectiveness of project management (Stanleigh, 2006). Previous studies, under the RBV perspective, consider PMO as an important explicit resource for managing project assets (Yogarajah, 2017).

Thus, PMOs gather project management resources in a structured and coordinated way, but distinct PMOs can have different roles and functions (Hobbs and Aubry, 2008). Given the operational features of PMO in our study, it involves tangible (templates) and intangible resources (mentoring), which, in the third sector, together comprise the resource attributes that result in a sustainable competitive advantage, according to RBV: valuable, rare, costly to imitate and organized to exploit.

This understanding is different from what Jugdev et al.(2007) suggest for private for-profit organizations. In these, while PMO is a valuable and organized resource, it is not uncommon or costly to imitate. Therefore, under RBV, a sustainable competitive advantage could not result from it. However, it is different with third sector projects, where a PMO is rare, particularly in Brazil: the PMI Survey revealed that only 2 percent of NGOs had a PMO in their organizational structure (PMI chapter, 2012). Given its rareness, it is difficult to imitate. Thus, we can suggest that a PMO has the four attributes that build a sustainable competitive advantage.

There is evidence to assume that PMOs contribute to improve project management (Yogarajah, 2017), and that project management, in turn, positively affects project performance (Joslin and Müller, 2015). In addition, PMO moderates the relationship between project management and project performance metrics (Jalal and Kooshka, 2015).

Nevertheless, if not all project management resources have capabilities that result in a sustainable competitive advantage (Jugdev et al., 2007), some questions regarding PMO still remain. Being an organizational unit that coordinates project management resources (Yogarajah, 2017), does it moderate the relationship between these resources and the performance metrics of the sources of sustainable competitive advantage, especially fundraising in the third sector?

We found few studies that address fundraising as a specific metrics of performance, especially in the third sector (Biesenthal et al., 2012; Golini et al., 2014; Gomes, 2014; Lacruz, 2015). However, we found no study regarding fundraising performance linked to projects[2]. This gap led to the research question: do PMOs in NGOs affect the performance of projects’ fundraising?

Description of the selected NGO
The third sector organization that we studied is Instituto Terra, a NGO founded in 1998. Its areas of action are ecosystem restoration and environmental education, and its priority

Figure 1.
Generic phases of projects’ life cycle in the third sector

Source: Adapted from Lacruz (2014, p. 38)
The geographic field of operation is the Vale do Rio Doce (between the states of Minas Gerais and Espírito Santo). Some activities include the production of Atlantic Forest seedlings, dissemination of environmental programs, and applied scientific research. It promotes and carries out actions by fundraising, mainly through project proposals (rather than transferring funds to third parties and monitoring their progress). The projects have national and foreign donors: public, private-for-profit organizations, and other third sector institutions. It is one of the largest environmental NGOs in Brazil (AGA, 2015), and has received worldwide recognition for its work on spring protection (Gazeta Online, 2016).

We justify its choice for three main reasons: it develops a large part of its actions through projects, for which it gets funds in the donation market (Glaeser, 2003); it has relationships with a diversity of donors from different segments, such as government agencies, business foundations, private companies and other NGOs, both national and international; and it was a pioneer in the Brazilian third sector in the implementation of a corporate PMO (Lacruz, 2010; PMI chapter, 2012).

Before PMO implementation, Instituto Terra’s organizational structure was functional. Afterwards, it became a matrix. PMO is situated at the tactical level, lateral to the other departments (business units divided according to the institution’s areas of activities), and reports directly to the CEO. The organizational design matches a functional structure with some kind of departmentalization of units of temporary projects (during the period of the contract).

After reviewing the organization’s strategic planning, and relying on PMBOK, the establishment of PMO began in 2009, with the integration of the management areas of cost, time and scope.

PMO was conceived as a guiding unit with the following activities: development, implementation and support to the methodology, as well as to the project management tool; preparation of project proposals; project monitoring and control, and definition and monitoring of performance indicators; sharing of performance reports and documents; and support to the management of shared resources.

PMO functions are more closely associated with the stages of fundraising, monitoring and accountability (Figure 1). In the course of its operation, management comprised other areas mentioned in PMBOK (communications, acquisitions, risks, quality, human resources and stakeholders), besides project auditing and portfolio management, with the resulting expansion of PMO’s functions.

Method
This exploratory study has a quantitative approach and uses a longitudinal analysis to investigate the effect of establishing PMO in a NGO, on projects’ fundraising, which characterizes it as an ex post facto research.

Ex-post facto research is an appropriate method for the analysis of natural experiments (Chapin, 1947). This study fits into this method, since it assesses the potential moderating role of PMO (exogenous event) in the relationship between project management (explanatory variable) and fundraising (explained variable), under the analytical perspective of RBV (theoretical lens).

For McMillan and Schumacher (2006), an ex post facto study explores the existence of relationships between variables that the researcher cannot control, since their manifestations already took place, and the study is done after the occurrence of changes in the dependent variable without a direct control over the independent variables. The researcher makes inferences about the relations observed between the variables, from the simultaneous variation between the independent and dependent variables.

In order to explore PMO’s influence, we chose two moments in the organization: six years before its implementation (2003-2008) and six years after it (2009-2014). The sources of
evidence used to get several measures of the same phenomenon, during the analysis stage, were the annual activity reports and NGO’s audited financial statements. Depending on the macroeconomic scenario, a larger availability of projects can affect fundraising, and the organization can capture funds for several projects, regardless of PMO. Thus, we used the annual gross domestic product (GDP) with current prices as the control variable in the model, in order to minimize potential effects that could confuse PMO’s influence. Other social variables, such as the Gini Index or the Human Development Index, which also have an impact, were not included in order to avoid multicollinearity problems. Figure 2 shows the research scheme.

The study explores PMO influence on the performance of fundraising processes in terms of number of projects and their budgets. Performance scores of the variable “project budget” were determined in order to cushion the value of money over time, considering the mean Extended Consumer Price Index during the period 2003-2014 as the discount rate (5.91 percent per year) (Instituto Brasileiro de Geografia e Estatística, 2015). Table I describes the criteria and their calculation.

The small sample size (six years before and six years after PMO implementation) has limitations regarding the use of data processing techniques. For this reason, we checked if the performance scores after PMO establishment were different from the pre-implementation scores, by using the Mann-Whitney’s non-parametric hypothesis test, which is appropriate for small samples (n < 30). However, we could not satisfactorily verify if the numerical variable could result from a variable with normal distribution. We used SPSS 20 and GPower 3.1 software for data processing.

Results and discussion

Before starting the extraction of measures, we characterize the variables. We observe a higher mean and a lower data dispersion in the period after PMO implementation, in relation to the approved number of projects. Data dispersion before implementation corresponds to 36 percent of the mean, whereas after it is only 8 percent. Thus, we can suggest that PMO contributed to a higher stability of the fundraising process and brought important benefits to NGOs, which get better conditions for planning, with less

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Description</th>
<th>Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fundraising for projects</td>
<td>Annual number of approved projects</td>
<td>( F_j )</td>
</tr>
<tr>
<td></td>
<td>Annual mean of the approved projects’ budgets</td>
<td>( \sum_{t=1}^{g}P \times (1 + i)^{t} / F_j )</td>
</tr>
</tbody>
</table>

Table I. Performance score description

![Figure 2. Nomothetic model](image-url)
risk associated to forecasting. Regarding the projects’ budget, the mean of the period after PMO implementation is lower than in the previous period, and dispersion is similar (17 and 19 percent of the mean, respectively). Therefore, we can sense that PMO contributed to reduce the mean value of all projects.

According to the classification criterion proposed by Cohen (1988), for differences between independent group means \( (d > 0.79) \), the effect sizes can be considered large for number of projects and project budget \( (d = 4.63 \text{ and } d = 1.87, \text{ respectively}) \).

We explored the relationships between GDP at annualized market prices, the number of projects funded \( (\rho = 0.796) \), and the mean budget of projects \( (\rho = 0.456) \), by the Spearman correlation coefficient \( \rho \). Since we cannot assume that data follow a normal distribution, we observed that there was not a statistically significant correlation \( (p-value > 0.05) \); thus we can assume that GDP variation did not affect the number of projects funded or the mean budget of projects during that period.

Finally, we conducted the Mann-Whitney’s non-parametric U test for independent samples, and observed that there was sufficient evidence to refute the null hypothesis. We found a different performance before and after PMO implementation \( (p-value < 0.05) \) for both variables: number of projects funded \( (p-value = 0.002) \) and mean projects’ budget \( (p-value = 0.009) \). Statistical power \( (1 - \beta) \) was 0.97 for the number of projects, and 0.81 for the mean budget of projects, above the threshold \( (> 0.8) \) from which the value is consensually considered appropriate (Hair et al., 2009). For the calculation of statistical power, we determined the effect size by Cohen’s \( d \) (see Table II).

PMOs influence on fundraising linked to projects, regarding the number of projects, is positive, since the mean after PMO implementation is higher than before \( (22.3 > 9.7) \); while the influence regarding the mean budget of projects is negative, because the mean in the second period is lower than in the first period \( (585 < 830) \), as shown in Table II. Therefore, results show that PMO had a statistically significant influence, both regarding the increase in the number of projects and the decrease of their mean value.

By concentrating the processes of fundraising, monitoring and control in a specific organizational unit dedicated to these activities, it was possible to identify more opportunities and to prepare and submit project proposals more in line with the donors’ interests (associated with the function “elaboration of project proposals”). In addition, the management of multiple projects of the same nature (programs) allows integrated acquisition processes, which result in economies of scale in the procurement and hiring processes (associated to the function “support for shared management of resources”). Moreover, it facilitates corrective measures in projects’ processes (associated with the function “project monitoring and control,”

<table>
<thead>
<tr>
<th>Projects</th>
<th>Before implementation</th>
<th>After implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fundraising – number of projects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>9.7</td>
<td>22.3</td>
</tr>
<tr>
<td>Minimum</td>
<td>5</td>
<td>21</td>
</tr>
<tr>
<td>Maximum</td>
<td>15</td>
<td>25</td>
</tr>
<tr>
<td>SD</td>
<td>3.4</td>
<td>1.8</td>
</tr>
<tr>
<td>Effect size</td>
<td></td>
<td>Cohen’s ( d = 4.63 )</td>
</tr>
<tr>
<td>Fundraising – project budget (in thousands of reais)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>830</td>
<td>585</td>
</tr>
<tr>
<td>Minimum</td>
<td>666</td>
<td>444</td>
</tr>
<tr>
<td>Maximum</td>
<td>1,025</td>
<td>660</td>
</tr>
<tr>
<td>SD</td>
<td>156</td>
<td>100</td>
</tr>
<tr>
<td>Effect size</td>
<td></td>
<td>Cohen’s ( d = 1.87 )</td>
</tr>
</tbody>
</table>

Table II. Descriptive statistics and effect size
“definition and monitoring of performance indicators,” and “sharing of performance reports and documents”).

If, on one hand, the lower mean value of the projects is a positive aspect, since it allows the organization to access the donations market more easily, with an efficiency gain, on the other hand the reduction in the mean value may reflect a decrease in the quality of project results. Or, in other words, in worse social services related to projects.

Spearman’s correlation coefficient shows a statistically significant negative linear relationship ($\rho = -0.808 \mid p\text{-value} = 0.001$), suggesting that the higher the number of projects the lower their mean value (see Table II). Finally, the costs behind these benefits are worth questioning: has the increase in the number of projects and the reduction of their mean cost resulted from higher administrative expenses? Based on the overhead margin (percentage of administrative expenses in relation to the expenses with activities, extracted from the yearly income statements), there is a strong reduction after PMO implementation, as shown in Figure 3.

The mean of the pre-implementation period was 29 percent and standard deviation was 9 percent (30 percent of the mean), while the mean after implementation was 11 percent, and standard deviation 1 percent (9 percent of the mean). By plotting a trend line in Figure 3, we see that the results after PMO establishment are lower than shown in the trend line, thus strengthening PMO’s contribution to reduce the overhead margin. That is, PMO not only did not increase the overhead margin, but also reduced it substantially (63 percent).

**Conclusion**

RBV provides inputs to examine the behavior of a third sector organization, by concentrating on the set of resources and competences, intrinsic or externally acquired. In the development of the study, we analyzed PMO as an internal strategic resource that can provide a sustained competitive advantage in project management.

The proposed analytical framework, regarding the contributions identified in the study on project fundraising, suggests that PMO is an inductor of project management maturity, according to Rodrigues et al. (2006). These contributions can be associated with processes used in multiple projects to provide organizations with past experiences, which allow them to transfer knowledge from one project to another, replicating successful actions and seeking alternatives for the unsuccessful. These results add up to Julian’s (2008) findings, since the addressed PMO centralizes the coordination of all the organization’s projects.

**Figure 3.**

Overhead margin

**Notes:** The dotted line represents the overhead margin; the continuous line, the trend; and the dashed line perpendicular to the abscissa separates the period before and after PMO implantation.
Results also highlight the positive relationship between PMO implementation and the increase in the number of projects and in fundraising. That is, the organization benefited from the increase in the global budget and in the corresponding reduction of the seasonality of activities related to projects, thus achieving cost reduction in project management, as well as reduction of risks associated to the intensive use of capital. However, there may be other effects on dependent variables that we did not analyze. As mentioned, the organization implemented PMO after reviewing its strategic planning to provide support for tactical and operational plans. Other internal variables that resulted from this process, and whose effects we could not isolate, due to the nature of the study (ex post facto), may have affected the results that suggest differences between the periods, either directly or through their interaction with PMO. Furthermore, this study relies solely on a particular organization, which limits the generalization of results. Therefore, we need caution to interpret these results. As McMillan and Schumacher (2006) noticed, in ex post facto studies the usual results are the confirmation of relations between variables, rather than assuring cause-effect relationships. Our results may serve for future studies that have access to data from a larger number of NGOs that use PMO in their organizational structures.

Even if we could not establish a cause-effect relationship between PMOs and fundraising, we suggest this possibility, which should be sought in future studies. Given the lack of consistent empirical support on this matter, this paper tried to fill the gap by exploring the influence of PMO in NGO fundraising.

Another limitation regards the feasibility of PMO implementation, considering economic and financial aspects. The overhead margin analysis alone does not lead to a satisfactory conclusion, despite its evident reduction after PMO establishment. Unfortunately, it was not possible to measure classical indicators of feasibility analysis (such as net present value, internal rate of return, etc.), through differential cash flow due to the lack of access to PMO-specific expenses, since data are not presented by cost centers, but consolidated for the whole organization.

We suggest that NGOs’ motivation to adopt project management practices in general, and PMOs specifically, results partly from partnerships with business organizations, state organizations, business foundations and associations, and other NGOs (as a result of fundraising), since they need organizational arrangements to coordinate the activities resulting from these partnerships. According to Alvarez (2009), in Latin America this process is called “NGO-ization” of social movements. Hence, a more intense competition for public and private resources stimulates the professionalization of NGO management processes, among them the adoption of project management practices, in search of higher efficiency, which drives them to shift from a philanthropic model to a corporate one (Alvarez, 2009; Silva, 2010).

For new studies and a greater reach of the conclusions, judging from the results and limitations of this study, future research should use a mixed research method (Creswell and Clark, 2013) to enhance the analysis, with both qualitative information (raised by in-depth interviews) and quantitative information (through questionnaires). Further research can explore PMO implications for other performance metrics such as project governance, beneficiaries’ satisfaction, partners, and donors. Moreover, researchers could examine the differences between NGOs of different sizes (volume of resources received) and areas of interest (health, environment, education, sports, etc.).

Thus, the results bring three important advances to the area: first, from the theoretical standpoint, it demonstrates the moderating role of PMO in the performance of fundraising processes linked to projects. Although some studies showed the influence of PMO on internal project management (Jalal and Koosha, 2015; Lacruz, 2015; Liu and Yetton, 2007; Dai and Wells, 2004), studies on NGOs are a research gap. Second, from a practical perspective, some NGOs have found that PMOs are an alternative for improving project
performance (Golini et al., 2014; Gomes, 2014; Lacruz, 2015), and these findings contribute to the assessment of cost opportunity. Third, from a methodological perspective, we demonstrated the effect size (Cohen’s $d$), which allows other studies to compare the mean effectiveness of the model developed in this study, in their research area, which brings a practical significance to the effect size.

Finally, we expect that this research will collaborate with future studies in building plans for PMO implementation and evaluation in NGOs.

Notes

1. The difference between cost center and expense center refers to the link of costs with generation of results (deliverables), while expenditures exist regardless of results.

2. We conducted a bibliographic research in SciELO database, searching the use of the term “project” combined one by one to “donation” and “fundraising,” in the papers’ abstracts, without using filters.

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Private investment in transportation infrastructure in Brazil: the effects of state action

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University of Sao Paulo (USP), Sao Paulo, Brazil

Abstract

Purpose – The purpose of this paper is to discuss the impacts of the investment programs created by the Brazilian federal government on private investment in transportation infrastructure (crowding-in effect).

Design/methodology/approach – The study used two quantitative techniques of data analysis: cluster analysis and panel data analysis.

Findings – The results show that the investment programs created by the Brazilian federal government were successful in attracting private agents to invest in transportation infrastructure in the country. This effect is observed even in the cases of programs focused on public investments.

Research limitations/implications – Advancing the research area that seeks to assess the impact of public policies is the main practical and social implications of the papers. As a research limitation we can highlight that need for a comparison to other country investment's public policies.

Practical implications – Performance of public policies.

Social implications – Economic development.

Originality/Value – The paper discusses the effects of the Brazilian Federal Government programs for infrastructure investment in the private investment in the country (investment in transportation infrastructure). The issue is relevant for policies makers.

Keywords Investment, Infrastructure, Public policies

Paper type Research paper

1. Introduction

Contrary to the traditional argument that investments in logistics infrastructure is the duty of the state, some emerging countries have experienced a clear upward trend in private investments in transportation infrastructure, especially since the beginning of the 1990s (World Bank, 2015a, b, c, d). Along with this increasing participation of the private sector, economic liberalism claims that the state should limit itself to setting rules in favor of private investments, since its presence in the production sector would restrict the action of private investors in the economy, the so-called crowding-out effect (see e.g. The Heritage Foundation, 2015).

However, recent studies such as that of Mazzucato (2014b) claim otherwise: that governments that run the economy directly have a relevant role and capacity to create and shape new markets, directing the private sector's action, the so-called crowding-in effect (attraction).

This paper aims to discuss this issue, seeking to make a headway in relation to the theoretical approaches regarding the role of the state, based on the Brazilian experience in the infrastructure sector. Thus, based on theoretical references addressing investments and the New Institutional Economy, this paper seeks to answer the following research question:

RQ1. Have the state's investment programs in transportation infrastructure had any positive effects on private investment in Brazil since the 1990s?
The results are based on two quantitative techniques of data analysis: cluster analysis and panel data analysis. The cluster analysis is used to find, based on data from the World Bank (2015a, b, c, d), countries that are similar to Brazil for the panel data analysis. The panel data analysis compares these countries, making it possible to find out the impacts of public policies on private investments.

The second part of this paper includes discussions about the relationship between public policies and private investments, with emphasis on the transportation infrastructure sector. The methodology used – cluster analysis and panel data analysis – is described in Section 3. The results are shows in Section 4. Finally, the conclusions are discussed in Section 5.

2. Public policies and private investments

The relationship between investments and the characteristics of the institutional environment is already consolidated in the academic literature (Acemoglu and Robinson, 2012; North, 1990). The main argument is that strong institutions stimulate economic development through a better allocation of resources (Besley and Ghatak, 2010) and inclusive institutions (Acemoglu and Robinson, 2012) evolve and change to minimize transaction costs (Williamson, 1985).

The academic literature also has plenty of studies evidencing that institutions do in fact matter. North and Weingast (1989), for instance, show that the establishment of stronger institutions with well-defined property rights stimulated England’s economic growth with the Glorious Revolution of 1688. By analyzing investments in two regions of Ghana, Besley (1995) argues that institutions influence the level of investments made. Pongeluppe and Saes (2014) reconfirm this hypothesis by showing that less secure institutional environments tend to receive less investments.

According to The Heritage Foundation (2015), market openness, regulatory efficiency, government size, and rule of law are the principles of economic freedom. In economies with great economic freedom, state action or government control that interferes with individual autonomy limits economic freedom (The Heritage Foundation, 2015). By fulfilling the role of setting the rules for private investments, the state must act transparently, ensuring equal opportunities to all individuals in a society.

Following liberal thought, The Heritage Foundation (2015) claims that the state is the most efficient agent in supplying the so-called “public goods” (national defense, for example) and that its action beyond the necessary level limits economic freedom, thereby reducing investments. “Government provision of goods and services beyond those that are clearly considered public goods also imposes a separate constraint on economic activity, crowding out private-sector activity and usurping resources that otherwise might have been available for private investment or consumption” (The Heritage Foundation, 2015). This crowding-out effect, in which private agents no longer make investments in the presence of public investments, due to the competition for resources, among other factors, is discussed considering the Brazilian economy in the studies conducted by Sonaglio et al. (2010) and Jacinto and Ribeiro (1997). In this theoretical model, state action must therefore be effective only to “correct” existing market failures, investing in public goods and creating market mechanisms to internalize external costs (pollution, climate change).

Opposed to this argument, Mazzucato (2014a, b) advocates that unlike the crowding-out effect on private investments, governments, through public policies, have the role and the capacity to create and shape new markets (crowding-in effect). The author shows that major advances in different sectors of the economy would not have happened in the same way without the state’s decisive role in boosting the sectors, through a direct action. Together with the private sector, the state acts by sharing investment risks and benefits, focusing on reducing
market failures and on boosting innovation-mission-oriented public investments. Mazzucato (2014b), arguing about the development of these sectors, emphasizes that “the State leads the growth process rather than just incentivizing or stabilizing it” (Mazzucato, 2014b, p. 92).

The controversy – public investments result in a crowding-out (or crowding-in) effect on private investments – will be tested for the Brazilian case in the transportation infrastructure sector. This is a sector that has been historically under the responsibility of the public sector.

2.1 Investment in transportation infrastructure: public and private investment

There is a consensus in the literature that investment in infrastructure is a prerequisite for economic development. Romminger et al. (2014) indicate that there is a causal relationship between public investments in transportation and GDP growth. Aschauer (1989) shows that public expenditure on infrastructure stimulates the productivity of the economy, a fact that is also argued for by Fernald (1999). These studies are focused on evaluating public investments in the sector, since it involves large investments with characteristics of public good.

The participation of the private sector in infrastructure projects is a growing phenomenon, not exclusive to the transportation segment and to Brazil. The increased number of countries that invest through partnerships with private entities, as well as the increased number of investment projects, are indicators of this phenomenon.

The growth trend in the flows of private investments in Latin American countries has also gained significant importance in the literature, especially as to how this subject correlates with international capital investments. Forte and Santos (2015), for example, highlight the fact that Latin American countries have very different levels of economic development and show, based on cluster analysis, that groups of countries with better performance in certain variables (institutional and economic) attract greater flows of foreign investments.

Other studies focused on Latin American countries show that private investments are also boosted with: higher levels of aid for education in the country (Donaubauer, Herzer, and Nunnenkamp, 2012); higher levels of economic freedom and a lower political risk (Amal and Seabra, 2007); and appreciation of local currency and inflation control/reduction (Baingo, 2013).

Freitas and Prates (1998) show that Argentina, Brazil, and Mexico were the Latin American countries that received most of the foreign capital invested since 1990. As for investments in transportation, the target sector of this study, Brazil, India, and China are the three countries that carried out the most investment projects in partnership with the private sector between 1990 and 2014 (World Bank, 2015a, b, c, d). In addition to Brazil, Mexico, Argentina, Colombia, and Peru are countries in the Latin America and the Caribbean region that appear in the ranking of the ten countries that had the most investment projects in transportation infrastructure with the participation of private agents (World Bank, 2015a, b, c, d).

It should be noted that, since 1990, the private sector has been increasingly present in investments in transportation infrastructure. This growth can be seen in the total group of countries, according to data from the World Bank (2015a, b, c, d), and also when the analysis addresses Latin American countries only. Campos Neto (2014) notes that in 2013 private investments in transportation infrastructure in Brazil already surpassed federal public investments. This growth is a part of a special moment resulting from the launch of public programs aimed at the infrastructure sector and, in particular, the transportation sector.

2.2 Investment programs in infrastructure in Brazil: PAC and PIL

In Brazil, the public policies related to investments in infrastructure are also related to the creation of a positive image of the Brazilian governments (Abreu and Camara, 2015). This is not only due to the impacts generated by the economic-social development provided
by the investment, but also by the political visibility that this type of public policy generates for the government. According to Abreu and Camara (2015), “public policies for infrastructure are great vectors of political alliances with segments of society and political leaders.” Despite the numerous programs historically created by the Brazilian Government, this paper focuses on discussing the possible effects resulting from the Growth Acceleration Program (PAC) and the Logistics Investment Program (PIL).

According to the Ministry of Planning (2015), the PAC, created during President Lula’s second term, in 2007: “[...] promoted the resumption of planning and execution of major social, urban, logistics and energy infrastructure projects in the country, contributing to its accelerated and sustainable development.”

The scope of PAC’s investments covered the segments of social and urban infrastructure, logistics infrastructure, and energy infrastructure (Ministry of Planning, 2015). In the logistics segment, the program includes investments in highways, railways, ports, waterways, and airports. Data reported by the program show that public investments, which were approximately 1.62 percent of the GDP in 2006, rose to 3.27 percent in 2010.

In 2011, the second edition of the program was launched (PAC2). This program featured investments with public funds, through partnerships between the federal government and the state and municipal governments, without focusing on the investments made in partnerships with the private sector.

In 2012, the federal government created the PIL. Unlike the PAC, the PIL focuses on the significant increase of investments from the private sector in logistics infrastructure projects, aiming at the “renovation and integration of the Brazilian transportation system, in order to meet the growth demands of a country with continental dimensions” (Logística Brasil, 2015). The federal government believes that the existence of a consolidated demand for infrastructure is ideal to attract investors.

The program is structured to attract investments in transportation infrastructure in Brazil, creating mechanisms for investments in highways, railways, ports, and airports. Through these mechanisms, investments should reach in total R$198.4 billion (Logística Brasil, 2015). The search for partnerships with the private sector is made through programs of highway concessions, railway concessions, and investment programs in ports and airports. The National Bank for Economic and Social Development (BNDES), Caixa Econômica Federal and Banco do Brasil are the three public banks that finance the works, in order to facilitate the development of long-term projects.

Based on the discussion regarding incentives for investments in the transportation infrastructure sector, the following research hypothesis will be tested:

\[ H1. \] Public investments in the transportation infrastructure sector lead to a crowding-in effect on private investments.

3. Materials and methods

The analyses in this paper are based on data from the World Bank (2015a, b, c, d) regarding the participation of the private sector in investments in infrastructure projects – Private Participation in Infrastructure Database. The historical analysis consists of data pertinent to investment projects in transportation infrastructure that took place between 1990 and 2014, and includes more than 80 countries.

The ten countries with the largest private investments in transportation infrastructure between 1990 and 2014 were: Brazil (BRA), India (IND), China (CHN), Mexico (MEX), Turkey (TUR), Malaysia (MAL), Colombia (COL), Argentina (ARG), Russia (RUS), and Peru (PER). These countries are analyzed in this study.

Prior to the main analysis of this paper, a statistical technique was applied to segment the observations of the database into homogeneous groups. In this case, the “cluster analysis”
technique was used. According to Fávero et al. (2009), “the cluster analysis technique, also known as cluster analysis, is a statistical technique of interdependence that allows the grouping of cases or variables into homogeneous groups according to the degree of similarity between individuals, based on predetermined variables” (p. 195).

It is a descriptive data analysis technique used to identify similar elements based on their characteristics (Fávero et al., 2009). This technique seeks to:

[...] Divide a large group of observations into smaller groups so that observations within each group are relatively similar (that is, so that they mostly have the same characteristics) and observations in different groups are relatively dissimilar (Lattin et al., 2011, p. 215).

This technique is used with the purpose of finding, among the ten selected countries, those that are most similar to Brazil, to then analyze the influence of Brazilian public policies on attracting the private sector to make investments in transportation logistics in the country. For the identification of clusters between these countries, we used variables that captured, for each of the cases under analysis, characteristics of the institutional environment, size, logistics efficiency, and economic growth. The variables used in the model are:

- Property rights (PR): this indicator measures “the degree to which a country’s laws protect private property rights and the degree to which its government enforces those laws” (The Heritage Foundation, 2015). The index ranges from 0 to 100 and the higher the score, the greater the guarantees of property rights in a particular country.

- Investment freedom (IF): “In an economically free country, there would be no constraints on the flow of investment capital” (The Heritage Foundation, 2015). This index portrays the existing constraints on the flow of investment capital. It ranges from 0 and 100, and the higher the score attributed to a particular country, the smaller the constraints on private capital investment.

- Logistic efficiency (LOG_infra): the logistic efficiency of each country was measured based on data from the Logistic Performance Index (World Bank, 2015d). These data are part of a global survey and measure logistic performance in most countries.

- Economic growth (GDP_growth): economic growth was measured according to the variation of the gross domestic product between 1990 and 2014, in each one of the locations. Data were obtained from the World Bank database (World Bank, 2015a).

- GDP per capita (GDP_percapita): GDP per capita was also a variable inserted in the cluster analysis. The figures are from 2014, obtained from the World Bank database (World Bank, 2015b).

- Size (POP): the size of the countries was measured based on the variable that measures the size of the population. The figures are from the World Bank (2015c) and refer to the total population of each location in 2014.

Still with respect to the cluster analysis, it should be noted that the SPSS software version 21 was used.

Based on the results from the cluster analysis, the statistical technique called “Panel Data” was used to measure the effects of the government programs created in the period of analysis. This technique of analysis is used in studies that pervade a group of individuals/cases over time (Gelman et al., 1995). This method of analysis, according to Gelman et al. (1995), can be used to: “(1) increase the accuracy of the estimated parameters, (2) minimize the problems of multicollinearity, (3) provide possibilities to reduce estimation bias, (4) allow the specification of more complicated behavioral hypotheses, and (5) a more accurate prediction of individual results.”
Fávero et al. (2009), in addition to emphasizing the reduction of multicollinearity problems, also claim that one of the main characteristics of this technique is related to the higher number of observations to work with, and the subsequent increased degree of freedom of the analysis. Another relevant aspect related to this statistical technique is the control of individual heterogeneity. Baltagi (1995) shows that the heterogeneity of individuals, firms, states, and countries is taken into account in panel data analyses, which is not seen in studies using cross-section or time series analyses (in these cases, there is a greater risk of obtaining biased results).

Considering this point, the use of the panel data technique is adequate to achieve the goals of this study. Despite the cluster analysis to compare similar countries, there is still considerable variability among the cases considered, which will be taken into account throughout the analysis.

We used the fixed and random effect panel data analysis technique. The fixed-effect model, generically represented by the following equation, considers changes in the cross-sections over time:

$$Y_{it} = \alpha_i + \beta X_{it} + \mu_{it}$$

(1)

In this case, the intercepts of the observations (in this study: the countries analyzed) may be different, and these differences may be due to the peculiar characteristics of each observation (Fávero et al., 2009). Therefore, the technique corrects eventual problems of endogeneity in the analysis.

In the random effects models, generically represented by the following equation, the explanatory variables that are constant over time are analyzed. This is important because this technique assumes that the unobserved effect is uncorrelated with the explanatory variables, unlike the fixed effects models:

$$Y_{it} = \alpha_i + \beta X_{it} + \mu_{it} + \epsilon_i$$

(2)

In an analysis that considers aspects of the institutional environment, which have little or no variation over shorter time horizons, the consideration of the random models is pertinent to this research.

A total of seven variables, including explanatory and control variables, were included in the panel data analysis. The variables PR, IF, POP, and GDP_growth were included in this analysis and are the same variables that were included in the cluster analysis. The difference is that the panel data analysis considered the variation existing in these indicators, and the period of time analyzed was from 1995 and 2014.

Other three variables were included in the analysis, in order to measure the impact of Brazilian Government policies on private investments in transportation infrastructure. Applied to Brazil only, the variables pac, pac2, and pil refer to, respectively, the first edition of the PAC, the second edition of the PAC, and the PIL. All three variables were included in the model as dummy variables, in order to differentiate the previous periods and, if appropriate, after each of the existing government programs. The following periods (years) were assigned to each of the variables as follows:

- pac2: 2011, 2012, 2013, and 2014; and

Finally, the variable inv is the dependent variable of the model under analysis. This variable refers to investment data of the Private Participation in Infrastructure Database.
The panel data analysis was performed in the Stata software (version 12) and a total of four models were considered, in which the variables and main characteristics of each one are shown in Table I.

4. Results and discussion

For a better presentation, the results of the two statistical techniques applied were analyzed separately. Following the order of preparation of the analyses, the results of the cluster analysis will be shown and discussed first. Subsequently, the results of the panel data analysis will be explored.

4.1 Cluster analysis

The output of the cluster analysis divides the ten countries that received the most investments in transportation infrastructure from the private sector into five distinct groups, based on institutional, logistics infrastructure, size, and economic growth variables. In the division of groups, the variables \textit{GDP\_growth}, \textit{POP}, and \textit{GDP\_percapita} were, respectively, the most discriminating of the cluster analysis.

Among the ten countries, Argentina and Russia were grouped in Cluster 1, and the variables \textit{PR} and \textit{IF} were the two most discriminating in the composition of this cluster. This result allows us to conclude that, among the characteristics of this group of countries, the institutional environment is the most common between the two countries.

Cluster 2 includes: Brazil, Malaysia, Mexico, and Turkey. \textit{PR} and \textit{LOG\_infra} are the two variables that had greater importance in the differentiation of this group compared to the others, with \textit{IF} also having significant importance for such differentiation. In terms of \textit{PR}, these countries are in the upper middle axis among the ten countries analyzed. Malaysia's score was 55 (the highest \textit{PR} in the ten countries of the sample), while the score of the other three countries was 50. With an average \textit{PR} of 40.50, the common characteristic shared by the countries in this cluster is their high \textit{PR} level.

The third cluster is composed exclusively of China. \textit{GDP\_growth} and \textit{POP} are, respectively, the two variables that most differentiated this cluster from the others, but it is worth noting that \textit{LOG\_infra} and \textit{PR} also had significant importance.

Cluster 4 includes Colombia and Peru. \textit{IF} and \textit{LOG\_infra} are the two variables that most contributed to the differentiation of this group. The institutional environment, with regard to investment freedom, is the main characteristic connecting these two countries in this cluster.

Finally, Cluster 5 is composed only of India. In this case, \textit{GDP\_percapita} and \textit{POP} were the two variables that, respectively, had greater importance in the segregation of this cluster and the others.

The above results provided a basis for the panel data analysis, whose results and discussions (focused on Cluster 2) are shown below.

4.2 Panel data analysis

The central aim of this analysis, Brazil, is included in Cluster 2, along with Malaysia, Mexico and Turkey, all of which share the most similarities in terms of: quality of the

<table>
<thead>
<tr>
<th>Analysis ID</th>
<th>Type</th>
<th>Period of analysis</th>
<th>Variables included in the analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fixed effects (FE)</td>
<td>From 1990 to 2014</td>
<td>\textit{pil}, \textit{pac} and \textit{pac2}</td>
</tr>
<tr>
<td>2</td>
<td>Random effects (RE)</td>
<td>From 1990 to 2014</td>
<td>\textit{pil}, \textit{pac} and \textit{pac2}</td>
</tr>
</tbody>
</table>

\textbf{Source:} Prepared by the authors
institutional environment, logistics infrastructure, economic growth, population income and size. Despite these similarities and the fact that these four countries are among the top ten countries that received investments in transportation infrastructure from the private sector between 1990 and 2014, the investments during the period of analysis reported different behaviors, as shown in Figure 1.

Brazilian history with regard to investments in transportation infrastructure with the participation of the private sector can be divided into two main periods. The first period, with a more intense participation of the private sector, took place between 1996 and 1998. After this period, there was a reduction until 2007, when a second increase period began. During this second period, 2014 and 2012, respectively, were the years that had the largest volume of investments.

This increase was not seen in the same proportions when the focus of analysis includes the other countries that make up Brazil’s cluster. In Mexico, the peak of investment contracts with the participation of the private sector in the period of analysis took place in 2007, followed by the second highest figures in 1990. After 2007, these investments became smaller, not exceeding US$5 billion per year.

Turkey historically reported, from the beginning of the 1990s, a low rate of private investments in the sector. Between 2007 and 2014, there was an increase in private investments in transportation infrastructure. Despite this increase, the comparison with Brazil shows that this occurred on a much smaller scale. Investments in 2014 did not exceed US$5 billion.

Finally, Malaysia is the country of Cluster 2 where the private sector reported the lowest participation in investments in transportation infrastructure in the period of analysis. The peak of private investments took place between 1994 and 1997, with average annual investments of approximately US$2.2 billion.

In Brazil, the impact of the PAC and PIL policies on private investments in transportation infrastructure was measured by the panel data analysis, with fixed and random effects, the results of which are shown in Table II.

Analyzing the variables related to the investment programs proposed by the Brazilian federal government, both the PIL and the two editions of the PAC were decisive for attracting more private investments in transportation infrastructure. The results of Models 1, 2, 3, and 4 show that both programs reported positive results related to the level of private investments observed in Brazil, which made this country stand out in relation to the other countries in Cluster 2.
The results of these four models also show that the PIL plays an even more decisive role in the increase of private investments in infrastructure. This fact is in line with the purposes of this investment program, which is to attract the private sector to invest in strategic sectors in Brazil, as is the case of the transportation infrastructure sector. In all the analyses, the coefficient of the results of variable pil is considerably higher than the coefficients related to the variables pac and pac2, which assigns a greater importance to the PIL in attracting the private sector.

In relation to PAC (first and second edition), the results show that although the program focuses on investments made by the state (federal government, in partnership with states and municipalities), the fact that priority is given to the infrastructure sector in the country is also decisive in attracting the private sector to make investments. The level of significance found in the models does not allow us to discredit the importance, albeit indirectly and at a lower level, of these investment programs promoted by the government in stimulating investments from the private sector. Thus, H1 is not rejected.

Therefore, the answer to the central question proposed in this paper (RQ1) is affirmative. The analysis shows that there has been, in fact, a positive effect of Brazilian Government programs initiated in the 1990s in attracting private agents to invest in transportation infrastructure.

These aspects are in line with the theory proposed by Mazzucato (2014a, b), which says that the state plays an important role in directing particular sectors of the economy. The “institutionalization of investments,” expanding the sources of funding, in addition to the public commitment to the sector under analysis, directs the business community to make investments. The comparison between countries in Cluster 2, in which countries are quite similar in relation to the quality of the institutional environment and logistics infrastructure, for example, shows this differential role that states may play.

It is also worth noting that the creation of infrastructure investment programs depends on the availability of funds from the public treasury. As mentioned by Abreu and Camara (2015), the PAC uses public budget for its implementation, in partnership with states and municipalities. This same dependence is attributed, to a lesser extent, to the PIL, since the projects are largely funded with resources from the public administration.

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<table>
<thead>
<tr>
<th>Variables</th>
<th>1 (FE)</th>
<th>2 (RE)</th>
<th>3 (FE)</th>
<th>4 (RE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PIL</td>
<td>15,956.67*** (7.88e−12)</td>
<td>15,956.67*** (2.15e−12)</td>
<td>15,607.54*** (266.5926)</td>
<td>15,653.65*** (377.1464)</td>
</tr>
<tr>
<td>Pac</td>
<td>4,906*** (3.11e−12)</td>
<td>5,314.732*** (166.3739)</td>
<td>5,010.836** (1,423.562)</td>
<td>5,145.86** (301.2843)</td>
</tr>
<tr>
<td>Pac2</td>
<td>4,335*** (3.15e−13)</td>
<td>4,743.731*** (166.3739)</td>
<td>4,402.612* (266.5926)</td>
<td>4,545.86* (293.2709)</td>
</tr>
<tr>
<td>PR</td>
<td>−30.30076 (63.51232)</td>
<td>−19.97773 (47.81636)</td>
<td>23.08131 (14.75322)</td>
<td>13.57039 (9.305702)</td>
</tr>
<tr>
<td>IF</td>
<td>4,33e−06 (7.35e−05)</td>
<td>2.95e−06 (2.97e−06)</td>
<td>4.33e−06 (7.35e−05)</td>
<td>2.95e−06 (2.97e−06)</td>
</tr>
<tr>
<td>GDP_growth</td>
<td>−1,510.897 (1,779.451)</td>
<td>−1,328.966 (1,759.246)</td>
<td>1,449.35*** (6.09e−13)</td>
<td>1,401.267*** (166.3739)</td>
</tr>
<tr>
<td>R² (within)</td>
<td>0.9900</td>
<td>0.9900</td>
<td>0.9893</td>
<td>0.9974</td>
</tr>
<tr>
<td>R² (between)</td>
<td>0.7630</td>
<td>0.7632</td>
<td>0.7670</td>
<td>0.7681</td>
</tr>
<tr>
<td>Number of observations</td>
<td>68</td>
<td>68</td>
<td>68</td>
<td>68</td>
</tr>
<tr>
<td>Number of groups</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

**Notes:** *p < 0.1; **p < 0.05; ***p < 0.001

**Source:** Prepared by the author, based on the results of the analysis

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The results of these four models also show that the PIL plays an even more decisive role in the increase of private investments in infrastructure. This fact is in line with the purposes of this investment program, which is to attract the private sector to invest in strategic sectors in Brazil, as is the case of the transportation infrastructure sector. In all the analyses, the coefficient of the results of variable pil is considerably higher than the coefficients related to the variables pac and pac2, which assigns a greater importance to the PIL in attracting the private sector.

In relation to PAC (first and second edition), the results show that although the program focuses on investments made by the state (federal government, in partnership with states and municipalities), the fact that priority is given to the infrastructure sector in the country is also decisive in attracting the private sector to make investments. The level of significance found in the models does not allow us to discredit the importance, albeit indirectly and at a lower level, of these investment programs promoted by the government in stimulating investments from the private sector. Thus, H1 is not rejected.

Therefore, the answer to the central question proposed in this paper (RQ1) is affirmative. The analysis shows that there has been, in fact, a positive effect of Brazilian Government programs initiated in the 1990s in attracting private agents to invest in transportation infrastructure.

These aspects are in line with the theory proposed by Mazzucato (2014a, b), which says that the state plays an important role in directing particular sectors of the economy. The “institutionalization of investments,” expanding the sources of funding, in addition to the public commitment to the sector under analysis, directs the business community to make investments. The comparison between countries in Cluster 2, in which countries are quite similar in relation to the quality of the institutional environment and logistics infrastructure, for example, shows this differential role that states may play.

It is also worth noting that the creation of infrastructure investment programs depends on the availability of funds from the public treasury. As mentioned by Abreu and Camara (2015), the PAC uses public budget for its implementation, in partnership with states and municipalities. This same dependence is attributed, to a lesser extent, to the PIL, since the projects are largely funded with resources from the public administration.
Thus, periods whose availability of public funds is restricted end up adversely affecting the preparation of investment programs that rely on government funding and disbursements. In this case, the increased attraction of private agents is related to the granting of other guarantees in return for the investment.

5. Conclusions
Based on the theoretical grounds presented and on the results discussed above, this paper shows that, in Brazil, investments in infrastructure in the 1990s were positively influenced by the investment programs created by the federal government.

Taking Brazil as an example, the most important consideration of this first set of results is that the state plays an important role in directing investments and the interest of the public sector in less dynamic sectors of the economy, such as the infrastructure sector. The state is therefore not limited to correcting market failures or improvements in the institutional environment. The public administration has the power to act in the creation of incentives for private agents to make investments in logistics infrastructure. With the investment programs created (in this case: PAC1, PAC2 and PIL), regardless of their main purpose, there was a greater flow of investments in transportation infrastructure from the private sector in Brazil, whose institutional environment, among the countries of Cluster 2, was the most fragile. Therefore, no crowding out effect was observed in the market, contrary to many theorists in the literature on investments and market failures expected.

The results obtained by the econometric models analyzed are in line with the theory proposed by Mazzucato and Penna (2014) and Mazzucato (2014a, b). The analyses show that the state plays an important role in boosting investments in certain sectors of the economy, especially sectors that may have large socio-economic impacts. The results make it possible to argue in favor of the importance of the “institutionalization of investments,” and that the public commitment of the state with a certain sector of the economy channels the actions of the private sector.

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