

TURNOVER AND TURNAWAY OF INFORMATION SYSTEMS/TECHNOLOGY PROFESSIONALS DURING A NATIONAL CRISIS AND ACROSS AGE GROUPS

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ABSTRACT

We study how the perceptions of job insecurity (JI), job satisfaction (JS) and professional self-efficacy (PSE) of information systems/technology (IST) professionals influence their intentions to leave their organizations (ILO) or to leave the IST profession (ILP) during a multi-order national crisis. We also examine if the professionals' age has any influence over those perceptions and intentions. We analyzed survey data from 291 IST professionals of all ages in several organizations from different economic segments of the private and public sectors in Brazil. Data collection occurred in two distinctive moments of the largest crisis in recent Brazilian history – a pre-awareness period, and a crisis-conscious period. The main empirical findings are that PSE negatively influences JI and positively influences JS, JI positively influences ILP, JS negatively influences both ILO and ILP, age negatively influences ILO and positively influences ILP, and the intensity of a national crisis positively influences ILP. Our study contributes by suggesting a parsimonious network of constructs to study ILO and ILP among IST professionals, by providing clues on how the cognitive-affective job-related archetype of IST professionals reacts to background crises and according to an individual's age, and by going upstream to warn that being a highly demanded IST professional is not an unlimited guarantee for one's job satisfaction and security.

INTRODUCTION

An information systems/technology (IST)¹ professional may be considered as the one “responsible for working with IS users to gather and analyze information about current and future systems for their organization (...) solving problems, making system improvement proposals, training the user, and delivering and setting up finished products” (Boyd et al., 2007, p. 190). In our view, this definition is broad enough to account also for new types of IST professionals that are emerging in the field and that have already been acknowledged in the literature (Joseph et al., 2012). Our study is concerned with IST professionals and encompasses IST-related jobs in a broad sense, i.e., including computer scientists and engineers, systems analysts and computer programmers, but also any other professionals who consider that they spend most of their time working on IST-related tasks.

Until recently, the commitment to attracting, developing, and retaining IST professionals ranked high among the top concerns reported by CIOs and other IST executives (Luftman & Kempaiah, 2008; Luftman & Ben-Zvi, 2010). As of 2014, 50.8% of a company's IST budget was dedicated to personnel costs, with 38.5% for the company's internal IST personnel alone – by far the largest percentage of the total IST budget dedicated to a single budget category (Kappelman et al., 2014). Retaining good professionals remains a challenge, because they are desperately sought out by the market. Also, due to the demands of the profession (e.g., long hours of work, the pressure to generate quick results, and the fast-paced evolution of technologies) or opportunities for those with a better understanding of organizations and their needs, they are lured away from the field as their interdisciplinary skills

¹ Armstrong et al. (2015) are concerned about the use of two different terms (“IS” and “IT”) to refer to the field. They claim that “IS” is preferred by academicians, while “IT” is adopted more frequently by practitioners, and, therefore, they prefer to refer to the field as “IS” when addressing other academic researchers. We do not totally agree with them, as there are many academic works that use “IT”. Bacon (1992) chose to use “IST” for information systems/technology. As it is a simple acronym and encompasses both terms, we adopted it in our work.

develop. In this light, not just the intention to leave the organization/turnover (ILO) is a concern, but also the intention to leave the profession/turnaway (ILP).

Interestingly, although the relationship between ILO and job insecurity (JI) has been a long-time concern in the management literature (Ashford et al., 1989; Murphy et al., 2013; Staufenbiel & König, 2010), it does not seem to be a current interest in the IST literature. A recent bibliographical search revealed that only three studies about JI were published in reputed IST journals, what suggest that JI is not a key concern in the field. This may be related to the facts that the IST profession is highly demanded worldwide and that some IST professionals are able to negotiate more flexible employment contracts than other professionals. Also, a substantial part of the IST workforce is composed of self-employed professionals who are more independent in terms of work arrangements. Nevertheless, the IST profession is also part of the broader economic environment, and as such it is expected to be influenced by economic cycles, economic contingencies, and by the level of maturity of local institutions. Furthermore, the IST literature is mainly represented by U.S., European and Australasian studies, thus providing little light on job-related issues in the context of emerging national economies, such as those of the BRICS countries.

Brazil is one of the BRICS countries that has received considerable attention from scholars, practitioners, and government officials in the last decade. Between 2004 and 2012, it invested heavily on social programs geared towards increasing employment and fighting extreme poverty and inequality. In that same period, leading economies faced unprecedented economic crises, which contributed to highlighting Brazil's seemingly successful case. However, especially after 2013, anti-corruption investigations headed by the Brazilian Federal Police and other institutions unveiled a variety of schemes involving business and political leaders in bribery, embezzlement, money laundry, and the manipulation of public data to benefit political parties and individuals. Such facts shed serious doubts about the country's recent socioeconomic achievements and prospects. In fact, since 2014, Brazil has witnessed a steep decline in its economic indicators, including the employment rates. For instance, around 100,000 businesses closed their doors in 2015 (G1, 2016) and the official inflation rate was 10.67% (EBC, 2016b). Moreover, as of April 2016, official unemployment reached 10.2% and the average monthly salary was 3.9% lower than one year before (EBC, 2016a).

The current state of the Brazilian economy and labor market represents an opportunity to study IST professionals' JI and related constructs according to their influence over ILO and ILP in a socioeconomic context that is radically unique. In fact, crisis awareness interacts with one's perceptions about JI and the intentions to leave or remain in the job (Murphy et al., 2013). And since age interacts in important ways with both individual personality and culture (Tams et al., 2014), we also explore how the age of IST professionals impacts their perceptions and intentions about job continuance. We therefore focus on two research questions:

RQ1 – How does JI of IST professionals influence ILO and ILP?

RQ2 – Is there any difference in the influence of IST professionals' job-related perceptions over job-continuance intentions according to their age group or according to the state of the economy when they manifest their perceptions and intentions?

We developed and statistically tested a parsimonious causal model using partial least squares (PLS) structural equation modeling (SEM) techniques applied to a dataset of 291 Brazilian cases collected during 23 months spanning two distinct moments of the Brazilian crisis – a pre-awareness period, in which people did not know how severe the crisis was, and a crisis-conscious period, in which the central government admitted the critical economic situation and its foreseeable consequences on businesses and the individual workers.

THE INFORMATION SYSTEMS/TECHNOLOGY LABOR MARKET

The demand for IST professionals is known to exceed the supply, and it seems that the supply is even declining while the demand is rising (Armstrong et al., 2015). Particularly in the USA, worker shortage (Freeman et al., 1999; Moore et al., 2001; Guzman & Stanton, 2009) and the retention of staff (Agarwal et al., 2006; Ghapanchi & Aurum, 2011; Dinger et al., 2015) are enduring concerns since at least the late 1990s.

Keeping the supply-demand equilibrium and retaining IST professionals in the company and/or in the profession are two different, although related, concerns². There are four broad ways a professional may develop his/her IST career: he/she may (1) remain in the organization and remain in the profession³; (2) leave the organization, but remain in the profession; (3) remain in the organization, but leave the profession; or (4) leave the organization and leave the profession. Following Joseph et al. (2012, 2015), *turnover* refers to the case where a worker leaves the organization and remains in the IST profession; and *turnaway* refers to the case where a worker leaves the IST profession by moving to another field of expertise either inside the organization or across the organizational boundaries. For the sake of conceptual clarity and empirical investigation, in our study we exclude the cases in which a worker (1) decides to stop working at all, (2) compulsorily retires (such as when following a country's particular legislation), or (3) is laid off.

IST professionals have high job mobility (Moore & Love, 2005; Fallick et al., 2006), with managers in the late 1990s already striving to keep the turnover rates within a maximum of 30% (Agarwal et al., 2006). Reasons for the mobility are manifold, including the very nature of the IST professional – who is eager to develop new knowledge and face new challenges (Jacks & Palvia, 2014) –, the project-oriented nature of IST work (Agarwal et al., 2006) and the competitive and highly demanding labor market that offers alternative work opportunities. The IST labor market has been consistently reported as one of the most problematic regarding turnover, thus challenging the human resources departments (Bernthal & Wellins, 2001). But as a knowledge worker (Scarborough, 1999) who performs a rather autonomous work (Moore & Love, 2005) and whose work routines are difficult to supervise (Dinger et al., 2015), the IST professional is also highly skilled and is interested in an environment that promotes continuous learning, creativity, and self-management opportunities, in order to keep motivated. If management does not address such interests, it is likely that the IST professional will consider leaving the organization.

Although most studies on ILO and on the effective turnover of IST professionals typically end up recommending ways to retain them in the organization (e.g., Joia & Mangia, in press, Moore et al., 2016, and Agarwal et al., 2006), there are certain types of organizations that deliberately do not focus on retaining their IST workforce (like the ones that have a “task focused”, “utilitarian” or “incented technician” organizational mindset, as described in Agarwal et al., 2006). Also, on the workers side, Moore and Burke (2002) describe an opposing force to retention that nevertheless acts towards the workers' best interests – leaving the organization is seen as part of a successful career in the IST occupational culture. This means that voluntarily moving and changing jobs would be a consequence of IST professionals' perception that being able to move to another organization from time to time is an evidence of an individual's ability to transcend the organizational boundaries, and thereby, signals a successful career.

On the other hand, ILP and the effective turnaway of IST professionals are less researched topics. This may be due to the unique IST occupational culture (Guzman & Stanton, 2009) that is likely to keep workers attached to the profession, but also because of the large demand for IST workers and the

² When a worker leaves the IST occupation, he/she broadens the demand and lessens the supply. When a worker stays in an organization he/she does not contribute to rotate the sector's workforce in order to better match the worker's capabilities (supply) and the organizations' needs (demand). When a worker voluntarily leaves an organization, he/she broadens that organization's demands for IST capabilities, but may be increasing the supply to the industry, unless he/she is turning away the profession.

³ That is, he/she may remain on the same job or move to another IST-related job inside the organization.

difficulty to find job opportunities in other areas due to the highly specialized skills of IST professionals and their alleged demands for work autonomy. Thus, ILP may not lead to effective turnaway, and as such, turnaway may be less common than turnover. ILP may occur due to the fast pace of professional obsolescence in the IST field, or to a search for new challenges and experiences, or even to a middle-age crisis (Ramos & Joia, 2014). Other factors that may motivate the development of ILP in the IST profession include work exhaustion, dissatisfaction with the profession, the need to develop new experiences in order to have more opportunities in the labor market, and the need to advance the career (Mangia & Joia, 2015). IST professionals who effectively turn away do it rationally, especially if they want to climb the organizational hierarchy (Mangia & Joia, 2015), thus accepting more managerial and multi-role positions.

In the next section, we develop a parsimonious network of constructs that is intended to explain the development of ILO and ILP by IST professionals. The network has two main attributes: it addresses clearly defined, different and critical constructs (as opposed to excessively complex, unbalanced networks found in some studies), and it includes JI as a new concern of both the academic and the professional IST communities.

The Antecedents of Turnover and Turnaway

JI is “perceived powerlessness to maintain desired continuity in a threatened job situation” (Greenhalgh & Rosenblatt, 1984, p. 438). We surveyed all published material available in Web of Science about JI in the IST field in order to see how central this topic is in the literature, and also to build a frame of reference to study JI among IST professionals. Since JI is a widely known concept both in terms of meaning and phrasing, we searched for articles that included in their titles, abstracts or keywords the following terms: “job security”, “job insecurity”, “information technology”, “information technologies”, “information system”, or “information systems”. We believe that by performing the search using those terms, we were able to reach the most meaningful papers on IST-related JI. The search for “job insecurity” alone produced 1921 results; but when we added the restriction to the IST field, only 15 articles remained (Table 1). Of those 15 articles, 12 were published in the last ten years (from 2007 on), only three were published in journals included in the AIS basket of journals, four articles may be regarded as work in progress for having been discussed only in conferences, and only three articles (one of which was not published in a peer-reviewed journal) address the relationship between JI and turnover or turnaway – a particular interest of our study. We conclude that the academic interest on JI in the IST profession is recent and scarcely discussed in the literature.

Source	Key findings about job insecurity (retrieved from the Abstracts)
Lam, J., Fox, K., Fan, W., et al. (2015). Manager characteristics and employee job insecurity around a merger announcement: The role of status and crossover. <i>Sociological Quarterly</i> , 56(3), 558–580.	<ul style="list-style-type: none"> • Having an Asian as opposed to a White manager is associated with lower job insecurity. • Managers' own insecurity positively predicts employees' insecurity. • Contingent on the organizational climate, managers' own tenure buffers, and managers' perceived job insecurity magnifies insecurity of employees.
Fontinha, R., Chambel, M. J., & De Cuyper, N. (2014). Training and the commitment of outsourced information technologies' workers: Psychological contract fulfillment as a mediator. <i>Journal of Career Development</i> , 41(4), 321–340.	None.
Major, D. A., Morganson, V. J., & Bolen, H. M. (2013). Predictors of occupational and organizational commitment in information technology: Exploring gender differences and similarities. <i>Journal of Business & Psychology</i> , 28(3), 301–314.	<ul style="list-style-type: none"> • Satisfaction with growth opportunities, job security, job stress, and work-family culture generally were related to commitment outcomes as expected, accounting for the greatest variance in organizational commitment.
Yim, M.-S. (2012). An exploratory research on causality among information technology stress creators in organizations. <i>Journal of Digital Convergence</i> , 10(8), 1–14.	<ul style="list-style-type: none"> • Complexity of technology positively influences not only work overload but job insecurity. • Work-home conflict has a positive effect on job insecurity.
Moon, T.-E. (2012). Research on the workers'	<ul style="list-style-type: none"> • There should be better policies to improve not only the working

awareness and the status of the current working conditions in domestic IT and non-IT industries. <i>Journal of Digital Convergence</i> , 10(9), 225–238.	conditions but also to find solutions to eliminate the sources of insecurity of retirement in the information technology industry.
Ayyagari, R., Grover, V., & Purvis, R. (2011). Technostress: Technological antecedents and implications. <i>MIS Quarterly</i> , 35(4), 831–858.	<ul style="list-style-type: none"> • Certain technology characteristics like usability (usefulness, complexity, and reliability), intrusiveness (presenteeism, anonymity), and dynamism (pace of change) are related to stressors (work overload, role ambiguity, invasion of privacy, work home conflict, and job insecurity).
Dinger, M., Thatcher, J. B., & Stepina, L. P. (2010). A study of work-family conflict among IT professionals: Job characteristics, individual values, and management practices. <i>Journal of Organizational Computing & Electronic Commerce</i> , 20(1), 91–121.	<ul style="list-style-type: none"> • When IT professionals perceive high levels of job security and are satisfied with supervision, work-family conflict diminishes.
* McKnight, D. H., Phillips, B., & Hardgrave, B. C. (2009). Which reduces IT turnover intention the most: Workplace characteristics or job characteristics? <i>Information & Management</i> , 46(3), 167–174	<ul style="list-style-type: none"> • Workplace characteristics (structural fairness, trust in senior management, employee information sharing, and job security) out-predicted job characteristics in affecting turnover intention of programmers and analysts.
Bartol, K. M., Liu, W., Zeng, X., et al. (2009). Social exchange and knowledge sharing among knowledge workers: The moderating role of perceived job security. <i>Management & Organization Review</i> , 5(2), 223–240.	<ul style="list-style-type: none"> • Perceived organizational support (POS) was positively related to knowledge sharing, and perceived job security moderated the association. • The positive association between POS and employee knowledge sharing held only for employees who perceived higher job security from their organization. • POS was not significantly associated with knowledge sharing when employees perceived their job security to be relatively low.
Tan, D. C. M. (2009). The relationship between the perceived threat from information technology outsourcing and job satisfaction of information technology professionals. <i>12th International Business Information Management Association Conference</i> . Kuala Lumpur, Malaysia, Jun 29–30.	<ul style="list-style-type: none"> • IT professionals who perceived IT outsourcing as a significant threat to their job security reported lower perceived job satisfaction.
Park, J.-C. (2009). Perceived job insecurity of Internet information system employees impact on organizational trust and organizational commitment. <i>Journal of Internet Electronic Commerce Research</i> , 9(1), 163–175.	<ul style="list-style-type: none"> • Job insecurity had significant influence on organizational trust and organizational commitment. • Job insecurity had significant indirect impact on organizational commitment.
Newton, S. K.; Blanton, J. E., Wingreen, S. C. (2007). Exploring the characteristics of an IT professional's employment arrangement. <i>45th Annual Computer Personnel Research Conference</i> . St Louis, MO, ACM, Apr 19–21.	None.
Louis, L. R. (2003). Employee perceptions of outsourcing of information technology operations: An empirical investigation. <i>Information Resources Management Association Conference</i> . Philadelphia, PA, May 18–21.	None.
* Hsu, M. K., Jiang, J. J., Klein, G., et al. (2003). Perceived career incentives and intent to leave. <i>Information & Management</i> , 40(5), 361–369.	<ul style="list-style-type: none"> • Job security and service incentive are most important in reducing an employee's intent to leave the organization.
* Mak, B. L. (1998). Job security and retention factors for IS employees. <i>29th Annual Meeting of the Decision Sciences Institute</i> . Las Vegas, NV, Nov 21–24, Decision Sciences Institute.	<ul style="list-style-type: none"> • Job security factors related to job retention of IS employees consist of the company's technological adoption policy, job development policy, and job assignment policy, as well as employees' pessimism to job prospect. • Job retention factors consist of turnover intent, attraction of other job offers, stress, and job commitment. • True job retention and job security issues are highly and positively correlated to one another, suggesting that management should develop policies to foster employees' job security in order to enhance employee retention.

* Work that addresses at least some part of our study's theoretical interests.

Table 1. Studies on JI and the IST occupation indexed in Web of Science (as of May 23, 2016)

It is our guess that prior to the first published studies on JI in the IST profession, the profession was enshrined as the redoubt of untouchable employees – for the highly skilled and organizationally critical routines its practitioners performed. After the dotcom bubble burst in the first years of the 2000s (Hirschheim & Klein, 2003), the alleged commoditization of the information technologies (Carr, 2003) and the U.S. financial crisis of 2007-2008, which led to an 8.9% unemployment rate in that country (Murphy et al., 2013), the IST profession may have started to be seen as just another organizational function, and, as such, threatened by unemployment. That is, it is possible that perceptions of JI emerged as a topic in the field, especially during the occurrence of crises. Therefore, the seemingly lack of studies on JI in the IST literature may not be due to a lack of interest, but rather to the perception of JI being a new phenomenon among IST professionals.

The experience of JI is an opportunity for workers to reflect on their organizational embeddedness and may ultimately result in looser bonds between the worker and the organization (Murphy et al., 2013). Furthermore, at least in the context of onshore versus offshore worker sourcing, the sense of JI leads to competitive behaviors among workers on the basis of costs and skills in order to protect their job positions (Zhang, 2012). Thus, when developing a sense of JI, IST professionals may behave in ways that indicate attachment to the job, while also loosening their bonds to the organization.

In other professions, anxiety is known to develop when JI is present (Boya et al., 2008; Burgard et al., 2012), even when workers feel threatened by undesirable job status changes, instead of effective job losses (Gallie et al., in press). It may be also so in the IST profession that anxiety and JI are related. Indeed, since the IST professional feels the needs of both protection and recognition (Dinger et al., 2015), the sense of being able to perform well may mitigate the anxiety of external assessments which is associated with JI. Furthermore, the sense of being able to perform well would contribute to increase the worker's job satisfaction (JS) due to increasing the likelihood of a prospective positive performance assessment from peers. Additionally, as organizational citizenship behavior among IST professionals is low (Moore & Love, 2005) – that is, they perform their tasks in a mostly autonomous fashion –, we hypothesize that their sense of JS and JI is mostly dependent on their own perceptions of ability to perform well. By extending the concept of self-efficacy (Bandura, 1997) to the perception an individual has about his/her own efficacy in the profession, that is, how well he/she is able to perform, we develop the concept of professional self-efficacy (PSE) and the following two hypotheses:

H1) PSE negatively influences JI.

H2) PSE positively influences JS.

For programmers and analysts in the IST field, JS and ILO are reported to be related (McKnight et al., 2009), with low job *security* being among the factors that reduce turnover (Hsu et al., 2003). Generally speaking, when there is a sense of JI, workers try to show they are valuable to the organization by working harder or being more present to the job (Staufenbiel & König, 2010), but the perception of JI ultimately leads to the intention to quit (Ashford et al., 1989).

According to Murphy et al. (2013), a similar reality would be in place even during a period of economic turmoil. They hypothesize that if workers perceive their jobs as secure, job security would positively influence their job embeddedness, which would in turn increase their intention to remain in the organization; and if workers perceive their jobs as very insecure, JI would cause disembeddedness, which would in turn negatively influence their intention to remain in the organization. Murphy et al. (2013) add that, according to the literature, job security is a basic motivation for work. However, we contend that this is in conflict with some organizational practices that do not focus on retaining the workforce, or that even stimulate the workforce to rotate (Agarwal et al., 2006). As said before, turnover is sometimes seen as positive within the IST occupational culture (Moore & Burke, 2002). At the end of their study, Murphy et al. (2013) found that JI negatively affected job search behavior during an economic recession.

Taking the results from Murphy et al. (2013), we believe that, particularly in periods of economic recession, if an IST professional sees his/her job as secure, he/she will not oppose leaving the job if an

alternative job opportunity arises (so that he/she will consciously or unconsciously adhere to the idea that career success in the IST occupation implies changing often between organizations); but upon the perception of JI, he/she will try to secure his/her job for an extended time in order to avoid the risk of unemployment. This is a potentially important investigation to be done in the IST field, since JI has not attracted much attention of IST researchers, maybe because JI does not seem to be the norm in the field. We then develop the following two hypotheses:

H3) JI negatively influences ILO.

H4) JI positively influences ILP.

In a favorable labor market, frustrated IST workers are likely to intend to leave their jobs (Moore et al., 2016). According to Moorman (1993), JS is usually defined as having an affective component – the overall positive emotional appraisal of the job – and a cognitive component – the logical and rational evaluation of the job conditions. So, JS is arguably related to the intention to stay in the job or not. JS seems to be related with job security in some IST cases (Tan, 2009), and JS is an important predictor of ILO (Thatcher et al., 2002). In fact, the higher the satisfaction with the job, the lower the ILO (Dinger et al., 2015). And as for ILP, results are inconclusive, but evidence suggests that JS may not be the primary source of influence (Ramos & Joia, 2014). It may be interesting to further investigate this. We then hypothesize that:

H5) JS negatively influences ILO.

H6) JS negatively influences ILP.

Figure 1 summarizes our conceptual model.

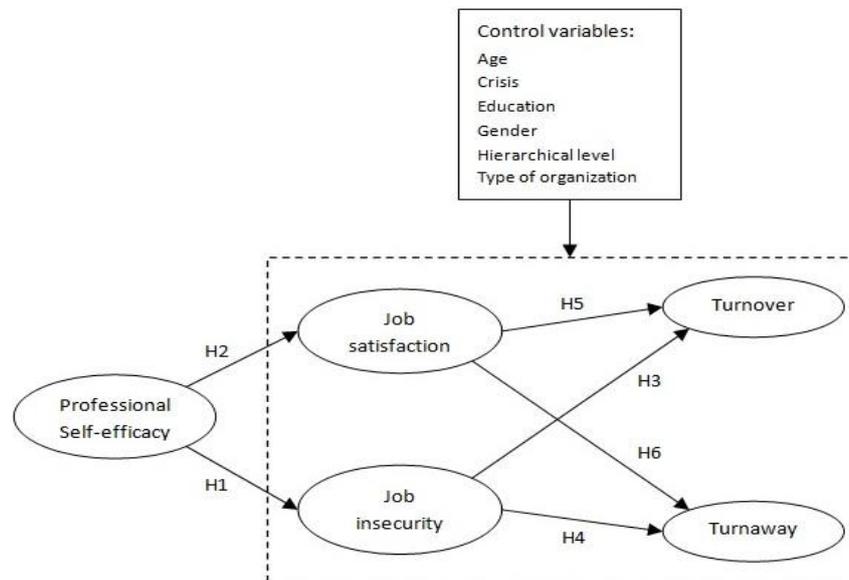


Figure 1. Conceptual model

METHOD

This study is part of a larger project (the World Information Technology Project, WITP, <http://worlditproject.com>), which has been gathering data about the IST profession in 45 countries since 2013. According to the WITP's team leader, Dr. Prashant Palvia (2013), the WITP was motivated by the fact that most IST research is dominated by the perspective of a few countries, and researchers in other countries – mainly the less developed ones – inadvertently adopt theoretical models and empirical findings that are exotic to their realities. At the same time, the international IST community does not have access to potentially useful perspectives and cases that remain isolated

within the geographical boundaries. The problematic development of true global knowledge about the IST field worldwide is certainly due to a variety of reasons, among which the language barrier, the irregular access to mainstream literature in many parts of the world, and the lack of initiative by both the local researchers and the global community towards a richer, shared frame of reference. Such a more diverse approach to IST interests is expected to enable greater effectiveness of local practices for both the demand and the supply sides of IST applications, services, and public policies.

In order to build this frame of reference, the WITP recruited researchers throughout the world who could interact with their local IST realities and make bridges with the global IST community. The focus was on the IST workforce in each participating country. A standard data collection instrument was shared with all research teams that joined the project, and the teams were expected to translate the instrument to their regional languages, apply the instrument to a statistically significant sample of IST professionals in their countries, and apply local knowledge to interpret the results. Besides collecting a series of demographic variables about the respondents and their organizations, the data collection instrument measured items on (1) the respondents' personality, friendship circle, IST-related competencies, and job-related perceptions and intentions; (2) their organizations' culture, IST maturity, business strategy, and competitive environment; (3) the IST occupational culture; and (4) the local national culture.

Our study is part of the WITP's Brazilian chapter. During the collection of data in Brazil, we realized that we had quality data to study the network described in Figure 1, and that we could also study the unique effects of two control variables, as we shall discuss later – the IST professionals' age, and two particular moments of a national crisis in the country where the professionals worked and lived. IST is not recognized as a true profession in Brazil (it is sometimes referred to as an occupation instead – Joia & Mangia, in press), but it is responsible for a great deal of the Brazilian economy, as part of the services sector – which corresponds to nearly 70% of the Brazilian GDP and also nearly 70% of the total job positions in the country. The IST sector employs some 1.3 million workers in Brazil, and another 750 thousand are expected to be demanded until 2020 (Garbin, 2016), while it is also true that the shortage of qualified professionals is an enduring issue in the country (Joia & Mangia, 2015; Mangia & Joia, 2015). As a matter of fact, the public interest, non-governmental organization that promotes the Brazilian software worldwide estimates a deficit of 408 thousand professionals by 2022 and a corresponding huge loss in business opportunities (Softex, 2015).

The Brazilian IST sector is solid, maybe because until the 1990s a federal regulation forced the country to develop its own IST solutions (Bellini et al., 2013). That reality may have boosted the country's IST knowledge base, so that some Brazilian IST cases and competencies attracted world attention. As a result, as of 2002, Brazil was reported to pertain to the “major destinations” (95%) cluster of offshore IST-related work sourcing for U.S. companies (Carmel & Agarwal, 2002). Nevertheless, the current reality of the Brazilian economy may be exerting an enormous impact on its IST sector, such as motivating people to leave the country and, consequently, giving rise to the much undesirable effect of brain draining – this is left open for future surveys to verify.

The study of a specific IST reality such as the Brazilian one promotes two benefits. First, it is a rare case where researchers have quality data collected during the unfolding of a long, impactful, multi-order crisis. And second, following the rationale for the WITP, we advocate that the mostly U.S., European, and Australasian literature on the cognitive and behavioral aspects of IST professionals does not apply in full to such idiosyncratic realities as Brazil's. For instance, what is described as reasons for and consequences from JI or JS in current literature may be less meaningful in certain places. Each country has its own policies for what happens if someone loses or quits the job, so workers may feel more or less secure and satisfied with respect to their jobs and with what comes next in case of a change.

Operationalization of Constructs

All constructs included in the conceptual model were operationalized and measured with previously validated five-point Likert scales. We adapted Schaufeli et al.'s (1995) GBQ self-efficacy subscale to measure PSE in our study. The new scale included items such as "in my opinion, I do a good job" and "at my work, I feel confident that I am effective at getting things done". JS was measured with the scale presented by Seashore et al. (1983). It is composed by the following items: "in general, I like working here", "all in all, I am satisfied with my current job", and "in general, I don't like my current job". JI was measured with a formative four-item scale adapted from Elst et al. (2014). It contains items such as "I am worried that future technology advancements may pose a threat to my job" and "I am concerned that my job may be outsourced soon". ILO and ILP were assessed with three-item scales adapted from Moore (2000). ILO items were "I will be with this organization one year from now", "I will take steps during the next year to secure a job at a different organization", and "I will be with this organization five years from now". ILP items were: "I will be working in the IT field one year from now", "I will take steps during the next year to secure a job outside the IT field", and "I will be working in the IT field five years from now".

Control Variables

We included several control variables to test the hypotheses, namely: the respondents' age, education and gender, their organizational hierarchical level, their organization's type (whether public, private, or mixed), and crisis (whether the respondents answered the questionnaire early in 2016, or early in 2015). Each control variable was allowed to influence all latent endogenous variables, that is, JS, JI, ILO, and ILP. These variables have been shown to influence a myriad of individual-level, job-related organizational phenomena, including those investigated in our study (e.g., Böhm et al., 2014; Murphy et al., 2013; Bright, 2008; Cole & Bruch, 2006; Roskies & Louis-Guerin, 1990; Scandura & Lankau, 1997). Age and crisis are of particular interest here, as we discuss next.

Age

Demographic variables are popular in IST research involving individual and group phenomena. However, we rarely see them assuming a pivotal role in the analysis of results. This is mostly the case for age, education, income, gender, ethnicity, and other research-specific variables. But demographic variables can have important and unanticipated impacts on individual and group phenomena. An emblematic case is represented by a polemic sociological research that turned out to be published as a best-selling book in Brazil (Almeida, 2007), according to which one's educational background explains much of his/her perceptions about himself/herself, family, religion, society, politics, and the economy.

Similarly, age may be behind the manifestation of certain important psychological phenomena, since age has strong links with the development of cognition, emotions and the ability to express them purposefully. Age is even said to impact one's personality and cultural traits (Tams et al., 2014). Therefore, besides age being intimately associated to biological phenomena – say, a family's handbook about raising children will precisely describe the occurrence of certain phenotypical characteristics according to a very accurate sequence of days, months and years of the development of a child –, age may also be a contributor to an individual's socially developed characteristics. This is the case, for instance, for how one interprets the history of trials and errors through life and the likelihood that a decision will lead to successful action and outcomes or not.

In the IST profession, age has been considered a driver of certain phenomena. Evidence suggests that there are differences between early and late career professionals (Dinger et al., 2015); that turnover is higher among younger workers in consulting companies than among staff at their client companies (Agarwal et al., 2006); that age in the particular case of the public U.S. sector does not influence ILO (Thatcher et al., 2002); that an aging workforce may be a bottleneck for the competitiveness of firms that want to benefit from modern collaborative technologies (Tams et al., 2014); and that turnaway

may result from a crisis of the middle ages (Ramos & Joia, 2014), that is, for workers between 35 and 45 years of age (Mangia & Joia, 2015).

Tams et al.'s (2014) study is arguably the most important to date about age in the IST field. They make several claims of how age is superficially included in IST studies, notwithstanding its potential contribution to explain phenomena. They suggest that what they call *touch points of age* (the *fluid abilities* of selective and divided attention, working memory, spatial ability, reasoning ability, and perceptual speed; and the *crystallized abilities* of verbal ability, knowledge and experience transfer ability, and discrete knowledge structures) may explain how and why age impacts the IST phenomena. Their theoretical review and propositions are about human-computer interaction, but we believe they are also useful to explain perceptions and intentions of IST professionals according to the age groups they pertain to. For instance, the fluid abilities (that benefit younger people) may make older ones less able to follow the rapid advancements in the IST field, whereas the crystallized abilities (that benefit older people) may make younger ones less able to adapt to and have richer social exchanges in new professional environments. Overall, Tams et al. (2014) claim that age-related research in the IST field has produced findings that are superficial, inconsistent and with low diversity, so as to conclude that there is emerging importance to study the impacts of age on IST phenomena. Our contribution is in that direction – studying whether or not the age of IST professionals impacts their job-related perceptions and intentions. However, at this moment, we do not go beyond including age as a control variable.

Crisis

The Brazilian multi-order crisis marked especially by an economic recession, political turmoil and social conflicts started to be broadly noticed in April 2013⁴, when citizens took to the streets and to the virtual social networks to massively protest against corruption, the political system, and forged public data. But it was not before the middle of 2015 that most people realized the critical situation the country was in, which was then also officially recognized for the first time by the government. The year of 2016 has been especially marked by a variety of events that substantially increased the perception of the Brazilian people about the depth and the consequences of the crisis, what in turn led the Brazilians to enact some of the largest demonstrations in the country's history. By May 2016, the Brazilians have witnessed a series of scandals involving public officers and businessmen, the president was temporarily removed from the job, and the Brazilians also realized that the country was immersed in an extraordinary economic recession.

It is possible, therefore, that a certain amount of the variance in our latent variables would be due not to the hypothesized theoretical relationships among constructs, but to the differences in attitudes, expectations, and personal issues of individuals motivated by the dynamics of the Brazilian crisis. In fact, as implied by the work of De Moura et al. (2015), two antagonistic forces may act in shaping the individual perspectives of IST professionals: their work-related perceptions may be influenced by the background context, but at the same time their personal traits may be more stable and less subject to the environmental contingencies, as compared to other professionals. We believe that especially the perception of IST professionals about JI may have been affected during the evolution of the crisis. As we had the opportunity to measure JI before and after the crisis upheaval, controlling for crisis seems to be necessary, and this may also provide us with an opportunity to discuss the interplay between national crises and the IST profession in a way that very few studies would be able to.

Given that we fortuitously collected data during two distinct moments of the unprecedented Brazilian crisis, we included a dummy variable to indicate whether the respondent answered the questionnaire early in 2016 or one year before. The dummy variable was possible because we had the timestamp of each answer, so that we were able to associate the answers to the distinctive moments of the crisis.

⁴ https://en.wikipedia.org/wiki/2013_protests_in_Brazil. Also, "Has Brazil blown it?", *The Economist*, September 28, 2013, <http://www.economist.com/news/leaders/21586833-stagnant-economy-bloated-state-and-mass-protests-mean-dilma-rousseff-must-change-course-has>

Data Collection

We were primarily interested in IST professionals who had an organizational life, that is, those who were employed by organizations. A few self-employed professionals and owners of IST organizations also answered the questionnaire. We decided to keep them in the dataset since our constructs are somewhat meaningful for self-employed IST professionals and owners of IST organizations as well. Also, we wanted to include all professionals that make the IST profession, thus leaving for future research the interest for more particular analyses.

IST professionals were contacted in Brazil through professional associations and universities that offer IST-related undergraduate and graduate degrees. Potential respondents were contacted through several means, including electronic mail, virtual social networks, and conferences. We also benefited from the help of the most popular Brazilian website⁵ among executives and business people in general, which promoted our data collection among target IST professionals and boosted responses. IST professionals who were invited were also asked to forward the survey to other people they believed were part of the target population. The questionnaire was anonymous and, therefore, it is not possible to know if and when someone who had been invited actually participated in the survey. But using different communication approaches, we believe that respondents were exposed to the request more than once, which we consider an important factor to reach the intended audience and increase the response rate.

Our messages to potential participants included a link to the electronic data collection instrument developed as a GoogleForms document. Caution was taken to ensure that the meaning of all items in the original English WITP questionnaire was preserved after the translation into Portuguese. Special attention was given to phrasing the items so as to assure theoretical consistency and professional colloquialism. We accomplished that by having the three Brazilian WITP researchers (who are academics and practitioners in the IST field) independently translating the items and subsequently merging the translations after discrepancies were solved. We also compared our translation with other similar instruments available in the literature, and we finally submitted the instrument for face validation by an IST research group that included two professors, four PhD candidates, several MSc and BSc students, one CIO, and one systems analyst. We concluded that the instrument was consistent and sufficiently clear to be applied to the field. And after making the instrument available online, we enabled participants to comment about its quality in terms of completeness and clarity. We received several comments especially about the length of the questionnaire (it had 160 items) and about its specific focus on IST professionals who were employees in organizations (instead of self-employed professionals and company owners). However, no comments implied any change in how data should be collected, such as the sequence of questions or how they were phrased, except for some comments about questions that seemed to be the same for the respondent – but this was intentional.

The usual disclaimers regarding confidentiality of personal information and the voluntary nature of the study were provided in our contacts with the IST professionals, their associations and organizations. Disclaimers were also included in the beginning of the electronic questionnaire, in order to make sure that the purposes of the study were appropriately communicated. Also, we offered free registration to all respondents in the 2016 edition of an academic and professional conference organized annually in Brazil, in order to stimulate the participation in the survey and increase the probability that our respondents would be effective IST professionals living and working in Brazil.

Most of the collected data was not used for the purposes of this specific article, as they refer to other concerns of the broader WITP's Brazilian chapter. Data were collected continuously from January 2015 to April 2016, reaching a total of 385 cases. But after screening out anomalous cases and outliers, our final dataset consisted of 291 cases distributed in two very clear timeframes: from January to May 2015, and from January to April 2016. We did not interrupt the collection of data from June to December 2015 (the online questionnaire was permanently open), but we promoted the Brazilian WITP mainly in the beginning of each year. We had a few dispersed cases collected in other periods,

⁵ Administradores (<http://www.administradores.com.br>)

but they were eliminated during the purification of the dataset. By our data having clustered in those two specific timeframes, we were fortunate to end up with data about two distinct periods of the Brazilian crisis: a pre-awareness period (from January to May 2015), in which presumably most of the population was not fully aware of the important crisis that was taking shape; and a crisis-conscious period (from January to April 2016), in which presumably most of the population realized how bad the situation actually was. The difference between the two periods is well documented in local and international mass media. Dinger et al. (2015) and Murphy et al. (2013) also reported their ability to collect data during a period of economic decline (in the USA) marked by employment difficulties; however, we do not know of any other study that collected perceptual and attitudinal job-related data in the IST field during two very distinct moments of a national crisis.

Sample

We originally collected 385 cases. After removing some incomplete cases, outliers, and individuals who reported dedicating less than 50% of their time to IST-related activities, we obtained a final sample of 291 cases. Outliers were identified based on Mahalanobis distance score (Riani et al., 2009; Verardi & Croux, 2009), with a 0.001 significance level.

One fourth of the valid responses (73) were obtained during the first cycle of data collection (from January to May, 2015) and three fourths (218) during the second cycle (from January to April, 2016). Over 88% of the respondents were between 21 and 49 years of age, 37.5% were between 30 and 39 years of age, and 13% were female – what is consistent with recent surveys by Brazilian consulting companies and professional magazines. More than 82% of the respondents reported having at least a university degree, approximately 53% had a master's degree, and 6% had a doctoral degree. Almost 79% reported total work experience between five and 29 years, and 77% had between five and 29 years of specific work experience in the IST field. Furthermore, 61% worked full time in their organizations, with 65% working in management positions. As for their organizations, 26.5% were public organizations or government agencies. About half of the organizations in our sample had 500 or more employees, 9% had between 5,000 and 10,000 employees, and 11% had more than 10,000 employees.

RESULTS

An initial examination of our data suggests that several variables were not normally distributed. In addition, the proposed model includes both formatively measured and reflexively measured variables. For this reason, partial least squares (PLS) was a better choice for analyzing the data than traditional covariance-based structural equation modeling (SEM). Differently from covariance-based SEM, PLS is a technique that does not assume a common factor model, and it has been reported to generate consistent results even for small sample sizes and when data fail to adhere to the joint multivariate distribution and the independence of observations assumptions (Chin, 2010; Henseler et al., 2014). Furthermore, PLS can easily handle models that include both formative and reflexive latent variables (Chin, 2010; Ringle et al., 2012). We used SmartPLS v2 (Ringle et al., 2005) to calculate the parameter estimates for the proposed model.

Measurement Model

To assess the quality of our measurement model, we followed the procedures described by Wetzels et al. (2009), and we did a confirmatory factor analysis (CFA). The corresponding cross-loading matrix showed that all items loaded appropriately on their respective latent variables. Besides, the outer loadings related to each reflexive measurement scale were above 0.7 and statistically significant ($p < 0.001$).

It is important to highlight that the outer loadings of two (out of four) items in the JI formative scale were not statistically significant. As a consequence, we decided to remove them from the model. The

JI latent variable in our study thus reflects an individual's concern with the possibility that his/her job may be eliminated or outsourced soon – as measured by the remaining two items.

As shown in Table 2, the composite reliability (CR), average variance extracted (AVE), and Cronbach's alpha for all measures are above the limits suggested in the literature ($AVE > 0.5$; $CR > 0.7$; $\alpha_c > 0.7$) (Chin, 1998; 2010). Also, the square root of AVE for each latent variable (shown in the diagonal of the table) is greater than the correlations of each variable with the other ones. Taken together, these results indicate that the constructs of the proposed model have adequate internal consistency and discriminant and convergent validity.

Reflexively measured latent variable	Items	Loadings (min., max.)	AVE	CR	α_c	1	2	3	4
PSE	4	.70, .85	.61	.86	.81	.78*			
JS	3	.86, .90	.78	.91	.86	.35	.88*		
ILO	3	.84, .87	.74	.90	.83	-.30	-.63	.86*	
ILP	3	.89, .91	.80	.92	.86	-.28	-.34	.24	.89*

N = 291; * square root of AVE

Table 2. Results for the measurement model

Structural Model

To assess the significance of path loading estimates for the structural model, we employed bootstrapping techniques with a sample size of 291 and 1,000 resamples. Figure 2 shows the main results.

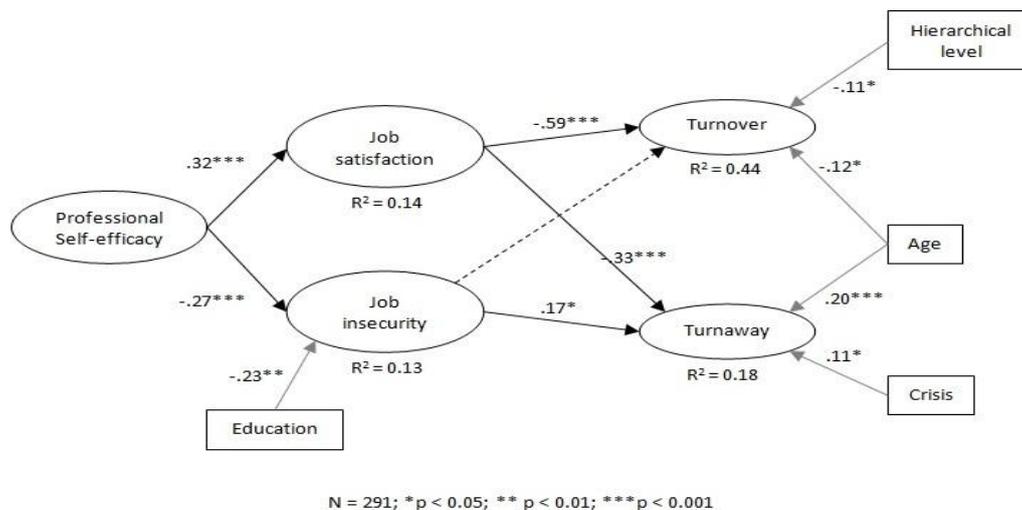


Figure 2. Results for the structural model

The proposed model was able to explain a considerable proportion of the variance of ILO ($R^2 = 0.44$). Although the corresponding values for the remaining exogenous latent variables were lower ($R^2 =$ from 0.13 to 0.18), most hypotheses in our study obtained empirical support.

PSE had substantial effects on both JS and JI. The corresponding path loading estimates were statistically significant and similar in magnitude, although with opposite signs (0.33 and -0.27, respectively; $p < 0.001$). Hence, as proposed in the theoretical review, IST professionals who have higher PSE tend to report higher JS and lower JI. Hypotheses H1 and H2 were then empirically supported.

JS was the foremost predictor of ILO and ILP, with statistically significant effects of -0.59 and -0.33, respectively ($p < 0.001$). These results support hypotheses H5 and H6, that is, IST professionals who have higher JS are less likely to report ILO or ILP.

JI was accepted as a significant influence over ILP (0.17; $p < 0.05$). But contrary to what was expected, JI had no effect on ILO. It seems, therefore, that IST professionals who have stronger concerns about the possibility of losing their jobs (higher JI) are more likely to take steps to leave the profession. It is important to reiterate that, in our study, JI reflects one's concerns about his/her job being eliminated or outsourced soon. We then conclude that hypothesis H3 was rejected, while hypothesis H4 achieved empirical support.

Table 3 shows the indirect effects of PSE on ILO and ILP as calculated with the bootstrapping technique. As expected, PSE had a statistically significant negative effect on ILO through JS; that is, JS mediates the effect of PSE on ILO. On the other hand, the effect of PSE on ILP is mediated by both JS and JI. The estimated total effect of PSE on ILP was -0.15 ($p < 0,001$). Thus, the stronger the beliefs of IST professionals that they are able to properly perform their assigned tasks, the less they intend to leave the IST profession.

Path of indirect effect of PSE	Mean	Standard deviation	T	p-value
JS → ILO	-.19	.04	-4.99	.00
JS → ILP	.06	.03	2.35	.02
JI → ILO	-.02	.03	-.86	.39
JI → ILP	-.05	.02	-2.06	.04
N = 291				

Table 3. Indirect effects of PSE on ILO and ILP

Some control variables had statistically significant effects on the endogenous latent variables. The more educated an individual is, the less he/she reports JI (-0.23; $p < 0.01$). And both age and hierarchical level seem to negatively influence ILO (-0.12 and -0.11, respectively; $p < 0.05$), that is, older IST professionals and those who have higher positions in the organizational hierarchy seem to be less likely to intend to cross the organizational boundaries. On the other hand, older professionals tend to report higher ILP (0.20; $p < .001$). This is not supported by another Brazilian study that did not confirm age as an antecedent of ILP (Joia & Mangia, in press). The intent to leave the IST profession seems to be also in the mind of professionals who answered the questionnaire in 2016 (the worst of the two years of the Brazilian crisis so far) when compared to those who answered before (0.11; $p < .05$). It is therefore possible to conjecture that the consciousness that the crisis became stronger affected ILP but not ILO.

Although Joseph et al. (2015) found different job mobility patterns between male and female IST professionals, Joia and Mangia (in press) did not find any significant influence of gender on career transition, and we also did not find gender influencing our model. Finally, a counterintuitive result for Brazilians was that the type of organization (whether public, private, or mixed) also did not have any influence in our model. The international literature says that “employees in public and private organizations might not differ in terms of important beliefs or attitudes” (Dinger et al., 2015, p.), but we contend that, in Brazil, employees in the private and the public sectors present very different mindsets and behaviors, and especially in terms of job perspectives, it is extremely unusual to see public employees thinking of quitting the job – and as a result, losing their job stability (Joia & Mangia, in press).

DISCUSSION

*“Crisis, What Crisis?”
Supertramp, 1975*

We started our study with the provoking idea that, in the IST occupational culture, an individual who is able to change between organizations is seen as a successful one (Moore & Burke, 2002). We then worked on the idea of PSE as the perception one has about his/her own efficacy in the profession in order to conjecture that PSE may influence ILO and ILP through other constructs – and we found JS and JI as the mediating ones. Nevertheless, JI seems to be a new phenomenon in the IST profession, thus another theoretical and applied challenge was to investigate JI among IST professionals.

Besides the nomological network of constructs that we tested, we had the opportunity to test the effects of two particular control variables: one’s age, and a national crisis. Age was modeled as a control variable because we did not find any theory relating age to our model; and crisis was modeled as a control variable because although we had some theory about professionals’ job-related decisions during crises, we did not collect any specific data about crisis directly in our empirical investigation. The reason for not collecting crisis-related data is that we only realized that we had the unique opportunity to investigate how a crisis may influence job-related perceptions and intentions of IST professionals when we finished the data collection process – since we obviously did not know that a crisis would take shape during the collection of data. We then took the timestamp of each answer and built a dummy variable that informs in which of the two main periods of the crisis each answer was reported. Therefore, our study also contributes by discussing potential job-related decisions of IST professionals according to their age groups (younger versus older professionals) and according to the influence the periods of a national crisis may have on perceptions and intentions.

Additional constructs might interact with the ones in our study to explain ILO and ILP – such as workload/exhaustion, work-family conflict, enjoyment at work, professional obsolescence, professional growth, career versus organizational embeddedness, and many others. Nevertheless, we believe that very complex networks of constructs pose serious difficulties to our understanding, as well as threats to validity. As an example, Joia and Mangia’s (in press) study involves a very large number of constructs modeled as direct antecedents of ILP of IST professionals; but even such a complex model does not include at least two other constructs that we believe to help explain both ILO and ILP: PSE and JI. Moreover, by modeling all constructs as direct antecedents, their model does not discuss the possible cross-influence of constructs, that is, they do not have a stage model (such as in Joseph et al., 2007). And stage models with many constructs are also very difficult to craft, at least for the following two reasons: there may be conflict in the literature on whether a construct is an antecedent or a consequent of another construct; and since we mostly deal with constructs that are both strongly related with each other and based on psychological phenomena, there is likely to be a significant conceptual and perceptual overlap among most constructs – for example, how do we accurately separate JS from work exhaustion or work-home conflict? Therefore, we chose to study a more conservative, parsimonious network of constructs, which addresses three important attributes of a conceptual model: each of its constructs should be theoretically necessary, any two of its constructs should not overlap significantly, and all of its constructs taken together should explain most of the variance of the phenomenon of interest. We believe to have achieved this intent with the conceptual model we submitted to empirical test.

The first important finding of our study – that does not depend on the empirical results, but instead on processing the theoretical sources and our professional experience – is that it would be misleading to assume that all organizations and IST professionals see job retention as a signal of a fulfilling IST career. So, our study from the very beginning contributes to a few others that conceive IST career development from a slightly more complex perspective, either from the perspective of organizations (Agarwal et al., 2006) or the professionals (Moore & Burke, 2002). That is, although counterintuitive especially for the advocates of knowledge management and work motivation, retaining workers is but one alternative for an organization to both securing an IST-intensive knowledge base (that is, not

losing IST capabilities when losing an IST professional) and being a fulfilling place for the IST workforce (that is, not demotivating them for not struggling against turnover).

Second, our literature review enabled us to develop insights and propositions that guided the development of hypotheses about specific job-related constructs. Being an IST professional provides a natural sense of job security about the concerns of desiring or having to leave the job, since IST professionals are highly demanded by organizations, and organizations usually resort to many means to retain their IST professionals. Therefore, both the sense of job security and the IST occupational culture that stimulates job search behavior motivate the IST professionals to leave the job. But we contend that a national crisis with economic recession may change one's perception about job security and his/her intentions about the job.

Third, we found that JI did not fully behave as expected – it had an influence on ILP, but not on ILO. We do not believe that JI is not related to ILO, especially as our empirical investigation measured JI as the worker's perception about the job being eliminated or outsourced soon. JI seems to be a new phenomenon for practitioners and researchers in the field, thus it is possible that our respondents did not have a solid appraisal of how JI may relate to job perspectives. It may be also that our sample describes an idiosyncratic group of IST professionals, particularly those who need to deal with an unprecedented multi-order crisis that hit them unprepared to think about the consequences over their jobs and their organizations.

Fourth, as far as JS was a strong predictor of an IST professional's ILO or ILP, satisfied employees tend to leave their jobs less often than unsatisfied ones. Although retaining the IST professionals should not be the “the one best way” practice in all organizations all the time, a good advice for organizations that want to keep their valuable IST human resources – or at least until the “nomad culture” of IST professionals pushes them away from searching for new challenges – is to make sure that the organization has a timely assessment of and action towards job-related perceptions of its IST workforce.

Fifth, as for whether one's age influences ILO and ILP, we found that the older the worker is, the less willing he/she is to manifest ILO, and the more likely he/she is to manifest ILP. This may be explained by the natural human need of diversifying one's activities after a period doing a single activity, but it may be also explained by a need to finding better dividends elsewhere in order to cope with the current moment of the Brazilian economy. Thus, ILP may mean that older people are naturally trying to find more pleasure in other activities, or their broader view of the economic activities makes them confident to explore other fields. Also, in some cases, ILO means a higher disposition to move to another community (where the future employer is located), and this is reasonably less likely to attract older people; older people probably have a complex set of material and affective investments in the place where they live, so that the criterion of asset specificity (Williamson, 1985) compels them to stay in the current organization/community if much better alternatives are not available.

Finally, the progress of a crisis taking over the country had no impact on ILO, but impacted ILP. This may be explained by the insecurity one may feel about losing a job in a moment where finding job alternatives may be problematic, even if the IST profession is highly demanded by organizations. After all, besides the objective benefits of having a job (such as payment), in the particular case of Brazil, workers have a series of additional benefits that accumulate according to for how long one works in the same organization. Also, changing between organizations is associated with other changes that may represent important costs, such as for the transportation between home and work, eating, dress codes, and so on, and this is mostly expected when moving to another city. Additionally, if changing between organizations represented a chance for better salaries in the past, the current situation in Brazil is the very opposite – organizations are replacing their human resources by cheaper workers, so that changing to another organization may represent an important losses in income as well. On the other hand, moving to another profession may be explained by new opportunities to increase the dividends, as commented before.

Theoretical Implications

The first theoretical implication of our study is to bring to light the discussion of JI in the IST field, which seems to be a new phenomenon both in the literature and in the profession. Second, our study is among the few to address both ILO and ILP, and it is maybe the first one to address the influence of a national crisis on job-related perceptions and intentions of IST professionals. Third, we contribute to the calls for more emphasis on age as an important factor in IST research (Tams et al., 2014), especially in job-related studies. Fourth, we develop a parsimonious network of constructs to study IST professionals' job-related, perception-based antecedents of ILO and ILP.

We also contribute to the literature by demystifying the IST profession as a domain that is protected against job threats. Although our results are somewhat exploratory, we do frame the IST profession according to new lenses. But this should be no surprise; after all, all professions are regulated by the tenets of supply and demand, and job-related decisions are additionally regulated by human perceptions and intentions. That is, it is but a matter of time for the IST profession to intensify its theoretical concerns about JI and related phenomena.

Managerial Implications

Although losing an IST employee can be costly to organizations (Moore et al., 2016), it would be naive to finish our paper by merely suggesting ways to retain the IST professionals in the organization. Those professionals still have lots of opportunities in the labor market, and they usually feel as their career success is dependent on their ability to be attractive to other employers – and ultimately move to another organization as a result. Also, some organizations are described in the literature as being oriented towards other goals about their IST employees other than just retaining them. So, we diverge from most published works on the IST professionals' job-related perceptions, intentions, decisions and effective actions by suggesting that (1) managers should be aware that IST professionals' frame of mind suffers the influence not only from the attitudes of organizations towards them, but also from the larger community of IST peers; and that, (2) especially during a national crisis with economic recession, the very IST professionals may feel the need to secure their jobs, given that JI may emerge. That is, the effectiveness of an organization's incentives to retain its IST professionals is limited by the influence of the professional's peer community; but on the other hand, each individual professional may decide to deploy his/her own means to secure his/her position in the organization regardless of the organizational incentives for job continuance, especially if JI is high during a national crisis with economic recession. The latter is explained by the fact that economic recessions increase the risk that job losses result in difficulties for one to survive in a deteriorating context of quality of life, as well as difficulties for one to find another position with similar or better benefits in the labor market.

Limitations

We need to be careful with the very use of an international literature (mainly represented by U.S., European and Australasian studies) to set the grounds for a study developed in a very specific context. Discussing the reasons for ILO and ILP among IST professionals in very different cultures, economies and legislations (such as comparing our data and data analysis with those from other places) is risky. For instance, the implications of being unemployed are certainly much different if one is a citizen in a developed versus less developed country. Also, some studies seem not to distinguish between turnover and turnaway, and other studies are unclear of whether "job" refers to a current job position occupied by someone in particular, or to a job concept to be eliminated or not; therefore, we cannot exclude the possibility that we may have made use of theoretical sources that are not perfectly consistent with the sharp systematization that we applied to our study.

Second, we used a standard questionnaire (WITP's) with no specificity to the Brazilian society and the Brazilian IST profession, let alone the particular period of deep multi-order crisis that dominates the country. We could not adapt the instrument to deepen the comprehension of the constructs of our interest; although the application of a standard questionnaire to all countries in the WITP meets the

important goal of enabling comparisons and cancelling out the effect of personal preferences in data collection, it is, nevertheless, a limitation for the specific intents of this article.

A third limitation – that stems from the previous one – refers to the available set of control variables in our data collection and the corresponding data analysis. As a matter of fact, we could identify literally dozens of particular variables that were already described in the literature as possibly influencing ILO and ILP. However, many of them were not available for analysis. For instance, we do not know for how long our respondents were working in their organizations, their income perspectives, their levels of job and organizational embeddedness, and their attitudes towards organizational citizenship behavior.

A fourth limitation concerns the very nature of psychometric studies based on self-reports and no interaction between the interviewer and the interviewee. Besides the known problems that stem from this type of data collection (such as how the respondent interprets each question, or his/her personal interests in giving certain answers), we should note that the phrasing of some questions in our questionnaire may be disputable – and as such, misguide the real intent of inquiry. For instance, while the original WITP questionnaire asked about agreement with “*I will be with this organization one year from now*” (adapted from Moore, 2000), the Brazilian-Portuguese version of the questionnaire asked for “*Espero ainda estar nesta empresa no próximo ano*” whose initial verb is more akin to the initial verb in “*I expect to continue working as long as possible in this organization*” (as used in Murphy et al., 2013 to measure the intention to remain in the organization). Our Brazilian-Portuguese version better conveys an expectation (as in Murphy et al., 2013) than a prediction (as in Moore, 2000), but on the other hand it introduces some ambiguity: “espero” (“I expect”) means either “I wish” or “it is likely that”.

Future Research

Besides continuing our line of investigation and addressing the limitations of this particular study, future research should try to unveil whether job-related perceptions, intentions, decisions and effective actions of IST professionals are immune to important national crises or not. Second, according to how a national culture interprets the aging process, people may see other people as more or less IST adept. For instance, the USA and Japan are in opposing positions in how people regard older ones (Tams et al., 2014), and as such we can suppose that people in a particular culture would also see themselves differently according to their age. Thus, the decision of Brazilian IST professionals to leave or remain in their jobs may have links with their own beliefs about age and occupational work. This is a reason for us to consider age as key in job-related perceptions, intentions, decisions and actions, particularly when a survey within a strong national culture is envisioned.

Third, future research should do separate analyses for strict IST employees, that is, those who are effectively *employed in* organizations, thus excluding self-employed professionals and owners of IST organizations. We believe that separate analyses might reveal a difference particularly in JS and JI, as well as in ILO and ILP. Also, research should investigate whether and why public and private sector professionals have different job-related perceptions and intentions, since there are particular implications in many countries about job stability for public and private sector employees.

Fourth, by introducing the novel discussion of the effects of a multi-order crisis on job-related perceptions and intentions among IST professionals, we anticipate another line of research that may be of interest for the IST field as crises develop in other parts of the world: the possible occurrence of a job-related, *field-wide* crisis (instead of individually perceived crisis) and its effects on career decisions by categories of IST professionals. Riaz et al. (2016) describe one such crisis in the US banking sector during the global financial crisis, as well as the actions deployed by some actors in the sector to defend their positions.

Fifth, the generally dramatic current reality of the Brazilian society may be promoting an important exodus of Brazilian IST professionals to other countries. Even if the internal job market is not

seriously affected (this is just a supposition), the Brazilian crisis is not only marked by a fierce economic recession, but also by urban violence and the increasing taxation of services, products and public tributes, so that both the economy and the general society are affected in important ways. Therefore, it is likely that brain-drain effects are accelerating in Brazil, and future research on job-related intentions of Brazilian IST professionals may focus on the reasons for and preferred destinations of professionals who intend to leave the country.

Sixth, we did not test for the direct influence of PSE on ILO and ILP. We have anecdotal reasons to study the direct influence of PSE on at least ILO, but we chose to study the mediating role of JI and JS instead. We found that PSE has a positive effect on JS, and a negative effect on JI, what eventually leads to less ILO and ILP. However, if the conjecture is correct that high PSE would directly and positively influence ILO, we might have conflicting conclusions. More theoretical developments are needed before we can test this causal path.

Finally, we leave for future research the study of 12 cases that seem profitable for a richer understanding of how one's age and a national crisis may influence job-related perceptions and intentions of IST professionals. The cases are stated in Table 4.

Job Satisfaction
Does the influence of JS on ILO of younger professionals differ across the maturation stages of a national crisis?
Does the influence of JS on ILP of younger professionals differ across the maturation stages of a national crisis?
Does the influence of JS on ILO of older professionals differ across the maturation stages of a national crisis?
Does the influence of JS on ILP of older professionals differ across the maturation stages of a national crisis?
Does the influence of JS on ILO of younger professionals differ from the influence of JS on ILO of older professionals during the same maturation stage of a national crisis?
Does the influence of JS on ILP of younger professionals differ from the influence of JS on ILP of older professionals during the same maturation stage of a national crisis?
Job Insecurity
Does the influence of JI on ILO of younger professionals differ across the maturation stages of a national crisis?
Does the influence of JI on ILP of younger professionals differ across the maturation stages of a national crisis?
Does the influence of JI on ILO of older professionals differ across the maturation stages of a national crisis?
Does the influence of JI on ILP of older professionals differ across the maturation stages of a national crisis?
Does the influence of JI on ILO of younger professionals differ from the influence of JI on ILO of older professionals during the same maturation stage of a national crisis?
Does the influence of JI on ILP of younger professionals differ from the influence of JI on ILP of older professionals during the same maturation stage of a national crisis?

Table 4. The influence of JS and JI on ILO and ILP according to age and crisis.

CONCLUSIONS

Our study addressed several enduring interests of the IST field – the disbalance between the supply and demand of IST professionals worldwide, the struggle of many organizations to secure their IST human resources, the idiosyncratic IST occupational culture, and the phenomena of turnover and turnaway in the profession. We contribute to the literature by organizing a parsimonious network of constructs targeted at explaining turnover and turnaway, by introducing JI as a newly important concern in the field, and by contextualizing our study in terms of the professionals' age and according to the stages of maturation of a national crisis during which the professionals expressed their perceptions and intentions about job.

In general, we found that JI, JS and PSE are important direct or indirect antecedents of both ILO and ILP. This means that a small set of key perceptions of IST professionals about themselves and their jobs is capable of satisfactorily explaining the costs and benefits of job continuance, and the likely decisions that may result. This is important when searching for a more manageable explanatory model to be deployed in practice and in research.

However, the perspective of IST professionals about work may be influenced by their broader background (De Moura et al., 2015). This is an important assumption that led us to look more closely

on the influence of age and crisis over the perceptual and attitudinal constructs of interest here. Also, one's age and background crises represent two current opportunities for research in the IST field. Our preliminary findings suggest that job-related intentions of IST professionals are in fact shaped to some degree by one's age and the stage of maturation of a national crisis that impacts their work environment. But given the nature of our data and the state of the art, further theoretical and empirical developments are needed in order to introduce age and crisis more formally in models of ILO and ILP.

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