

Engagement of Information Technology Professionals with Their Work

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ABSTRACT

Personal engagement with work is the maximum, deliberate and simultaneous use of physical, cognitive and psychological effort in the execution of the individual's role in his or her work (Kahn, 1990). The subject is relatively new and the way engagement should be operationalized- whether in one or three dimensions – is still a matter of discussion. The purpose of this article was therefore to verify the relationship between the engagement of information technology professionals with their work and the nature of the task, operationalizing the construct in three dimensions: the physical, psychological and cognitive dimension. In addition, this study aimed to verify the concept of engagement on a different field of investigation than the ones employed to date. The survey with 613 subjects and the Exploratory Factorial Analysis enabled the empirical validation of the three dimensions of engagement. Regression Analysis demonstrated a positive relationship between the nature of the task and engagement and also pointed out antecedents for each of the three dimensions of engagement.

Keywords

Physical engagement, psychological engagement, cognitive engagement, nature of the task, IT professionals.

INTRODUCTION

Personal engagement with work is an issue that has only recently been raised by the literature. The most cited article is that of Kahn (1990), who defined engagement as the full realization of working activities with the maximum, deliberate and simultaneous use of physical, cognitive and psychological effort in the execution of the individual's role in his or her work. Although Kahn (1990) defines the phenomenon with three dimensions, some authors operationalize engagement as one-dimensional (Rich, Lepine and Crawford, 2010) and the definition of the term also presents ambiguity (Macey and Schneider, 2008; Thomas, 2006). Even though engagement is already identified as an antecedent or consequent of many organizational phenomena, the scarcity of empirical research justifies this study (Macey and Schneider, 2008; May, Gilson and Harter, 2004; Saks, 2006). This article emphasizes two important aspects of engagement that have been previously neglected: the three-dimensionality (Catsouphes and Costa, 2008) and the influence of environmental characteristics on the phenomenon. This situational character of engaged behavior suggests that the nature of the task affects the degree in which each dimension of engagement is employed.

The field of information technology (IT) is a favorable field of research because of the nature of the task of its professionals. These tasks are in constant flux because of the instable and dynamic environment. In addition, organizations are increasingly dependent on business practices based on technology. The IT business is therefore complex and its professionals need specific technical knowledge and constant improvement because of the speed in which technology is changing (Ono and Binder, 2010). The ability to work remotely, distances individuals from their employer and weakens the bonds within organizations. The individual commits to his career and no longer to his employer (Capelli, 1999). In most cases, technology is associated with concerns about machines and processes. Individuals are put in the background. Training and development of dedicated IT teams are lost in discussions about hardware, software, telecommunications and the outsourcing of services.

This context gives little priority to individuals, but still requires them to update their skills and knowledge constantly, in addition to judging them on results. The nature of the realized task may mitigate the negative effects (Lawrence, 1965; Wey and Salvendy, 2004), one of these being the lack of engagement with the work. This study aims, therefore, to determine how the nature of the task influences the personal engagement of IT professionals with their work.

The theoretical contribution is justified because it promotes the expansion of the emerging literature on engagement by using IT as its field of research - a field that has characteristics that differ from the already researched contexts (e.g., architectural firms, firefighters, nurses, insurance companies), by expanding our understanding about antecedents and by demonstrating that the phenomenon presented itself as three-dimensional. From a practical standpoint, the study can be justified by the potential influence of engagement on individual performance (May et al., 2004) and by the presence of these professionals in most companies. The article is divided into the following sections: theoretical and empirical framework of references and hypotheses, methods, data analysis, discussion of results and concluding remarks.

THEORETICAL AND EMPIRICAL FRAMEWORK OF REFERENCE AND HYPOTHESES

Personal Engagement with Work

The concept of engagement with work is relatively recent and still little explored. The meaning of the construct is varied and ambiguous, with significant variations in how the concept is defined and operationalized (Macey and Schneider, 2008; Thomas, 2006). The most well-known work in this field is represented by Kahn's study (1990), whose concepts and propositions have underpinned subsequent research, including this article. For Kahn (1990), people perform roles in their work and in this act they commit varying degrees of themselves. From this perspective, engagement is represented by situations in which the individual deliberately and simultaneously commits his physical, psychological and cognitive energy to a task-specific behavior in order to fully perform the role he's taken on. That is, a person is considered engaged when he becomes physically involved in the tasks through an identification with the work, whether on his own or with others; when he is cognitively vigilant, focused and alert; and when he is emotionally connected with his work and colleagues (Rich et al., 2010). It is the use of "hands, head and heart" (Ashforth and Humphrey, 1995: 110) in the active performance of work. In Kahn's definition (1990) the construct is composed of three dimensions: the physical, affective and cognitive dimensions. Physical engagement is related to the physical energy per unit of time used in performing the work. Affective engagement is related to the positive feelings of the individual in relation to his work (e.g., enthusiasm, excitement and interest), while cognitive engagement refers to the amount of care that is spent in performing the work, to the effort made to understand complex ideas and master difficult skills, and to focus and concentration, (Rich et al., 2010). Schaufeli and Bakker (2003) also define engagement in three dimensions. For these authors engagement is a positive and complete state of mind related to work and characterized by three aspects: (i) vigor, which is the use of high levels of energy, mental resilience, the willingness to put in effort and persistence in the face of difficulties, (ii) dedication, which refers to a sense of meaningfulness, enthusiasm, inspiration, pride and challenge, and (iii) absorption, which refers to deep concentration and immersion. In a study to construct a scale to measure engagement, Rich et al., (2010) also validated the three dimensions of engagement with Confirmatory Factor Analysis. They concluded, just as the other authors (Kahn, 1990; Schaufeli, Salanova, Gonzales-Roma and Bakker, 2002), that personal engagement in work comprises three dimensions that are distinct components, even if they are highly correlated: the physical, affective and cognitive dimension, respectively.

For Kahn (1990), the willingness to be more or less engaged is the result of three psychological conditions generated by personal characteristics and the perceptions of the individual about his working environment: meaningfulness, safety, and availability. Psychological meaningfulness is related to the return that the individual perceives to get from the effort he's put in. It is influenced by the characteristics of the tasks, the responsibilities of the role and interactional aspects. Psychological safety concerns the individual's perceived ability to express himself and act without fear of negative consequences for his self-image, status or career. Availability refers to his sense of ownership of the physical, affective or psychological resources required to fully perform a given role and is influenced by such matters as the depletion of physical or affective energy, individual insecurity and personal life outside work. The relationship between these three psychological conditions has been the subject of several studies and personal engagement is described in works by May et al., (2004), Margolis and Molinsky (2008) and Olivier and Rothmann (2007). Two aspects of the propositions put forth by Kahn (1990), however, still call for further investigation: the three-dimensional and situational nature of engagement. Assuming that engagement requires the full and deliberate commitment of physical, psychological and cognitive effort, it is necessary to recognize that, although the three spheres are highly correlated, each one represents a unique and specific variable of engagement with its own origins and characteristics. Therefore, condensing them into one dimension means you disregard the distinctions between them. Engagement at work has been approached as both cause and consequence of organizational phenomena, such as satisfaction and commitment (Harrison, Newman and Roth, 2006; Saks, 2006), leadership (Sparrowe, Soetjijto and Kraimer, 2006;

Zhang and Bartol, 2010; Zhu, Avolio and Walumbwa, 2009;) and organizational or individual performance (Bakker, Schaufeli, Leiter and Telis, 2008; Harter, Schmidt and Hayes, 2002; Rich et al., 2010; Schaufeli and Bakker, 2004).

Sonnetag (2003) concluded that situational aspects are crucial for the emergence of engaged behavior. The nature of the performed task has important consequences for the phenomenon in question. Tasks that are significantly different will potentially demand varying degrees of commitment of physical, affective and cognitive energy. For this reason, the results obtained in such studies as the one by Rich et al., (2010) have some reservation about the operationalization of engagement as a one dimensional factor and the use of a measurement scale that has been validated with professionals in nursing and applied to firefighters. These two groups perform activities that require a remarkably similar skill set. The influence of the nature of the task has therefore been overlooked.

It's from this vantage point that this work proposes to investigate empirically the influence of the nature of the task on engagement, considering the three dimensions proposed by Kahn (1990), and using IT professionals as unit of analysis. In this scenario, the nature of the task differs greatly from the one examined in Rich et al., (2010) and Kahn (1990). It makes no sense to imagine whether firefighters would consider committing, or not, their full physical, psychological and cognitive energy in performing their task, given the possible consequences of such a decision. The nature of the task of IT professionals, however, does not impact directly on people's lives and safety. The field of IT is characterized by flexible structures with remote work, a greater number of outsourced than in-house employees (Allan, 2000), and professionals in constant need of improvement because of a rapidly changing labor market. Companies dismiss professionals with obsolete skills and hire others with the new skills that are in demand at the time. The desired professionals is the one who has the multiple and flexible skills that are considered of central importance to the organization (Bartol and Martin, 1992).

The theoretical perspective of this study is justified because it promotes an expansion of the literature related to engagement at work, broadening our understanding of the antecedents of the construct and complementing earlier work by including the three-dimensionality of engagement. From a practical standpoint, it is justified because engaged behavior has considerable influence on organizational performance and business results and because of its positive consequences for organizations. This relationship, which has been ostensibly reported in previous work (Bakker et al., 2008; Bakker, Hakanen, Demerouti and Xanthopoulou, 2007; Rich et al., 2010; Saks, 2006), leads to the conclusion that the engagement of its members is desirable for an organization, especially IT organizations where the practice of flexibility and remote working can distance professionals from the organizational objectives (Capelli, 1999).

Nature of the Task as Antecedent of Personal Engagement with Work

The nature of tasks has been researched since Taylor's time and motion studies (1911) because of its influence on individual and organizational outcomes (Morgeson and Campion, 2003; Parker and Wall, 1998; Wall and Martin, 1987). In developing his theory on these two factors, Herzberg (1964) was already concerned about the influence on individual behavior of job characteristics and organizational practices, factors that are important because they are related to the capacity for human achievement, which in turn influences psychological development. The author pointed to recognition, achievement, responsibility and the work itself as factors that create job satisfaction. Morgeson and Humphrey (2006) concluded that the studies conducted so far were limited. They addressed different aspects of the nature of tasks, but did not seem to put in any effort to integrate them. The authors (Morgeson and Humphrey, 2006) proposed, therefore, to broaden the focus, which was hitherto limited to describing the task, including motivational, social and work context components in the description of the construct. Their research resulted in a measurement tool called the Work Design Questionnaire - WDQ. The motivational characteristics were divided into characteristics of the task itself (autonomy, variety, significance, identity and feedback) and of the knowledge needed to perform the task (complexity, information flow, problem solving, range of knowledge needed and specialization). The social characteristics are related to the social relations arising from the performed task (social support, task interdependence, interactions outside of the organization and feedback). The contextual characteristics are related to the physical characteristics of the workplace (ergonomics, physical demands, working conditions and equipment used).

According to Wei and Salvendy (2004), the nature of the task consists of identifying the core competencies and skills required to perform the tasks, the identification of underlying components (attitude, initiative) to execute the planned activities, and the cognitive analysis of the task, with task mapping based on worker skills being important for decision making. For these authors, the central features of the job may have a catalytic effect on the positive attitudes and behaviors of individuals in relation to their work. Ali and Aroosiya (2009) point out that only a challenging job creates the opportunity for achievement, recognition, promotion, and growth, motivating individuals in the pursuit of a particular objective. Christian, Garza and Slaughter (2011) studied aspects of the nature of tasks, such as autonomy, variety and complexity, as causes of engagement. They concluded that these variables are positively linked to engagement and that there is evidence that

engagement is positively related with the individual's performance at work. Al-Ahmadi (2009) also found a positive relationship between the nature of the work and individual performance.

Until recently, researchers paid more attention to motivational aspects, which was justified by the belief that the greater the complexity or enrichment of the task, the greater the motivation of individuals in their work would be (Christian et al., 2011). Among these motivational characteristics of work, task autonomy reflects the extent to which a particular job allows an individual the freedom and independence to schedule work, make decisions and choose the methods used to accomplish the tasks (Breugh, 1985; Wall, Jackson and Davids, 1992; Wall, Jackson and Mullarkey, 1995). This way the following hypotheses are raised:

H1a: task autonomy has a positive influence on physical engagement;

H1b: task autonomy has a positive influence on affective engagement;

H1c: task autonomy has a positive influence on cognitive engagement.

Morgeson and Humphrey (2006) discussed task complexity, referring to how difficult it is to accomplish and whether it requires the development of a set of varying skills. This makes the task challenging and, at the same time, stimulating for the individual, which could have positive results for the emotional well-being of the employee. For this reason the following research hypotheses are proposed:

H2a: task complexity has a positive influence on physical engagement;

H2b: task complexity has a positive influence on affective engagement;

H2c: task complexity has a positive influence on cognitive engagement.

Task variety is explained by the number of different activities necessary to accomplish it (Morgeson and Humphrey, 2006). Sims, Szilagyi, and Keller (1976) state that the greater the range of the task, the more interesting the work becomes for the individual. Kahn (1990) also pointed to the characteristics of the work as a source of engagement. Affective engagement can be reached if the characteristics of the task provide for challenging work, a varied use of skills and the opportunity to make important contributions to the organization. In addition, the author proposed that both individual and organizational factors influence the psychological experience of work and that this experience drives engaged behavior. Individuals who have the resources that enable them to execute their tasks are more likely to invest personal energy and resources to accomplish them (Bakker, Emmerik and Euwema, 2006; Salanova, Agut and Peiro, 2005). Keeping this in mind, the following hypotheses can be put forth:

H3a: task variety has a positive influence on physical engagement;

H3b: task variety has a positive influence on affective engagement;

H3c: task variety has a positive influence on cognitive engagement.

The context associated with the field of IT is relevant to the study of individual engagement with work because there are several factors that contribute to a weakening of the bonds between IT professionals and their employers. The practice of providing services remotely, the tendency to outsource IT professionals because of the increasing number of IT companies and the commitment of IT professionals to their career instead of the organization, creates so-called professionals without boundaries. The individual can now develop his career in his field without considering the boundaries of the organization he belongs to (Loogman, Umarik and Vilu, 2004). In addition, investments in IT tend to be focused on hardware and software, telecommunications and outsourcing services instead of on direct investments in the training and development of dedicated IT teams. The IT-based technological revolution of the 70s, and the disintegration of the organizational model based on rational and vertical bureaucracies, has resulted in decentralization, greater management flexibility, increased individualization and greater diversification of labor relations (Castells, 2008). The increasing use of IT systems by organizations has grown the job market for IT professionals, with a demand for specialized professionals with complex responsibilities (Huang, 2001). The context of IT, therefore, challenges organizations to direct their efforts to attract qualified and engaged IT professionals, and to identify ways to retain them given that the current scenario encourages the individual to change employers without changing his career (Capelli, 1999).

METHODS

The selected method was a survey using a structured questionnaire. The population of the study consisted of IT workers from 18 Brazilian states. In 2010 there were approximately 857 thousand IT professionals employed in Brazil (Softex, 2012). The data was gathered with a virtual questionnaire between August and October, 2012. The sample was non-probabilistic, by adherence. 917 questionnaires were received of which 613 were considered valid after verifying the missing values and the lack of minimal variation in responses. The questionnaires with at least one missing value in the main effect variables were discarded.

Measurements

The 18 indicators to assess the three dimensions of engagement were extracted from Rich et al., (2010). The nature of the task was measured by 11 indicators derived from Morgeson and Humphrey (2006), measuring three aspects of the task: autonomy in relation to the choice of working methods, complexity and variety of the task. A 1-10 Likert scale was used (1- strongly disagree; 10 – strongly agree).

Data Processing

The quality of the data was verified to see if they met the assumptions of each employed statistical technique (Hair, Babin, Money and Samouel, 2005). Subsequently, the data was submitted to Exploratory Factor Analysis (EFA) to determine the three-dimensionality of engagement, and to regression analysis to test the hypotheses.

DATA ANALYSIS

The studied sample was predominantly male (85%), young (average age of 33), with higher education (77%) and experience in the profession (average of 15 years). 88% worked in the private sector and 81% was employed in a state capital or its metropolitan area. Half of the sample is comprised of professionals working in companies that have IT as their core business and the other half by IT professionals who work in IT for a company whose core business is not IT. Most (86%) work in the company office and 14% in a home office. With regard to the position, 30% occupied management positions, 52% were specialists, 36% exercised operational functions and 2% had other functions. The average length of service was 6 years and respondents worked on average 44 hours per week.

Normality was assessed with the Kolmogorov-Smirnov test. The interval variables did not present a normal distribution, but all asymmetry values stayed close to ± 1.5 . This permitted the normality assumption to be relaxed to perform EFA and Regression analysis (Schumaker and Lomax, 2004).

Validity and Reliability of Measurements

The KMO (0,880), the results of Bartlett's test of sphericity (p-value $<.000$, Chi Square = 16283.889 and 406 degrees of freedom) and the correlations (most coefficients with values above .30) indicated that the sample was suitable for performing EFA, applied to a set of 29 indicators divided into six factors (Hair et al., 2005). The EFA was performed with factor extraction by principal components and the Varimax rotation method, which were realized without establishing the number of factors to be extracted. The Table 1 shows that the indicators load heavily on their respective constructs. These constructs were also the only ones with eigenvalues above 1.0 (Kaiser criterion), which increases the confidence of working with 6 factors. When only the eigenvalues greater than 1.0 were considered, the load values were also close to or above .60 (Hair et al., 2005). We chose not to change the scales (keeping the items with loadings inferior to .60 –e.g., task complexity and cognitive engagement) because Cronbach's alpha did not improve a lot if the items were deleted. The reliability of the measurements was supported by Cronbach's Alpha, which lowest value found was .812 (Hair et al., 2005). Although the number of factors was not defined, Table 1, next page, presents the loadings and cross-loadings of the indicators, Cronbach's alpha and the explained variance. The 6 factors combined account for 78.26% of the variance of the original variables. This supports the possibility of working only with 6 factors. Hair et al., (2005) recommend that the factors explain at least 60% of the cumulative variance.

	Variety	Complexity	Autonomy	Physical E.	Affective E.	Cognitive E.
1. Variety	.827	.122	.112	.007	.030	.107
2. Variety	.830	.179	.083	.024	.125	.074
3. Variety	.906	.172	.009	.064	.122	.058
4. Variety	.849	.181	.000	.098	.143	.159
1. Complexity	.213	.561	.005	-.064	-.028	-.020
2. Complexity	.177	.873	.001	-.029	.032	.097
3. Complexity	.095	.869	.004	-.048	.011	.123
4. Complexity	.099	.844	-.032	-.021	.088	.118
1. Autonomy	.081	.021	.844	-.010	.230	.099
2. Autonomy	.048	-.041	.914	.016	.222	.029
3. Autonomy	.066	-.004	.905	.026	.180	.031
1. Physical E.	.035	-.080	.013	.915	.028	-.062
2. Physical E.	.054	-.060	.021	.932	.042	-.058
3. Physical E.	.021	-.050	.015	.932	-.016	-.039
4. Physical E.	.042	.018	.013	.915	-.030	-.069
5. Physical E.	-.001	.003	-.033	.904	-.039	-.033
6. Physical E.	.045	-.033	.007	.934	-.022	-.044
1. Affective E.	.103	-.003	.150	-.006	.879	.127
2. Affective E.	.084	.030	.148	-.060	.893	.138
3. Affective E.	.015	.024	.145	-.005	.857	.176
4. Affective E.	.139	-.012	.063	.006	.865	.044
5. Affective E.	.062	.047	.142	.038	.891	.100
6. Affective E.	.063	.044	.104	-.015	.825	.203
1. Cognitive E.	.172	.149	.019	.048	.073	.586
2. Cognitive E.	.034	.034	.068	-.112	.130	.866
3. Cognitive E.	.028	.045	.042	-.158	.103	.897
4. Cognitive E.	.081	.049	-.011	-.005	.120	.804
5. Cognitive E.	.049	.040	.033	-.050	.163	.884
6. Cognitive E.	.052	.037	.049	-.049	.146	.900
Variance Explained	10,761%	9,336%	8,621%	17,843%	16,635%	15,061%
Cronbach's Alpha	.908	.812	.905	.966	.946	.900
Reference values: Cronbach's Alpha > .60, load of factors > .60.						

Table 1. Exploratory Factorial Analysis – Loadings and Cross-Loadings of Measures

Regression Analysis for Testing the Hypotheses

After evaluating the reliability and validity of the measurements, the factors were correlated and analyzed to establish the mean and standard deviation, as shown in Table 2. The t-test showed that the means of each variable are different (p-value <.01). The low correlations between the dimensions of engagement do not indicate multicollinearity problems, suggesting that engagement has three dimensions.

	Mean	s.d.	(1)	(2)	(3)	(4)	(5)	(6)
1. Variety	7.44	2.12	1					
2. Complexity	8.17	1.74	.363***	1				
3. Autonomy	7.27	2.20	.156***	.009	1			
4. Physical E.	7.66	1.98	.229***	.080**	.371***	1		
5. Affective E.	2.61	1.94	.075	-.084**	.016	-.018	1	
6. Cognitive E.	8.55	1.32	.224***	.190***	.129***	.357***	-.108***	1
***p < .01, **p < .05								

Table 2. Mean, Standard Deviation and Correlations Factors

The correlations contributed to the application of regression analysis to test the hypotheses, with the results presented in Table 3.

	Model 2	Model 4	Model 6
	Physical Engagement	Affective Engagement	Cognitive Engagement
Control Variables			
Log Age	.113 (1.384)	.053 (.708)	-.051 (-.656)
Log Length of Service (years)	.094 (1.889)*	-.115 (-2.490)**	-.126 (-2.612)**
Log Time on the Labor Market (years)	-.077 (-.977)	.031 (.423)	.111 (1.440)
Log Hours Worked per Week	.031 (.642)	.026 (.673)	.057 (1.398)
Dummy Gender (1 male, 2 female)	-.047 (-1.221)	.029 (.742)	.128 (3.139)**
Dummy Role (1 management, 0 others)	.025 (.144)	.019 (.466)	.011 (.245)
Dummy Home Office (1 HO, 0 company)	-.073 (-1.163)*	.002 (.053)	-.004 (-.097)
Dummy Company Business (1 core IT, 0 not IT)	-.072 (-1.605)*	.038 (.980)	.037 (.906)
Main Effect Variables			
Variety	.096 (2.105)**	.162 (3.821)**	.166 (3.740)**
Complexity	-.141 (-3.151)**	-.006 (-.156)	.113 (2.599)**
Autonomy	-.028 (-.646)	.344 (8.537)**	.111 (2.646)**
F	2.723**	11.416**	6.190**
R ²	.050	.181	.107
R ² Adjusted	.032	.165	.089
***p < .01, **p < .05, *p < .10			
Note: the presented values represent β (standardized beta) and the t-value (between brackets).			

Table 3. Results of OLS Regression Analysis

Six regression models were generated, three of them (models 1, 3 and 5) containing only the control variables used as independent variables of engagement and the other three (models 2, 4 and 6) with the main effect variables. We decided not to present the models with only the control variables here, since the aim of this paper is to investigate the relationship of the main effect variables with engagement. The low explanatory power of models 1, 3 and 5 supports that the effect of the main variables is not overstated in models 2, 4 and 6.

Model 2 (physical engagement) showed an adjusted R² of .032 (F = 2.723 and p-value <.05) and only explained 3.2% of the variance in physical engagement. The variable that contributed most to the significance of the model was task complexity (β = -.141 and p-value <.01). Task variety was the second most important variable (β = .096 and p-value <.05), followed by the control variables length of service (β = .094 and p-value <.10), home office (β = -.73 and p-value <.10) and company business (β = -.072 and p-value <.10), albeit with low explanatory power. Home office and company business showed an inverse relation with physical engagement. Given that the main effect variable task variety was statistically significant (p-value <.05), hypothesis (H3a) was confirmed. Hypothesis (H1a) and (H2a) were rejected.

Model 4 (affective engagement) presented an adjusted R² of .181 (F = 11.416 and p-value <.01) explaining 16.5% of the variance in affective engagement. This confirms hypothesis (H1b) and (H3b), positively associating affective engagement with autonomy (β .344) and task variety (β .162), respectively. In both cases the β values were significant with a p-value <.01. Hypothesis (H2b), which suggests a positive relationship between task complexity and affective engagement was not supported. The β values of model 4 showed that autonomy was the variable with the greatest relative importance in explaining the variation in affective engagement (β = .344 and p-value <.01), followed by task variety (β = .162 and p-value <.01) and length of service (β = -.115 and p-value <.05). In model 4, the main effect variables explain 13.9% of the variance in affective engagement.

Model 6 (cognitive engagement) had an adjusted R² of .089 (F = 6.190 and p-value <.01) and showed a positive association between cognitive engagement and autonomy, complexity and task variety. This is supporting evidence for hypotheses (H1c), (H2c) and (H3c). The model was able to explain 8.9% of the variance in cognitive engagement. Of the control variables, only gender and length of services proved to be significant in explaining cognitive engagement, explaining 12.8% and 12.6% of the total variance of the model, respectively. Length of service presented an inverse relationship with cognitive engagement.

DISCUSSION OF RESULTS

The results of the analyses confirm the three-dimensionality of engagement as opposed to a one-dimensional nature pointed out by some researchers (Rich et al., 2010; Schaufeli and Bakker, 2003) and support that the construct is significantly influenced by the nature of the task, especially by the task variety variable, which showed a significant positive relationship with all three dimensions of engagement. Task complexity showed no significant relationship with affective engagement and autonomy showed no significant association with physical engagement. The rejection of hypotheses (H1a) and (H2b) reinforces Kahn's theory (1990). Regression analysis also demonstrated that one dimension is independent from the other and that engagement is a situational construct, in this case related to the nature of the task. We found that the dimensions of engagement have variables with different kinds of explanatory power (structural and personal). Kahn (1990) stated that both individual and organizational factors influence the psychological experience of work. Only the variable gender, however, was significantly associated with cognitive engagement.

The model with the greatest explanatory power was model 2 for affective engagement (adjusted R² .165), which is related to the degree of affective engagement of the individual with his work or his positive feelings towards his job (Rich et al., 2010). Job characteristics such as task variety, autonomy and complexity make the task more meaningful to the individual. They encourage affective engagement because they make the work experience richer (Hackman and Oldham, 1980; Kahn, 1990). Although the findings of this study show that the activities of IT professionals are perceived as complex, non-routine and as allowing autonomy to individuals, only task variety and autonomy appeared to be antecedents of affective engagement. Task complexity failed to explain affective engagement. Professionals with little length of service are more affective engaged. Enthusiasm, excitement and interest are naturally associated with new jobs. Above all, the affinity or innate ability with computers and other technological resources, which is identified by IT professionals as a reason for choosing the profession (Ono and Binder, 2010), explains the better performance of the model of affective engagement in comparison to the other two models.

The physical engagement model presented the lowest explanatory power (adjusted R² .032). The low physical engagement of the sample differs from the results of Moreno, Cavazotte and Farias (2009). Their study with IT professionals suggested that this field was characterized by a high workload. The possession of technological resources may have lessened the perception that physical exertion is greater than in other fields. This shows the importance of comparative studies on engagement that consider different fields of activity, including their access to technology. Task variety and complexity are predictors of physical engagement. This is probably due to the desire to give more of oneself when the task is challenging. Rich and complex tasks generate greater motivation in individuals for their work (Morgeson and Humphrey, 2006). Although weak, the positive association between length of service and physical engagement may be associated with the perception of the time invested in the organization. Home office work showed an inverse relationship with physical engagement. There is less physical effort involved to get to work, since you don't have to worry about the commute or the traffic. Individuals who work in a company whose core business is IT have lower physical engagement than those working in IT at a company whose core business is not IT (e.g., government, finance, health care, education). The sense of ownership of the physical resources required for the full performance of a role may be greater in IT organizations. Possibly, these organizations make more, better and more innovative tools available in comparison to organizations with other core businesses in which IT investments are likely smaller (Kahn, 1990; Softex, 2012). Individuals who have resources that facilitate their tasks are more likely to invest energy and personal resources to accomplish their tasks (Bakker et al., 2006; Salanova et al., 2005). It is also possible that IT professionals in IT companies have better communication with their peers and managers. It is worth noting that the average hours worked in the sample was similar to other professional fields of activity. The fact that 14% work in a home office format also minimizes the need for physical effort to carry out the work.

Cognitive engagement is best explained by task variety and by gender. Varied tasks require more attention, focus and concentration from IT professional to change from one activity to another. A shorter length of service increases cognitive engagement. It is natural for professionals who are new to the company to pay more attention during the performance of activities. They are starting their life cycle at the company and will want to reduce the error rate and shorten the learning curve as much as possible. Complex tasks require greater cognitive effort from the individual. Autonomy can be justified as an antecedent of cognitive engagement because of the concentration required to make decisions on how to carry out the work. These decisions may shorten lead times and optimize resources, and they require concentration and focus of the professional.

One can observe that the variables that best explain each of the dimensions of engagement are related to the nature of the task. Autonomy best explained the affective dimension of engagement, complexity best explained the physical dimension and variety the cognitive dimension. Autonomy generates interest and enthusiasm, complex jobs are more physically demanding and varied work requires more cognitive powers from the worker to "turn the key" and work on what needs to be done at that time. In line with the work by Thomas (2006), the age of individuals could not explain any dimension of engagement,

possibly because 61% of the sample belonged to Generation Y. It is known that individuals of this generation are focused on technological environments. These individuals are described as creative, with a focus on results, in search of recognition and status, requiring constant communication, having short term personal projects that produce immediate results and changing employers often (Carli, Fontoura, Cafarate and Kemmerich, 2011). These characteristics may help to understand the findings of this study.

CONCLUDING REMARKS

The issues that motivated the interest in this subject and the realization of this study were: the ambiguity surrounding the conceptualization and operationalization of engagement and the absence of studies on engagement with IT professionals, a field that is of the utmost importance for various types of organizations. The three dimensions of engagement were confirmed and allowed us to conclude that engagement is influenced by the nature of the task, especially by variety, autonomy and complexity. The results of this study indicate that task variety is a predictor of the three dimensions of engagement. The same was not true for autonomy and task complexity, which were predictors of one dimension or another, contributing to the understanding that the context of an organization, the nature of the task and the demographic characteristics of the individual and the organization may favor one dimension of engagement over the other. Our survey shows that the IT professionals participating in this study perceive to exert little physical effort in their tasks. This had no negative influence on the use of psychological and cognitive energy. Among the three dimensions of engagement, the accomplishment of the work puts the greatest demand on cognitive effort.

It is important to know that affective engagement is influenced by contextual factors and not by individual characteristics. This will help managers recruit and retain people who have a psychological link with the task they should accomplish. Understanding which task characteristics encourage engagement will facilitate recruitment processes and, consequently, reduce costs associated with turnover. The results draw attention to the high degree of cognitive effort employed in carrying out IT tasks. This effort may lead to cognitive exhaustion, which may not be perceived by the organization since workload is usually measured according to the hours worked. This aspect deserves attention from managers to reduce turnover because of cognitive exhaustion. Overall, the main contribution of this article concerns the empirical validation of the conceptual model of engagement as a three-dimensional construct that recognizes the independence of dimensions.

Some limitations should be considered. There were insufficient workers in the sample occupying managerial positions. This could have enriched the analysis by considering differences in engagement across hierarchical levels. Workers in a home office setting were also underrepresented. Future research could contribute with studies in this direction and by contemplating organizations with different organizational settings and environments.

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