

Organizational factors as predictors of quality of working life in activities with Human-System Interaction

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Abstract: The productive context analyzed in this study has, as main feature, the activities of office with prevailing use of interactive systems. Having the ergonomics as theoretical framework, this research aimed (a) to assess the perception of employees about organizational factors and the quality of working life (QWL); and (b) to investigate the relationship between the perceptions of these variables. Work environment was located in a financial institution in Brasília, Brazil, and the sample was composed of 440 employees, of both genders, with advisory functions. In data collection, held in the online mode and with random sample and anonymous responses, we used the Organizational Factors in Human-System Interaction Assessment Scale; and the Quality of Working Life Assessment Inventory and, for data analysis, we used simple linear regression. The results showed, in general, favorable perception of employees about the variables and significant predictive power of Organizational Factors on the dimensions of QWL. For improvement in the perception of QWL by employees, the study suggests the adoption of technologies aimed at the rationalization of work, both at the operational and managerial level. Further studies should be carried out to increase the explanation of the variation in QWL perception by employees.

Keywords: Human-System Interaction (HSI), Human-Computer Interaction (HCI), ergonomics, organizational factors, quality of working life.

Fatores organizacionais como preditores da qualidade de vida no trabalho em atividades com interação humano-sistema

Resumo: O contexto produtivo analisado neste estudo caracteriza-se, principalmente, pelas atividades de escritório com uso prevalente de sistemas interativos. Tendo a ergonomia como referencial teórico, os objetivos da pesquisa foram (a) avaliar a percepção de trabalhadores acerca de fatores organizacionais e da qualidade de vida no trabalho (QVT); e (b) investigar a relação entre as percepções dessas variáveis. Os ambientes de trabalho se localizavam em uma instituição financeira de Brasília, Brasil e a amostra, aleatória, foi composta por 440 trabalhadores, de ambos os sexos, com funções de assessoria. Na coleta de dados, utilizaram-se a Escala de Avaliação de Fatores Organizacionais na Interação Humano-Sistema e o Inventário de Avaliação de Qualidade de Vida no Trabalho. Para a análise dos dados, utilizou-se regressão linear simples. Os resultados mostraram, de maneira geral, percepção favorável dos trabalhadores sobre as variáveis e significativo poder preditivo dos Fatores Organizacionais sobre as dimensões de QVT. Para melhorias na percepção de QVT pelos trabalhadores, o estudo sugere a adoção de tecnologias voltadas para a racionalização do trabalho tanto no âmbito operacional quanto no gerencial. Novos estudos devem ser realizados, visando aumentar a explicação da variação na percepção de QVT pelos trabalhadores.

Palavras-chave: Interação humano-sistema (IHS), Interação humano-computador (IHC), ergonomia, fatores organizacionais, qualidade de vida no trabalho.

1. Introduction

The competitive environment of the current times has led organizations to use diverse resources to reach their results, among them, the use of new information and communication technologies as managerial support. In this way, the traditional means of operating the work organization begin to receive the help of this new ally, who starts to absorb part of the tasks previously in charge of the managers.

This electronic delegation of power represents not only the transfer of management of the bureaucracy from the man to the machine, but also the transfer to the machine the exposure to the workers due to the act of demanding (and reiterating) results. In this way, the task of controlling and charging has been transferred to the machine, representing a comfortable situation for those who delegate, given that the reaction of the workers is not directly to the manager, since it passes, before, by the interface of the machine.

1.1. Research Problem

About twenty years ago, the new element of the productive context, for most office workers, was the computer. Now, in the work scenario of the new century, the computer stops being the protagonist to become the vector of changes both for the rationalization of work and for its intensification. What we propose to analyze in this study is not the technology itself, but the way in which it is introduced, directed, used and what it potentiates in the work environment, especially in terms of impact on workers' reality.

This form of technology use has, in its genesis, elements of predominantly organizational nature, when the employer instruments himself with the technological artifacts to obtain the desired results, or by its omission to intervene in order to reduce the unfavorable impacts of these devices on workers. In the context of work under analysis in this study, in which there is intense use of information and communication technologies, governed by the logic and urgency of the outcome, both in terms of quality and quantity, and with a configuration of work organization focused on the control of performance, we perceive that a great challenge arises for the organizations: get the balance between the fulfillment of the corporate objectives and the preservation of the safety, the health and the well-being of the workers. The identification of critical elements present in the productive context described here and the evaluation of their importance to workers' quality of life in corporate environments are therefore the problem to be addressed in this research.

1.2. Objectives, Research Questions and hypothesis

We verified in the literature review several studies focused on elements related to work organization in the context of computerized offices (for example, surveillance, informational volume, and inadequacy of technological devices for work). However, the approaches have focused on each theme in a restricted way, so we didn't find a comprehensive and integrated view of the elements and their impact on the work reality of the people who perform activities with interactive systems.

Therefore, in order to move forward in this field, which revealed potential for exploration, the objectives of this research were (1) to evaluate the perception of organizational factors (OF) and of quality of working life (QWL) by workers of the organization under study, in activities with interactive systems; and (2) to investigate the relationship between the perception of OF and the perception of QWL by these workers.

To achieve these objectives, the following research questions were formulated: (1) How do workers surveyed assess OF and QWL? and (2) Does the perception of OF predict the perception of QWL?

On this basis, we have proposed two hypothesis: (H₁) There is a positive relationship between the perception of OF and the perception of the QWL; and (H₂) The perception of OF predicts the perception of QWL.

2. Literature Review and Theoretical Framework

In the literature review, we sought to locate approaches focused on the impact of organizational elements on the quality of working life in activities with human-system interaction. The studies surveyed showed different positioning of the authors on the subject. Roberts and Henderson (2000), referring to the contribution of technological input to work performance, argue that the new artifacts come to complement the skills of workers whereas Kirsh (2000) and Karr-Wisniewski and Lu (2010), in a more preventive vision, alert for risks of productivity losses due to the complexity and the overuse of technology.

According to Bordi et al. (2018), using communication technologies at work may have various implications for well-being, depending on whether digital communication acts as a positive resource or a challenging or hindering demand. In their study, the authors pointed out, among the themes that emerged as the main digital communication factors affecting well-being at work, those referring to demands, which are those associated with ill-being, like the volume of digital communication, expectations of constant connectivity, the quality of the messages, the adaptation of new communication tools, and technical problems and negative user experiences. According to the authors, the only theme considered a resource, i.e., those that are associated with well-being at work, was flexibility in communication.

In the view of Hoeven, Zoonen & Fonner (2016), communication technology use facilitates flexibility by providing the means to communicate efficiently and be accessible from different locations and at different times. However, according to the authors, communication technology use can lead to interruptions and unpredictable work developments.

Among the elements present in the context of work in computerized offices, Brusique (2009) emphasizes the complexity, intensification and control of work that, augmented by new technologies, contribute to the emergence of new demands on workers. The information overload, also pointed out by several authors as one of the main features of office work in the current times, is approached by Chewing and Harrell (1990); Karr-Wisniewski and Lu (2010); and Kirsh (2000), when they mention the difficulties of workers in managing their activities due to the profusion of informational channels, such as email, cell phone, Intranet and electronic discussion groups. According to the authors, the excessive increase of the informational volume has impacted the quality of the decision, the focus on the object of the work and the time of accomplishment of the activities, among other aspects.

One of the main elements addressed by the authors, the control of the work exercised by managers, is enhanced by the support of new technologies, which enable their actions of surveillance (for example, electronic monitoring of performance) and management of information and communication in work environments (Carayon & Smith, 2000). Brusique and Ferreira (2012) also highlight the contribution of technological and

organizational innovations in the intensification of labor control through monitoring the level of compliance achieved in carrying out the activities in comparison with expected standards.

2.1. Work Organization

Many are the elements that exert influence on the work of computerized offices. The list is extensive and includes issues such as how people interact; the basic material conditions, such as workstations and chairs; the physical and environmental components, such as temperature, lighting, ventilation and noise level; technological resources such as computers, printers, software and systems, in addition to the ubiquitous worldwide network of computers, the Internet. But there is also an element that stands out among them and constantly influences them, the work organization.

Hagberg et al. (1995), as cited in Carayon and Smith (2000), define work organization as the way in which work is structured, distributed, processed and supervised. In the view of these authors, this is an "objective" feature of the work environment that depends on several factors, including management style, type of product or service, characteristics of workers, level and type of technology and market conditions.

In the view of Ferreira and Mendes (2003), the work organization consists of prescribed elements (formal or informal) that express the conceptions and practices of management of people and work and includes elements such as: (a) work division (hierarchical, technical, social); (b) expected productivity and time (goals, quality, workday, breaks, deadlines); (c) formal rules, controls (mission, standards, procedures, supervision); and (d) characteristics of tasks (nature, content).

2.2. Organizational Factors

The central issue under analysis in this study is identified within the scope of computerized office activities and refers to the increasing instrumentation of corporate management with the new information and communication technologies for structuring the work organization and obtaining the expected results. This use of technological artifacts in the organizational sphere was characterized and denominated Organizational Factors in the scope of the study reported in Brusique (2017).

Thus, through the allocation and this use of technology, the organization carries out its decisions about how to organize, perform and manage work, while observes the search of the employees for adaptations to new work situations. This movement of adaptation of the workers contradicts the fundamental precepts of ergonomics, the scientific discipline that serves as a theoretical framework for this study, which predicts, in opposition to this situation, the work being adjusted to the needs of the human being.

2.3. Human-System Interaction

Also found in the literature under the denominations Human-Computer Interaction, Human-Machine Interaction and Human-Technology Interaction (Zhang et al., 2002), among others, the area under study in this research will be identified as Human-System Interaction (HSI). This option is in line with the international standard ISO 9241-100 (2010) and the other standards of the series 9241, of International Organization for Standardization (ISO) related to the Ergonomics of Human-System Interaction, since this type of denomination seemed more comprehensive with regard to the possibilities of interaction between the human being and the new resources of information and

communication technologies. As presented in Brusquese (2017), activities with human-system interaction are characterized by the user interface with information technology artifacts, using components of an interactive system such as hardware and software (ISO 9241-210, 2010).

Olson and Olson (2003) define Human-System Interaction as the study of the ways in which people interact with computer technology, and identify two important aspects in this area: development of computational systems, aimed at the production of useful, usable and aesthetically pleasing software and hardware; and evaluation of systems in use, with project focus. Haklay and Tobón (2003), in their analysis on the theme, highlight usability assessment techniques in the search for more accessible computer systems, focusing on the needs and requirements of the user, while Zhang et al. (2002), in a more pragmatic approach, point out that HSI studies are interested in the ways in which people interact with information, technologies and tasks, especially in business, management, organizational and cultural contexts.

In a more comprehensive analysis, Strong (2002), as cited in Zhang (2002), points out that much of the Human-Computer Interaction (HCI) research is based on two primary domains: computer scientists study the "C" (focus on the machine), and cognitive scientists study the "H" (interaction with humans). The author, however, draws attention to the fact that the issue is not just HCI, but HCI in the context of a business task, and that only these two domains are not sufficient to provide usable and useful interactions in the context of a variety of user tasks.

This observation of the author seems to request a complement that can refer to other elements necessary to the aforementioned viability of the use of interactive systems in the performance of tasks, such as the way technological resources are introduced and used, which refers to factors that have an organizational nature. This analysis finds support in the consideration of Myers, Hollan and Cruz (1996), when they refer to HCI as the study of the way in which people design, implement and use interactive computer systems and how computers affect individuals, organizations and society.

2.4. Quality of Working Life

On the occasion of the literature review reported in Brusquese (2009), studies of several authors on the subject of Quality of Working Life (QWL) were researched. From these studies, important elements related to the characterization of the QWL approach are extracted, such as (a) from the perspective of the employer: cost, quality, performance and productivity; and (b) from the worker's perspective: workplace safety, occupational health, well-being, motivation, satisfaction, opportunities for improvement, growth and development, salary, participation in decision-making processes, social integration and work relevance.

Ferreira (2012) argues that the QWL issues should be viewed in a way that contributes to achieving three interdependent dimensions: (a) health and safety surveillance; (b) psychosocial assistance to workers; and (c) promoting well-being at work. Maggi and Rulli (2013), for their time, maintain that the quality of working life must be understood in the sense that the work to which citizens are entitled must be compatible with their well-being - physical, mental and social - and that not only allows, but also encourages the integral development of the human being.

In this perspective, Paschoal (2013) argues that rather than avoiding stress experiences, QWL practices should favor - or at least allow - a positive experience of well-

being and personal fulfillment at work. In this sense, Antloga (2013) approaches the theme QWL in a perspective in which the individual is understood in an integral way: when working, doesn't stop being human, a condition that gives him possibilities to create, make proposals and develop new ways of carrying out his activities.

A recurrent point in the approach of these authors, the concern with the well-being of workers reflects, on the one hand, the desirable situation of absence of risks in the performance of the activities, which results from the observance of occupational health and safety assumptions and, on the other hand, opportunities in the professional field. In this way, it is possible to establish minimum conditions for workers to dedicate themselves to the tasks at the time they are allowed conditions to draw a line of actions that favors the structuring of their professional future.

2.5. Ergonomics

There are several factors that are at the origin of the inadequacies of working conditions in the face of the real needs of workers. Sznclwar (2001) points out that the main causes of the problems are in the inadequacy of work to the human characteristics, situation in which the projects of the production systems and of the work organization are often made through simplified stereotypes of the population of workers, and in a context where production is the priority. The author adds noting that ergonomics proposes a differentiated approach, based on an anthropocentric perspective, in which the human being is also prioritized in production.

Derived from the Greek, by the combination of the terms *ergon*, which means work, and *nomos*, which refers to rules (Falzon, 2007), the designation *ergonomics* was officially adopted when the Ergonomic Research Society, of England, was created in 1949. Despite the short time elapsed from his "official birth" (Laville, 2007), are undeniable the advances obtained by this field of study of work that already bears the name of *scientific discipline*, which, according to Wilson (2000), must be reaching maturity.

This way of mentioning ergonomics is found in works by several authors, such as Falzon (2007), who describes it as discipline and as practice; Leplat and Montmollin (2007), who associate it with its references in the world of university and research; and also in the definition proposed by the International Ergonomics Association [IEA] (2014), which describes it as a scientific discipline related to the understanding of the interactions between the human being and other elements of a system, and the profession that applies theory, principles, data and methods for designing to optimize human well-being and overall system performance.

According to Wisner (1987), ergonomics "is the set of scientific knowledge related to man and necessary for the design of tools, machines and devices that can be used with the maximum comfort, safety and efficiency" (p.12). Although numerous work contexts are possible, the fundamentals of ergonomics apply to everyone. In the case of the present study, which makes a cut in this vast universe of work situations, addressing the activities in computerized offices, where reigns the use of the Internet and the solutions that work and are enhanced by this platform, ergonomics manifests itself ubiquitously.

3. Method

3.1. Characteristics of the Researched Work Environment

The work environments object of the present research were located in strategic departments (directories and general management) of a financial institution located in Brasília, Brazil.

As occurred in the study reported in Brusquese (2009), although the present research has investigated work environments in the financial sector, we considered that the productive context in analysis reflects the labor reality of several segments that use computerized offices. This labor situation was denominated *labor commodity* in the mentioned study, since it can be found in any part of the world - which gives it a universal character - in activities such as insurance companies, law firms, accounting, e-commerce and public service, among others. Its characteristics are: workstation equipped with computer connected to the Internet, Intranet and local networks; use of workstation generally in shared, air-conditioned and artificially illuminated environment.

3.2. Participants

In the definition of the population to be studied, and in agreement with the research described in Brusquese (2009), we opted for workers with technical functions, members of advisory segment in strategic departments of the researched institution, who worked eight hours per day. The option for this segment of workers was based on the consideration that this group constituted a portion more exposed to the effects of administrative actions supported by technological artifacts, given their hierarchical position in the institution.

From this perspective, holders of managerial functions have been seen in this study as less subject to the impacts of organizational decisions and less vulnerable to adverse situations at work, since they were in a better position to transfer part of their activities to the advisors, including those tasks with higher level of difficulty. In this way, it was left to the latter to absorb the demands and the responsibility to make the expected deliveries with their imperatives of quality, quantity and urgency.

Sample Calculation

The target population of the survey totaled 3,448 workers at the time of data collection. With the aid of the free software G*Power (<http://www.gpower.hhu.de/>), version 3.1.7, the sample was calculated which totaled 270 participants (the parameters used in the calculation of the sample were: alpha = 0.05; effect size = 0.15; statistical power = 0.80). However, in order to ensure this minimum amount of participants, we sent 924 invitations, with 468 questionnaires being returned, resulting in a rate of return of 50.6%. The definition of the recipients of the invitations occurred through random process, as described in section 3.4 (Procedures).

Sample Characteristics

The composition of the respondents was of 236 men (54%) and 204 women (46%); 60.5% married and 24.8% single; with working time in the organization of up to five years (5.5%), 11 to 15 years (37.7%) and over thirty years (6.6%); educational level varying from high school (3%) to postgraduate (80.5%); age up to 25 years (0.7%), between 41 and 50 years (28.6%) and over fifty years (13.6%); time in the current position or function of up to two years (36.6%), three to four years (31.1%) and more than 15 years (2.3%).

Missing Data

In the initial analysis of the data, we verified the existence of 28 cases in which none of the variables received scores, reason why we decided by its exclusion. Thus, the sample was reduced to 440 cases.

Table 1 shows the missing values, per variable.

Table 1 - Missing values

	N	Missing	
		Count	Percent
OF	440	0	0.00
WC	432	8	1.85
WO	423	17	4.02
RPG	409	31	7.58
SPRW	402	38	9.45
WSLL	400	40	10.00

Note. OF refers to the predictor variable Organizational Factors, measured by the Organizational Factors in Human-System Interaction Assessment Scale (OF-HSI) and WC, WO, RPG, SPRW e WSLL refer, respectively, to the variables Working Conditions, Work Organization, Recognition and Professional Growth, Socio-professional Relations at Work, and Work-Social Life Link, measured by the Quality of Working Life Assessment Inventory (QWL-AI), as presented in section 3.3.

As can be seen from the analysis of Table 1, three variables (OF, WC and WO) presented missing data percentages below five percent. Regarding the other variables (RPG, SPRW and WSLL), although they exceeded this limit, we decided not to treat the respective data, since they had not exceeded the limit of ten percent, as well as have been considered missing random.

Outliers

To check for outliers, we used boxplot diagrams. According to the data, the OF variable presented one outlier; the WC variable presented nine outliers; and the variables WO and SPRW presented four outliers, each. The variables RPG and WSLL did not present outliers. After the exclusion of the outliers, we used SPSS-specific syntax, according to Field (2009), to create and count the z-scores of the data, when we verified that there were no atypical values in the database.

Homoscedasticity, Linearity and Normality

To verify the assumptions of homoscedasticity, linearity and normality, we opted for the graphic analysis, as predicted in Field (2009). For this, standardized residuals (ZRESID) were plotted against the standardized predicted values (ZPRED), as well as a histogram and a normal probability plot of the residuals.

The graph of ZRESID and ZPRED looked like a set of points dispersed around zero, a pattern indicative of the situation in which linearity and homoscedasticity assumptions have been met. To test normality, the histograms and the normal probability plot of the residuals (P-P Plot) were checked. The histograms looked like that of a normal distribution. The normal probability plots, in turn, showed that the points were very close to the straight line, which also indicates an approximation of normality.

Ethical Issues of Research

This study is part of the doctoral thesis reported in Brusquese (2017) in which, in order to comply with the ethical precepts of research, the actions were based on normative and legal references, such as the internal norms of the institution researched and the Brazilian legislation for research with human beings, according to dispositions in the scope of the National Commission of Ethics in Research (CONEP), of the Ministry of Health.

In order to carry out the study, an authorization was requested and obtained from the researched institution, at which time the researcher signed a compromise term as a way to ensure compliance with ethical precepts of research and anonymity regarding the identification of the institution and the respondents.

Before data collection, the research project was submitted on June 09, 2015 for evaluation by research ethics committee. The committee responsible for evaluating the project was the Research Ethics Committee of the Institute of Human Sciences, University of Brasília. The project was approved on June 26, 2015 (approval number 1.156.934).

At the beginning of the questionnaires, participants were provided with a Free and Informed Consent Form, which included, among others, information on (a) the research and invitation to participate in it; (b) the confidentiality of participation in the research, ensuring the non-identification of the participants and the anonymity of the answers; (c) the absence of risks to participants; (d) the voluntarism of participation in the research and freedom in its interruption without any prejudice to the participant; (e) the possibility of publication of results; and (f) the expected benefits, such as the presentation of recommendations to the institution being researched, aiming at improving the working conditions of employees.

3.3. Instruments

Data collection was carried out in the online research modality with the application of two instruments: (a) Organizational Factors in Human-System Interaction Assessment Scale (OF-HSI); and (b) Quality of Working Life Assessment Inventory (QWL-AI), described below. The time to complete the survey, including demographic data, was approximately ten minutes.

Organizational Factors in Human-System Interaction Assessment Scale (OF-HSI)

The OF-HSI scale, that was developed within the scope of the research described in Brusquese (2017), has unifactorial structure (Cronbach's Alpha = .80) composed of ten items, as shown in Appendix, evaluated on a 10-point scale (1 = *totally disagree* and 10 = *totally agree*).

Quality of Working Life Assessment Inventory (QWL-AI)

The QWL-AI is a research instrument developed by Ferreira (2009), of a quantitative and qualitative nature. The version of the instrument used in the present research has 61 items in total, evaluated on a 10-point scale (1 = *totally disagree* and 10 = *totally agree*). The qualitative part of the instrument was not used because it was not necessary for the research objectives. With reference to the quantitative part, the following are the constituent factors of QWL-AI:

- **Work Organization** (Cronbach's Alpha = .73): expresses the time variables (e.g., deadline, pause); control (e.g., inspection, collection); characteristics of tasks (e.g., rhythm, repetition); and prescription (norms) that influence the work activity. This factor is

constituted of nine items, of which, is mentioned as example: "there is performance monitoring".

- *Working Conditions* (Cronbach's Alpha = .90): expresses the physical conditions (e.g., location, space, illumination, temperature); materials (e.g., supplies); instrumental (e.g., equipment, furniture); and support (e.g., technical support) that influence work activity. This factor is constituted of 12 items, of which the following is an example: "the physical space is satisfactory".
- *Recognition and Professional Growth* (Cronbach's Alpha = .91): expresses variables related to job recognition (e.g., professional achievement) and professional growth (e.g., opportunity, equity) that influence work activity. This factor is made up of 14 items, of which is an example: "the opportunities for professional growth are the same for everyone."
- *Socio-professional Relations at Work* (Cronbach's Alpha = .89): expresses the socio-professional interactions in terms of peer relations (e.g., peer support), leadership (e.g., dialogue, cooperation), communication (e.g., freedom of expression) and harmony in the work environment. This factor is made up of 16 items, of which the following is an example: "access to immediate leadership is easy".
- *Work-Social Life Link* (Cronbach's Alpha = .80): expresses perceptions about the institution and work (e.g., sense of utility, social recognition) and analogies with social life (e.g., family, friends) that influence work activity. This factor is constituted of ten items, of which the following is an example: "society recognizes the importance of my work".

Other Instruments

In the data collection, we used the LimeSurvey application, version 1.90+ Build 9071, which was being used by the researched organization. Its operation takes place on web platform that allows integration with the organization's electronic mail system to send research links to the participants. For data processing, we used the IBM SPSS statistics 20.0.

3.4. Procedures

Data Collection

The data collection took place during the period July 10, 2015 to August 07, 2015 using the LimeSurvey application, as described in section 3.3 (Instruments), and corporate personal email system.

In order to identify the research population, the organization surveyed was asked to list all the employees holding an advisory role in their strategic departments. The definition of the 924 subjects of this population, recipients of the invitations to participate in the research, as quoted in section 3.2 (Participants), was obtained by random process.

Through the LimeSurvey application, integrated with the organization's electronic mail system, an invitation message was sent to potential participants, when the research objectives and the consent of the organization were informed, as well as the link to access the instruments OF-HSI and QWL-AI. The employees' participation could be held in their own workstations, so that the reception of said message occurred through their access to the corporate personal email system, by inserting an individualized username and password.

After completing the questionnaires, the participants sent their answers, which composed repository database that could only be accessed by the research administrator.

When the completed questionnaires were returned, the names and any other form of identification of the participants were suppressed automatically, and a database was generated by the application containing only sequential numbering of the cases, assuring everyone anonymity in their answers.

4. Results

4.1. Factor Scores

To obtain the subjects' factor scores, all inverted items of both instruments used in data collection (OF-HSI and QWL-AI) passed through a reversal process, with the purpose of making them unidirectional within each factor, according to Field (2009) and Pasquali (2012). Thus, higher scores indicate the respondent's more favorable position with respect to the item being evaluated.

Table 2 shows the descriptive statistics for the Organizational Factors (OF) and for each of the QWL dimensions: Working Conditions (WC), Work Organization (WO), Recognition and Professional Growth (RPG), Socio-professional Relations at Work (SPRW) and Work-Social Life Link (WSLL).

Table 2 - Descriptive statistics - Factor scores

	OF	WC	WO	RPG	SPRW	WSLL
Mean	6.15	7.46	4.58	6.22	7.10	7.28
Standard deviation	1.42	1.43	1.44	1.94	1.45	1.27

Note. Means and standard deviations of factor scores.

In the section dedicated to collecting demographic data from the survey, the following question was included: "How long do you use your computer in your daily work?". The results showed that out of 440 respondents, only four scored the "3 to 4 hours" option. The remaining 436, representing 99.1% of the sample, indicated the response "throughout the workday".

4.2. Statistical Analysis

Tables 3 and 4 present the simple linear regression analysis used to verify the relationship between the predictor variable Organizational Factors (OF) and the variables Working Conditions (WC), Work Organization (WO), Recognition and Professional Growth (RPG), Socio-professional Relations at Work (SPRW) and Work-Social Life Link (WSLL).

Table 3 - Regression Analysis – Model Summary/ANOVA

	Model	R	R Square	F	Sig.
OF x WC	1	0.185	0.034	14.801	0.000
OF x WO	1	0.372	0.139	66.996	0.000
OF x RPG	1	0.279	0.078	34.308	0.000
OF x SPRW	1	0.309	0.095	41.680	0.000
OF x WSLL	1	0.295	0.087	37.839	0.000

Note. Predictors: (Constant), OF; Dependent variables: WC, WO, RPG, SPRW and WSLL.

Table 4 - Regression Analysis - Coefficients^a

Model			Unstandardized Coefficients		Standardized Coefficients	t	Sig.
			B	Std. Error	Beta		
OF x WC	1	(Constant)	6.318	0.304		20.771	0.000
		OF	0.185	0.048	0.185	3.847	0.000
OF x WO	1	(Constant)	2.260	0.290		7.787	0.000
		OF	0.376	0.046	0.372	8.185	0.000
OF x RPG	1	(Constant)	3.878	0.410		9.456	0.000
		OF	0.380	0.065	0.279	5.857	0.000
OF x SPRW	1	(Constant)	5.171	0.307		16.836	0.000
		OF	0.314	0.049	0.309	6.456	0.000
OF x WSLL	1	(Constant)	5.660	0.271		20.922	0.000
		OF	0.263	0.043	0.295	6.151	0.000

Note. a. Dependent Variables: WC, WO, RPG, SPRW and WSLL.

According to Table 3, the correlation between OF and each of the variables was positive and significant ($p < 0.001$): WC (0.185); WO (0.372); RPG (0.279); SPRW (0.309); and WSLL (0.295). The respective coefficients of determination (R^2) indicate that the perception of OF can explain 3.4% of the variation in WC perception; 13.9% (WO); 7.8% (RPG); 9.5% (SPRW); and 8.7% (WSLL). In all cases a large F-ratio was observed, significant at $p < 0.001$, which indicates that it is a good model for the data.

As shown in Table 4, the regression coefficient was 0.185 ($p < 0.001$) for the WC variable; 0.376 ($p < 0.001$) for WO; 0.380 ($p < 0.001$) for RPG; 0.314 ($p < 0.001$) for SPRW; and 0.263 ($p < 0.001$) for the variable WSLL, which indicates that the OF variable had a significant contribution to predicting the evaluation of these variables by the respondents.

5. Discussion

The assessment carried out by the workers on the OF and on the dimensions of QWL (WC, WO, RPG, SPRW and WSLL), as presented in Table 2, section 4 (Results), answers the first question of this research, about the perception of these variables. The low value found for the WO dimension ($M = 4.58$, $SD = 1.44$) confirms previous studies using the QWL-AI instrument. Ferreira (2012) brings a summary of four studies carried out in Brazilian organizations, two from the judiciary and two from the executive power.

According to the aforementioned author, the average scores attributed by the workers to the WO factor were 4.02 ($SD = 1.76$) and 4.13 ($SD = 1.18$) for the judiciary organizations and 4.41 ($SD = 1.74$) and 4.33 ($SD = 1.63$) for the executive organizations. With reference to the other variables measured, were found values ranging from 6.54 to 7.47 (WC); from 5.27 to 6.87 (RPG); from 6.67 to 7.22 (SPRW) and from 7.16 to 7.76 (WSLL), which also indicates proximity to the respective values found in this study, as shown in Table 2.

The unfavorable evaluation made by the workers on the dimension of Work Organization (WO) revealed in these studies draws attention to the importance of the characteristics of the contemporary productive context, independently of the economic sector where the organization is inserted, as observed in Figueira (2014), which approached the work environment of a public institution, and Santos (2014), whose research focused on the productive context of a public university. In both studies, the WO assessment was close to the values presented above.

The mentioned characteristics of this productive context reveal (a) a traditional management model in which the work organization is conditioned to decisions on the managerial sphere, with restricted participation of the workers, who, as a rule, are limited to the execution of the tasks without participating in its conception and planning, in reedition of practices that go back to the basic precepts of Taylorism (Ferreira & Brusique, 2014); and (b) the current moment of productive reality in the various economic sectors, which is characterized by the strong influence of a globalized world, in which issues such as the search for expansion in the conquest of markets and reduction of administrative costs associated with factors such as tightness of deadlines and greater intensification and control of work, equate the organizations by the predominant interest in business results.

Among these factors, the intensification of work plays a central role. According to Origo and Pagani (2009), as cited in Schrott, Moosbrugger and Iwanowa (2016), the intensification of competitive pressures in recent decades has required more flexibility for both firms and workers. On the side of workers, the relevance of this factor was confirmed in the results of the present research, especially regarding the question posed to the participants about the time of computer use in their daily work, which obtained the extraordinary percentage of 99.1% of the answers in the "throughout the workday" option.

This data reveals a situation of worker's excessive stay in the workstation and an increasing concentration of activities with interactive systems, confirming the tendency of densification and intensification of the work, as pointed out in Blanch (2013); Brusique and Ferreira (2012); and Ghadi and Levet (2013). Similar situation was verified by Hoeven et al. (2016), who emphasize that the increase of employees' communication technology use in their work routines causes the habit of immediate responses creating an "always-on" culture.

According to Table 2, presented in section 4 (Results), the predictor variable Organizational Factors (OF) received an average evaluation of 6.15 (SD = 1.42) that approached the evaluation of the other variables with the exception of Work Organization (WO), which presented the lowest evaluation, as previously analyzed.

Although the OF and WO variables refer to administrative issues, the former obtained more favorable evaluation by the participants. This seems to be due to the fact that while WO represents the most traditional form of organization demands, in which the managerial instance is most exposed to workers, OF refers to the same actions, but in an indirect way, encapsulated by the technological artifacts (e.g., an application is used to control deadlines of completion of tasks by the workers, without the need of a manager for this purpose).

In this way, these artifacts operate as a buffer between workers and managers, absorbing part of the reactions and criticisms of the employees about management acts. Thus, technology is used as a vector of administrative actions, which conceals the managerial guideline that is focused on the productive interest.

5.1. Original Research Hypothesis

With regard to our second research question, about the prediction relationship between OF and the five variables that represent the QWL dimensions (WC, WO, RPG, SPRW e WSLL), we found that our results supported the announced research hypotheses: there are positive and significant correlations [H_1] and there is significant prediction relationship [H_2] between OF and the five dimensions of QWL. Despite the confirmation of the research hypothesis, we found that the relationship between the predictor variable and each of the outcome variables performed differently, as shown below.

Correlations between OF and the Dimensions of QWL

The results showed positive and significant correlations of medium effect size between OF and the dimensions WO ($R = 0.37$, $p < 0.001$); RPG ($R = 0.28$, $p < 0.001$); SPRW ($R = 0.31$, $p < 0.001$); and WSLL ($R = 0.30$, $p < 0.001$), which indicates that respondents who evaluate organizational factors more favorably (i.e., perceive appropriate use of technological resources in management actions) do the same with regard to the work organization, the professional recognition actions, the social interactions and the associations they establish between personal life and the work environment. Although the correlation between OF and WC was significant ($p < 0.001$), the effect size was small ($R = 0.19$), which may reflect the distinct nature of these variables (i.e., while WC encompass material and environmental issues, OF brings together elements of the organizational sphere, which are more linked to the productive dynamics).

According to the results, the QWL dimension that obtained the highest percentage of variance explained by the Organizational Factors was Work Organization, with 13.9%, which reaffirms the proximity of these variables, which have, in their genesis, elements derived from corporate decisions, usually of managerial scope. Then, with smaller and approximate percentages of variance explained, are the dimensions Socio-professional Relations at Work (9.5%), Work-Social Life Link (8.7%) and Recognition and Professional Growth (7.8%), which have in common a strong social component.

The dimension with lowest percentage of variance explained by the Organizational Factors was Working Conditions, with 3.4%, which may be associated to the nature of the issues related to this factor, which represents the physical and instrumental working environment, distancing it, in a first moment, from questions of a more organizational nature, which have a strong connection with OF.

The Organizational Factors could explain, therefore, about 14% of the variance in the Work Organization dimension, remaining 86% to be explained by other factors, not included in the scope of this research. Either, there are remnants of variance to be explained to the dimensions Working Conditions (97%), Recognition and Professional Growth (92%), Socio-professional Relations at Work (90%) and Work-Social Life Link (91%).

Prediction between Variables

The prediction relationship between variables found in this study is seen as an important input for organizations and employees who seek a balance between the interests of both, which is in line with the objectives of ergonomics, according to Carayon and Smith (2000), which highlight the increase of performance, health and safety. However, the achievement of this situation will inevitably demand what is identified in ergonomics by *work transformation*.

According to Abrahão (2000), in the search for this transformation, the focus of ergonomic action is the work situation in order to reveal the logics of functioning and its consequences for both the quality of working life and the performance of production. In this sense, Remy (2001) points out that the transformation of work is necessary not only to respond to the requirements of quality and reduction of costs demanded by the competition, but to have a project for the human being in the organization, since work also represents an opportunity for qualification and professional development, with repercussions on the health and life of people outside work.

As presented in section 4 (Results), the predictive importance of Organizational Factors was significant and positive for all dimensions of quality of working life: Work Organization ($\beta^1 = 0.37$; $p < 0.001$); Socio-professional Relations at Work ($\beta = 0.31$; $p < 0.001$); Work-Social Life Link ($\beta = 0.30$; $p < 0.001$); Recognition and Professional Growth ($\beta = 0.28$; $p < 0.001$); e Working Conditions ($\beta = 0.19$; $p < 0.001$).

In our view, this predictive capacity of Organizational Factors on the dimensions of QWL delimits a possible area of action by organizations that may be interested not only in the reduction of risks at work but also the improvement of the work situations of their employees. As the results showed, it was in the Work Organization dimension that the greatest predictive capacity of the Organizational Factors was observed.

From this perspective, the starting point for the necessary transformation of the work must be within the scope of the work organization, given its centrality in the configuration of the productive context, since it acts as a reference element for the other dimensions of QWL. As highlight Maggi and Rulli (2013), it is within an organizational analysis of work that one can discern risky choices, and adopt other choices that avoid, eliminate or reduce those risks.

In this sense, the results showed possibilities of intervention in actions aimed at the allocation and use of information and communication technology - in the productive and managerial processes - which can directly impact the organizational factors, as analyzed in this study. The observance of specific criteria in the adoption and use of technology, in order to prioritize the rationalization of work, assumes the possibility of improving the assessment of QWL dimensions by workers, especially WO, SPRW, WSL and RPG, for which OF was better predictor.

In this way, the technological artifact is then used not as an instrument of control and pressure, but as a means to facilitate and improve the work, which, we hope, will lead to advances in quality of working life and also in corporate efficiency. In the words of Ghadi and Levet (2013), "the challenge is no longer to produce injunctions, but tools to be appropriated by their authors and with them to build a profound and lasting change in practices and organizations" (p. 82).

6. Conclusion

About thirty years ago, Grandjean (1987) pointed out that equipment and communication techniques were becoming much more complex and a critical element of the office. In the current context of computerized office work, in which complexity has migrated from the technical device to the processes, we perceive diverse and new situations, whose perception by workers can predict their evaluation of the quality of working life.

¹ β : standardized beta coefficient.

The present research, inserted in this context, gives its contribution to the understanding of this new occupational environment, to the extent that evaluates one of these predictive situations of QWL: the organizational factors. Thus, we discussed corporate practices using new technologies with priority focus on production, without sufficient consideration of the impacts on workers' activities, and we indicated a way for actions to adapt the productive context, situated in the scope of work organization. From this perspective, the findings of this research may lead the organizations' leaders to rethink their criteria when adopting new technologies, by including in the list of priorities the choice of technological artifacts aimed at (a) the rationalization and improvement of activities, through functionalities that are closer to the real needs of the workers, in order to provide them with suitable operational support; and (b) the support for managerial action in the form of a subsidy to strategic analyzes and not to the practices of surveillance, control and accountability of workers.

In this way, the findings of this research support that the transformation of the work, based on interventions both in the acquisition of technological resources and in their usage, either in the operational or managerial scope, may provide improvements in the perception of QWL, contributing to the corporate results.

Limitations

The large concentration of respondents at postgraduate level (80.5%) may have been a limitation of this research, given that a broader range of level of schooling could reinforce the approximation of the productive context addressed in this research to the intended universal character of the study. Likewise, the working environment of strategic departments of a financial institution, which was analyzed in this study, may have added features peculiar of this context, not present in conventional offices.

Future Studies

Aiming to advance in the understanding of the productive context analyzed in this research and, thus, contribute to the construction of safer, healthier and more efficient work models, we encourage the agenda of new studies, as follows:

- *Perception of QWL by workers* - The current office working environment, where the use of new information and communication technologies prevails, comprises a great diversity of work situations and many variables contribute to the explanation of the variation in the assessment of QWL by the workers. This research showed the part of the explanation due to organizational factors, but we realize the need for new studies involving the exploration of more factors, including other contexts of office work, that can expand this percentage of explanation of the variation in QWL perception.
- *Sample diversification* - As stated previously, we consider that new studies on the object of this research should count on sample of participants with a more diversified level of schooling in order to ratify and extend the findings of this research.
- *Research Approach* - Whereas in the studies identified in the literature review prevailed issues related to hardware, software and interactive systems, more specifically regarding the interface and usability, we hope that the approach of this research, focusing on the introduction and use of technology, will encourage further studies in this respect, in order to move forward in the better understanding of the occupational context of computerized offices.

Specific Recommendations to the Organization Investigated

Based on the research findings, we made recommendations to the organization researched, with the purpose of subsidizing interventions at critical points evidenced in the study, in order to contribute to the promotion of QWL and to the improvement of corporate efficiency and services provided to customers, users and society.

In the productive context analyzed in this study, the informational flow seems to exceed limits in generating demands to the workers, according to our data on the intensive use of computers in their activities. On this issue, we perceived as recommendable to the organization investigated: (a) the institution of a policy of rationalization of information encompassing guidelines, such as the incentive for succinct texts in corporate messages; and (b) carry out studies to identify and eliminate sources of improper information to employees, such as those from emails (e.g., spam, unnecessary copies, etc.) and from other corporate communication channels (e.g., profusion of internal websites).

Another recommendation for the organization was encouraging the realization of short pauses during the workday by all workers, in the various hierarchical positions, to relieve the static efforts required by the posture imposed by working with interactive systems, as well as to alleviate the high cognitive demand of the activities. According to Grandjean (1987), rest pauses are a physiological necessity to be respected if performance, efficiency and well-being are to be maintained.

With regard to the participants' perception on the quality of working life, the results pointed to the importance of issues related to work organization, which was the dimension that received the lowest valuation and, therefore, should be managed by the organization in questions such as task overload, rest pauses, pace of work, rigidity of rules and, in particular, performance monitoring and demands for deadlines and results. In this sense, the managers which are responsible for the work contexts surveyed should keep close monitoring of the activities of the workers, in order to observe, in the peculiarities of the tasks developed, not only points that require corrective action, but also opportunities for improvement of work situations, whose transformation, according to Maggi and Rulli (2013), must count on the "special intervention of the workers, for a real quality of life" (p. 120).

References

- Abrahão, J. I. (2000). Reestruturação produtiva e variabilidade do trabalho: Uma abordagem da ergonomia. *Psicologia: Teoria e Pesquisa*, 16(1), pp. 49-54.
- Antloga, C. S. (2013). Indicadores epidemiológicos, comportamentais e perceptivos: Monitoramento da qualidade de vida no trabalho em questão. In M. C. Ferreira; C. Antloga; T. Paschoal & R. R. Ferreira (Orgs.), *Qualidade de vida no trabalho: Questões fundamentais e perspectivas de análise e intervenção*, Brasília, DF: Paralelo 15, pp. 231-236.
- Blanch, J. M. (2013). Qualidade de vida no trabalho. A experiência espanhola: limites, avanços e desafios. In M. C. Ferreira; C. Antloga; T. Paschoal & R. R. Ferreira (Orgs.), *Qualidade de vida no trabalho: Questões fundamentais e perspectivas de análise e intervenção*, Brasília, DF: Paralelo 15, pp. 85-102.
- Bordi, L.; Okkonen, J.; Mäkinen, J. & Heikkilä-Tammi, K.; (2018). Communication in the digital work environment: Implications for wellbeing at work. *Nordic journal of working life studies*, 8, pp. 29-48. doi: 10.18291/njwls.v8iS3.105275
- Brusquese, R. G. (2009). *Technological and organizational innovations and the influence of the new requirements of work in offices on the quality of working life* (Masters dissertation, University

- of Brasília, Brasília, Brasil). Available at <http://repositorio.unb.br/handle/10482/4294>. Consulted in November 4, 2015.
- Brusique, R. G. (2017). *The Influence of organizational factors on quality of working life in activities with human-system interaction* (Doctoral Thesis, University of Brasília, Brasília, Brasil). Available at <http://repositorio.unb.br/handle/10482/22210>. Consulted in February 10, 2017.
- Brusique, R. G. & Ferreira, M. C. (2012). Inovações tecnológicas e organizacionais em escritórios e os impactos na qualidade de vida no trabalho. *Cadernos de Psicologia Social do Trabalho*, 15(1), pp. 1-16. doi: 10.11606/issn.1981-0490.v15i1p1-16
- Carayon, P. & Smith, M. J. (2000). Work organization and ergonomics. *Applied Ergonomics*, 31, pp. 649-662.
- Chewning, E. G. & Harrell, A. M. (1990). The effect of information load on decision makers' cue utilization levels and decision quality in a financial distress decision task. *Accounting Organizations and Society*, 15(6), pp. 527-542.
- Falzon, P. (2007). Natureza, objetivos e conhecimentos da ergonomia: Elementos de uma análise cognitiva da prática. In Editora Blucher (Ed.), *Ergonomia*, São Paulo, SP: Edgard Blucher, pp. 3-19.
- Ferreira, M. C. (2009). Inventário de avaliação de qualidade de vida no trabalho (IA_QVT): Instrumento de diagnóstico e monitoramento de QVT nas organizações. Available at http://www.ergopublic.com.br/?pg=textos_gerais&id=4. Consulted in October 26, 2014.
- Ferreira, M. C. (2012). *Qualidade de vida no trabalho: Uma abordagem centrada no olhar dos trabalhadores*. Brasília, DF: Paralelo 15.
- Ferreira, M. C.; Brusique, R. G. (2014). Novas condições de trabalho e velhos modos de gestão: a qualidade de vida no trabalho em questão. *Revista Brasileira de Gestão e Desenvolvimento Regional*, 10(3), pp. 247-267.
- Ferreira, M. C.; Mendes, A. M. (2003). Ergonomia da Atividade & Psicodinâmica do Trabalho: Um diálogo interdisciplinar em construção. In LPA (Ed.), *Trabalho e riscos de adoecimento: O caso dos auditores-fiscais da previdência social brasileira*, Brasília, DF: LPA Edições, pp. 31-60.
- Field, A. (2009). *Descobrendo a estatística usando o SPSS*. Porto Alegre, RS: Artmed.
- Figueira, T. G. (2014). *Bem-estar, mal-estar e qualidade de vida no trabalho em uma instituição pública brasileira*. Tese de doutorado, Universidade de Brasília, Brasília.
- Ghadi, V. & Levet, P. (2013). Certificação dos equipamentos de saúde e qualidade de vida no trabalho: Uma aproximação para introduzir a QVT na certificação dos equipamentos de saúde. In M. C. Ferreira; C. Antloga; T. Paschoal & R. R. Ferreira (Orgs.), *Qualidade de vida no trabalho: Questões fundamentais e perspectivas de análise e intervenção*, Brasília, DF: Paralelo 15, pp. 67-83.
- Grandjean, E. (1987). *Ergonomics in computerized offices* [Adobe Digital Editions version].
- Haklay, M. E. & Tobón, C. (2003). Usability Evaluation and PPGIS: Towards a user-centred design approach. *International Journal of Geographical Information Science*, 17(6), pp. 577-592. doi: 10.1080/1365881031000114107
- Hoeven, C. L. T., Zoonen, W. V. & Fonner, K. L. (2016). The practical paradox of technology: The influence of communication technology use on employee burnout and engagement. *Communication Monographs*, 83, pp. 239-263. doi: 10.1080/03637751.2015.1133920
- International Ergonomics Association [IEA] (2014). Definition and domains of ergonomics. Available at <http://www.iea.cc/whats/index.html>. Consulted in May 11, 2014.
- International Organization for Standardization - ISO 9241-100 (2010). *Ergonomics of human-system interaction - Part 100: Introduction to standards related to software ergonomics*. Geneva, CH: ISO copyright office.
- International Organization for Standardization - ISO 9241-210 (2010). *Ergonomics of human-system interaction - Part 210: Human-centred design for interactive systems*. Geneva, CH: ISO copyright office.
- Karr-Wisniewski, P. & Lu, Y. (2010). When more is too much: Operationalizing technology overload and exploring its impact on knowledge worker productivity. *Computers in Human Behavior*, 26, pp. 1061-1072. doi:10.1016/j.chb.2010.03.008

- Kirsh, D. (2000). A Few Thoughts on Cognitive Overload. *Intellectica*, 1(30), pp. 19-51.
- Laville, A. (2007). Referências para uma história da ergonomia francófona. In Editora Blucher (Ed.), *Ergonomia*, São Paulo, SP: Edgard Blucher, pp. 21-32.
- Leplat, J. & Montmollin, M. (2007). As relações de vizinhança da ergonomia com outras disciplinas. In Editora Blucher (Ed.), *Ergonomia*, São Paulo, SP: Edgard Blucher, pp. 33-44.
- Maggi, B. & Rulli, G. (2013). Qualidade de vida no trabalho no setor público: a experiência italiana. In M. C. Ferreira; C. Antloga; T. Paschoal & R. R. Ferreira (Orgs.), *Qualidade de vida no trabalho: Questões fundamentais e perspectivas de análise e intervenção*, Brasília, DF: Paralelo 15, pp. 103-121.
- Myers, B.; Hollan, J. & Cruz, I. (1996). Strategic directions in Human-Computer Interaction. *ACM Computing Surveys*, 28(4), pp. 794-809.
- Olson, G. M. & Olson, J. S. (2003). Human-Computer Interaction: Psychological aspects of the human use of computing. *Annual Review of Psychology*, 54, pp. 491-516. doi: 10.1146/annurev.psych.54.101601.145044
- Paschoal, T. (2013). A cultura organizacional pode influenciar a qualidade de vida no trabalho? In M. C. Ferreira; C. Antloga; T. Paschoal & R. R. Ferreira (Orgs.), *Qualidade de vida no trabalho: Questões fundamentais e perspectivas de análise e intervenção*, Brasília, DF: Paralelo 15, pp. 255-264.
- Pasquali, L. (2012). *Análise fatorial para pesquisadores*. Brasília, DF: LabPAM.
- Remy, P. L. (2001). Prefácio da primeira edição francesa. In Edgard Blücher Ltda. (Ed.), *Compreender o trabalho para transformá-lo: A prática da ergonomia*, São Paulo, SP: Edgard Blücher Ltda, pp. xv-xvi.
- Roberts, P. & Henderson, R. (2000). Information technology acceptance in a sample of government employees: a test of the technology acceptance model. *Interacting with Computers*, 12, pp. 427-443.
- Santos, L. A. (2014). *Quando chega domingo, fico triste de ter que trabalhar na segunda: A Qualidade de Vida no Trabalho em questão no serviço público federal*. Tese de doutorado, Universidade de Brasília, Brasília.
- Schrott, L., Moosbrugger, D. & Iwanowa, A. (2016). Working environment and well-being: Empirical evidence from the 5th European Working Condition survey. *Applied Economics and Finance*, 3(2), pp. 215-242. doi: 10.11114/aef.v3i2.1429
- Sznclwar, L. I. (2001). Prefácio da edição brasileira. In Edgard Blücher Ltda. (Ed.), *Compreender o trabalho para transformá-lo: A prática da ergonomia*, São Paulo, SP: Edgard Blücher Ltda, pp. ix-xi.
- Wilson, J. R. (2000). Fundamentals of ergonomics in theory and practice. *Applied Ergonomics*, 31, pp. 557-567.
- Wisner, A. (1987). Trabalho e condições de trabalho. In FTD/Oboré (Ed.), *Por dentro do trabalho: Ergonomia: método & técnica*, São Paulo, SP: FTD/Oboré, pp. 11-12.
- Zhang, P. (2002). The role of HCI research in the MIS discipline. Proceedings of the Eighth Americas Conference on Information Systems. Available at http://melody.syr.edu/hci/amcis02_panel/Zhang_HCI_Panel_Description_071502.pdf. Consulted in January 29, 2016.
- Zhang, P., Benbasat, I., Carey, J., Davis, F., Galletta, D. & Strong, D. (2002). AMCIS 2002 Panels and workshops I: Human-computer interaction research in the MIS discipline. *Communications of the Association for Information Systems*, 9, pp. 334-355.

Appendix

Organizational Factors in Human-System Interaction Assessment Scale (OF-HSI)

Final Version (total of items: 10)

No. item	Content
1	I have the impression that computer systems and applications control my work more than I do
2	I consider excessive the amount of information I receive in my daily work (e.g., by email, Intranet, and systems)
3	I worry about the fact that my opinions sent by email or registered in systems can be seen and criticized by many people of the company
4	Some programs or systems I use at work seem to take me longer to perform the activities than if I did them manually
5	Systems and applications adopted in my company increase my pace of work (e.g., applications that control deadlines)
6	I have difficulty in understanding the technical terms of the applications and systems I use at work (e.g., English words, computer terms)
7	The fact that the work I do gets registered in corporate systems worries me
8	I get work-related emails that are not of interest to my tasks (e.g., unnecessary copies)
9	It is common to receive unwanted emails in my work (e.g., spam, advertisements)
10	The use of computer and systems increases the requirement for quality and precision of work