

REPRESENTATIVENESS IN THE “WORLD IT PROJECT” SURVEY RESEARCH. THE METHODOLOGICAL PREREQUISITES AND VERIFICATION

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Abstract

Information Technology occupational research models belong to the basic theories of occupational culture research, alongside the Hofstede, GLOBE, and more recently the World IT Project (WITP), which is oriented towards IT human resources. In the WITP model, with application of the appropriate techniques, the influences of contextual factors on IT issues could be identified, evaluated, studied and explained. Thus, the research model, by defining and measuring these influences, can provide some useful, professional and profound insights as well as tools for both researchers and IT managers involved and interested in IS development and implementation.

Accordingly, the objective of this research is to understand and interpret the influence of contextual factors on basic IT issues in respect of IT occupational culture in firms and institutions, with regards to the multidimensional ecosystem composed of cultural, economic, managerial and social systems, in both the domestic and international environments¹.

The value of the quantitative research of WITP depends on the representativeness of the statistical research surveys and, as a result, their analyses and outcomes. It is widely accepted in quantitative research communities that if the samples are not representative, then the conclusions drawn from them cannot be generalized for the whole population studied. The identification of the type and strength of a particular influence among the WITP variables pinpointed by using appropriate methodology provides an insight into the nature, structure and scope of IT issues as well as creating the potential to make a positive impact on them.

Keywords: World IT Project (WITP), Information Technology occupational culture (ITOC), representativeness, occupational culture models, the process of ITOC survey research

1. Introduction

The achievement of the expected aims of information systems projects depends on the smooth cooperation within the multidisciplinary IT teams who develop the IS systems and services. Such teams usually work and cooperate in the context of their own specific national culture yet, on the other hand, they quite often work in an international environment. Thus, in both cases the team members are confronted by the arising occupational culture problems which are of an organizational, personal (individual) and technological origins. To resolve or alleviate such problems, well-matched contextual deliverables must be defined and examined for IT human resources in terms of both employees and managers. These are the crucial research challenges in many projects.

By applying appropriate models, methodology and techniques, the influences of contextual factors on IT occupational culture (ITOC) issues can be identified, evaluated, studied and explained. Thus, the selected research model called the World IT Project (WITP) (Palvia, 2013), by defining and measuring these influences, can provide some useful, professional and profound insights as well as tools for both researchers and IT managers involved and interested in IS development and implementation.

Accordingly, the objective of WITP research is the understanding and interpretation of the influence of contextual factors on basic IT issues in firms and institutions, with regards to the multidimensional ecosystem – cultural, economic, managerial and social — in both the domestic and international environments.

The paper is structured as follows. After the Introduction, the perspectives relevant to IT occupational culture, such as the Hofstede and GLOBE models, are analyzed and discussed. In the next section, the prerequisites are outlined for the WITP research model that is essential for this study. The key notion of this paper – the representativeness of the

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survey research — is identified and analyzed in the next section. In the next section, the original authors' proposal for the survey research procedure, applied within the WITP model, is elaborated and explained. The proposed procedure for ITOC survey research is exemplified and verified in the most extensive following section. The paper ends with some conclusions.

2. Related works

In order to both define and gain a profound understanding of IT occupational culture (ITOC) and consequently identify the conditions that influence them, theory-based models should be developed to assess and explain the impacts of diverse contextual factors on occupational culture issues. Several widely recognized theory-based or grounded models have been developed and proposed thus far. The most significant models recognized by management, business, and IT academic communities are:

- a. the Hofstede model (Hofstede, 1980)
- b. the GLOBE model (GLOBE, 2007), (Boundless, 2015)
- c. the World IT Project (WITP) model (Palvia, 2013) (Palvia, Jacks, 2014)

The pioneer of this research was G. Hofstede (Hofstede, 1980), who has carried out a study of IBM employees, working in over 40 countries, in the late 1960s and 1970s. His studies concerned the relationship between national character and motivation to work. He stated that there are substantial differences among people from different countries, which greatly undermines the universality of the effective managerial principles, based on Western theories and related to Western business and societies. Taking into account such studies, Hofstede developed a research model for analysis, explaining how certain patterns of thinking, feeling and behavior, distinguished members of one organization from another in different countries. In this way, he introduced the notion of organizational culture - different, yet characteristic of the various nations. Based on his research, Hofstede's model distinguished the following 5 aspects (the Big Five) of national cultures: Power Distance (Power Distance Index - PDI), Individualism (IDV), Masculinity (MAS), Uncertainty Avoidance (Uncertainty Avoidance Index - UAI), Long Term Orientation (LTO). The second widely recognized research regarding occupational culture is GLOBE (Global Leadership and Organizational Behavior) — a project and approach that is suitable for the leadership study and the identification of leadership qualities. The GLOBE project and model were created by an international group of social scientists and management scholars who studied cross-cultural leadership. They gathered data from 17,300 middle managers in 951 organizations from 62 countries. The GLOBE project investigates how cultural values are related to: organizational practices, notions of leadership, the economic competitiveness of societies, and the human condition of its members. As a result, they developed the GLOBE research model in which they identified nine cultural competencies that distinguish approaches to leadership. At the same time, they discovered the six global dimensions which enable cross-cultural comparative analyses of various leadership behaviors. Both the Hofstede and GLOBE model paradigms and research groups have a prevailing impact on IS researchers who have studied and analyzed the specific contextual factors that are significant for IT and the IT occupational culture. Consequently, the World IT Project (WITP) research model is discussed in the next section of the paper.

3. The WITP Research model

The aim of the World IT project is to investigate, identify, understand and conduct international comparative analysis in order to acquire new knowledge about the main issues concerning information systems professionals in many countries of the world in their unique, multi-dimensional context: cultural, economic, managerial and social. This will allow the examination of key issues, challenges for IT staff in companies and institutions — both executives and ordinary workers — in a number of countries participating in the project.

A significant stream of research in the IT business concerns the economic challenges and risks for the functioning and development of IT staff. These problems concern many countries around the world, representing different cultures, levels of economic development, social values and political systems — hence the need for an international study that will make a significant contribution to the acquisition of new knowledge concerning the culture of professional IT workers throughout the world.

Consequently, a team of scholars led by Professor Prashant Palvia, The University of North Carolina, developed and verified the WITP research model. Formally, it is also called “The World IT Project”. This project helps to examine the significant IT issues confronting IT employees with respect to the basic conceptual factors in many countries of

the world. The identification of the type and strength of the influence among WITP variables provides an insight into the nature, structure and scope of IT issues as well as creating the potential to make a positive impact on them.

The foundation for the application of the WITP model is the identification of the influences of the contextual factors on IT occupational issues. In this respect, the project will examine three basic IT occupational issues: organizational, individual (personal) and technological.

Organizational IT issues include IT strategic planning, IT-business alignment, Business Process Reengineering (BPR), security and privacy, IT reliability and efficiency, to name but a few. Individual issues cover: job satisfaction, efficacy, role ambiguity and others. The most important technological issues are cloud computing, social media, ERP systems, business intelligence (BI) and Big Data.

To determine the IT occupational issues, for a more profound and precise understanding, the influences of the relevant contextual factors must be studied and measured. These contextual variables in the WITP model are: national culture, organizational culture, innovativeness IT occupational culture, organizational structure, organizational strategy and demographics.

As a result, the following hypotheses of this research project are formulated as follows:

- 1. The basic IT occupational issues can be explained and examined by establishing some intentional and well-matched contextual variables.*
- 2. The following 6 contextual factors: national culture, organizational culture, innovativeness in IT occupational culture, organizational structure, organizational strategy, demographics/personality have an influence on the 3 basic IT occupational issues: organizational, individual and technological.*
- 3. IT occupational issues differ according to the various locations, country or regions where the firms and institutions exist.*
- 4. The level of impact of the contextual factors on the basic IT occupational issues differs according to the various countries that represent different cultures, levels of economic growth, values and social systems.*

4. The representativeness of the survey research

The proper preparation of the survey has a significant impact on its success. At the design stage, many key issues influence the quality of the research and the usefulness of its findings. One of the major issues underlying the quality of survey research is its representativeness. As stated by (Ramsey, Hewitt, 2005, p.71): "If the samples are not representative, any conclusions or decisions will be incorrect. Determination of the representativeness of samples is not a matter of statistical analysis of the data after the fact. It is a result of careful planning and proper design".

Also (Creswell, 2014, p.158) in his book, entitled "Research Design: Qualitative, Quantitative, and Mixed Methods Approaches" claims that only "a representative sample from a population provides the ability to generalize a population". In the opinion of (Onwuegbuzie, Leech, 2007, p.240-242), the representativeness of a sample allows generalizations based on the qualitative findings of the sample to be transposed upon the population from which the sample was drawn.

In order to ensure representative results of the study, the sampling should be random because the degree of representativeness of non-random selection is dependent only on the quality of the selection carried out by the researcher. The random selection rule means that every company and institution has a predetermined probability of being chosen for the sample. This makes it possible to estimate the parameters of the study population and thus generalize the likely results for the entire population with scientific methods consistent with the principles of statistical inference. A stipulation for the sample is to have a sampling frame - a list of all the entities to be considered for the draw. This must be characterized by completeness; all units of the study population are included and each unit can be used only once.

5. The design of the survey research process

The conditions for proper representative sampling to make the survey research require the formulation of methodological procedures to implement the WITP model. Szreder (2010, p.36-37) proposed the following procedure for survey research and was applied to the WITP model. The stages of survey research for WITP are:

1. The definition of the survey research
2. The questionnaire design
3. The preliminary determination of the statistical observation
4. Define the survey population and making sampling frame
5. The selection of sampling techniques
6. Determining the sample size
7. The research result analysis
8. Final report formulation and making the results available

6. Outcomes of the ITOC survey research

The survey research process starts with the definition of the survey research. This means, first and foremost, the suitable formulation of objectives and scope of the study in order to determine the appropriate test method. The examination of the occupational culture of IT personnel among companies and institutions operating in Poland needs to take into account the specific nature of the activity and the significant variation in demand for IT solutions.

Representative sampling in this research is absolutely imperative in order to fulfill the objective of this research in full since otherwise it would be expensive and labor-intensive, which would mean an extension of the duration of the study and a delay in the implementation of the WITP model. In addition, the number of IT professionals in Poland is estimated at over 100 thousand people. In future, perhaps the concept of Big Data and its analysis tools could hopefully resolve this challenge.

The second stage in the proposed process is the questionnaire design. For the aim of this research, a purposeful questionnaire called the WITP Instrument was constructed by the Core Research Team of the World IT Project (Palvia, 2013). The instrument consists of over 150 item questions. Most of the answers for these questions/ statements are marked by the respondents on a 5-point Likert scale.

An important role in this study was played by appropriate translation into local official languages. According to the principles and prerequisites of the Project, the Instrument was subjected to a forward and back translation. In detail, the implementation of the forward and back translation method includes the following main steps (Patel, Minas, Cohen, Prince, 2014, p.65-66):

- a) forward translation – the instrument was translated into an official local language version by a competent translator; a good translation should minimize the cultural differences without changing the essential meaning;
- b) expert panel session, i.e. translation review by bilingual experts to identify and resolve the inadequate expressions of the translation and recommending alternatives;
- c) back-translation — the Instrument was translated back into English by an independent translator; the back-translation should be conceptually and culturally equivalent compared with the forward translation,
- d) the final step — discrepancies were discussed with the experts; in cases of controversy, the previous three steps were reiterated as many times as necessary until a satisfactory version was reached

The use of the forward and back translation method in this study was very effective while also taking into account that most Polish professionals are fluent in English, in particular English IT terminology and in terms of daily communication in the international working environment of their firms and IT teams.

It should be noted that the questionnaire did not include the issue of sensitive and confidential data related to the organization. In addition, the questionnaire was characterized by its clear aesthetics as well as the clear layout of the questions. The questions were formulated in a clear and comprehensible manner so as to avoid errors related to the potential misunderstanding of the questions by the respondent. The respondents who filled out the questionnaire were

interested in the survey results, as shown by the fact that almost 40% of respondents left their e-mail asking to send them the Project results.

The preliminary determination of the statistical observation method is the third stage of the WITP survey research process presented in Figure 1. The acquirement of Information from primary sources involves the selection of techniques to collect statistical material. In the case of this study the following research techniques were taken into account:

- telephone interview (CATI – Computer Assisted Telephone Interviewing)
- survey completed on the Internet (CAWI - Computer Assisted Web Interviewing)
- direct interview

Each of the presented methods has various pros and cons. With regard to the first two methods, they were excluded because of their drawbacks for this specific survey. Telephone interviews would have been lengthy and time-consuming for both the interviewer and the interviewee. Furthermore, the CATI method was inconvenient for the respondents due to time limits in their work and difficulties related to the determination of individual phone numbers of the specific IT employees.

The easiest and, at the same time, the cheapest is the CAWI method. Its limited disadvantage is the risk of not achieving a satisfactory rate of people to take part in the study. This poses a serious challenge.

Therefore, finally the direct interview method was selected for the study. Although being perceived as the traditional one, this method generates a good quantity and quality of responses, thereby reducing errors possible in other methods. However, nowadays the direct interview method may be effectively supported by techniques used by the selected techniques also applied in CATI and CAWI - by using mailing lists, addresses and websites of the sampled companies and institutions. In this way, access to the IT staff of these organizations is considerably facilitated. A high participation rate was achieved in the survey — 70% of the organizations which had been chosen. This could be considered a very good result among statistical surveys, in particular while taking into account the moderate responsiveness and cooperativeness of big companies and corporations, for which the rate was noticeably lower.

The technique chosen for this survey research also proved to be effective according to the criterion of the participation rate of IT employees working in the sampled firms and institutions. By visiting them, the interviewer could easily carry out the individual questionnaire for the staff of IT companies. The interviewer could encourage the respondents to participate in the survey through a direct presentation of the research. As a result, the participation rate of employees in randomly selected organizations reached almost 100%, and only a single IT team member refused to participate in the study, mainly because of current urgent work duties.

When the statistical observation method has been selected, the survey population can be defined. The study population are IT employees from companies and institutions operating in Poland. The indispensable condition of the survey research is the so-called the sampling frame — the list of units considered in the selection, substantively connected with the matter of the study. The sampling frame must be characterized by completeness which means that all the units of the survey population are included in the survey. The sampling frame selected from the Central Statistical Office resources and used for the aim of this ITOC World research project included over 60,000 small, 15.5 thousand medium and 3200 big organizations.

The results yielded by this survey allow us to move to the fifth stage of the proposed ITOC survey research procedure — the sampling techniques selection. Among the many techniques for the random selection of the sample, the most common and the one used for this survey is individual, stratified and cluster sampling.

The individual selection is the most comprehensible and intuitive technique of the draw and adjusts all the parameters that can be estimated for the study population. However, using this method is not the most suitable for sampling IT employees in companies and institutions, because of an uneven distribution of enterprises in terms of size and the main sector of activity. In this way individual sampling fails to meet the project condition – the choice of a maximum of three organizations in every industry.

Such a guarantee is ensured by the use of stratified sampling. The main objective of this sampling method is the increase in efficiency and accurate programming by using additional conditions during the sampling. By using stratified sampling, there is no risk of the occurrence of a sample of some enterprises that represent smaller groups.

The cluster sampling technique based on the division of individuals into groups. The main advantage of cluster sample is the opportunity to significantly reduce the cost of preparing the sampling frame.

As a result, IT employees in this project were selected according to the cluster sampling technique, while the companies and institutions in which they work, were chosen via stratified sampling.

The aim of the sixth stage of the procedure is to determine the sample size. Taking into account the requirements of the project regarding the number of respondents and the structure of the industry, the distribution of employees in the sample was established — in terms of the industry they work as well as the size of the organization measured by the number of employees. This distribution is presented in Table 1; it was empirically used by the market research company in the survey. The administration of 300 interviews among IT workers required the selection of around 50 small, medium and big companies or institutions, 3 for each branch. They were selected from the following branches: Manufacturing; Wholesale trade; Retail trade, services; Construction; Transport; Education; Finance; Tourism; Information technology; Public utility companies; Freelance services; Healthcare; Entertainment; Media; Governmental / Public institution; Nongovernmental organization (NGO), non-profit and Other Industries.

With regard to the last two stages of the proposed ITOC process, i.e. the research result analysis as well as the final report formulation, they will be presented in the coming publications of the WITP outcomes.

Conclusions

The process of WITP research survey, strongly influenced by the criteria and techniques of sampling representativeness, was created and proposed in this paper. Taking into account the representativeness requirements, that only “representative sample from a population provides the ability to generalize a population” (Creswell, 2014, p.158), the developed process of WITP survey research was presented in Figure 1. It is comprised of the following eight stages: the definition of the survey research, the questionnaire design, preliminary determination methods for statistical observation, definition of the survey population and creation of the sampling frame, the selection of sampling techniques, determining the sample size, the research results analysis, and ultimately – the final report formulation and publication of the results.

The whole procedure was empirically applied in this WITP study. The details regarding each specific stage are discussed and verified in the following chapters of this paper, but in particular in chapter 6. The structure of the sampled and surveyed organizations is shown at Table 1. The specific findings regarding the structure of the selected sample, established according to the proposed process of survey research and the quantitative resources available, are included in Table 1. Actual analysis and findings, based on the methodological background elaborated in this paper, will be presented in forthcoming research papers and articles.

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