

**RESEARCH REGARDING ITC IMPLEMENTATION IN ROMANIAN SMES
IN KNOWLEDGE BASED SOCIETY CONTEXT**

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ABSTRACT

Knowledge and ability to create it, access and use effectively, has long been both an instrument of innovation and competition and a key economic and social development. However, a series of dramatic changes in recent years have increased the importance of knowledge for generating competitive advantage. Ability to process and use information globally and instantly increased exponentially in recent years due to a combination of scientific progress in computing and distributed computing, exacerbation of competition, innovation in all its forms and cuts of operating costs in global communication networks. This paper, based on a survey of 165 Romanian SMEs, address a sensitive issue of both business and academic fields – perception regarding ITC implementation in Romanian SMEs in knowledge based society context. Its conclusion can guide decision makers in Romania to develop an integrated approach to foster knowledge based economy in our country and develop programs dedicated to IT SMEs.

KEYWORDS: *knowledge society, ITC, SME, entrepreneurship.*

JEL CLASSIFICATION: *M15, M10, P27.*

1. INTRODUCTION

The domain of the management of ICT is relatively new on academic research field (Adams, 2001), for which reason there appear controversies regarding both the concepts (Banker, 1988), theories and instruments used, but also, insufficient definitions of concepts belonging to it (Ceptureanu, 2010b). Consequence of all the social, economic, technical and technological changes going on, the management of computer technology requires a systematic research to surpass the stage of mere managerial trend, as some specialists argue (Ceptureanu, 2010a).

The present paper aims to clarify some aspects, relying on two kinds of research-a theoretical and a practical one-trying to explain the extent to which the theoretical approaches can be confirmed by the social and economic realities of Romania (Ceptureanu et al. 2012; Stirbu, 2015).

For this purpose, I have set some major research objectives, as well as some hypotheses which will represent the main points of this research as follows:

1. The identification of the current state of implementing computer science in the companies in Romania
2. Identification of the ways of reaching economical and managerial performances for the middle and small scale enterprises in Romania
3. Identification of the particular features of computer science in the firms under analysis and the role they play in obtaining economical and managerial performances
4. Future directions of proliferation of computer technology in middle and small scale enterprises in Romania

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Starting from these objectives, the present thesis aims to offer some responses which could support the increase of the performances of middle and small scale enterprises by implementing computer science. We consider that both theoretical and practical research can successfully complete the literature of the field (Schreyer, 2000; Umar, 2003; Lovemann, 1994) and can give essential information in a field which is current again, now that the new global economic crisis has appeared (Ceptureanu et al, 2015).

During my research, I have identified some major impediments in realizing the objectives?

- lack of some significant research in Romania and abroad
- lack of some information of the organizations included in the study
- Increased reluctance of the representatives of the firms under analysis to supply information about them

The scientific and methodological basis of my research is represented by the concept of computer technology, middle and small scale enterprises, performance and management as they are represented in the relevant scientific sources.

2. PURPOSE, OBJECTIVES AND RESEARCH METHODOLOGY

This research aims to study the impact of ICT on the performance of SMEs in Romania. It aims mainly to establish that different parameters affect the performance of ICT companies.

The areas analysed are, accordingly to Lee et al. (2003) research:

- a. Questions regarding the characterization of Department for the information system.
- b. Questions regarding the characterization of system and hardware infrastructures of SMEs.
- c. Questions regarding the characterization of the computer and software system infrastructure of SMEs.
- d. Questions regarding the characterization of the information system in terms of security structure.
- e. Methods and management techniques - performance evaluation.
- f. Methods and techniques of management - IT Project Management.
- g. Methods and techniques of management - IT budget.

Research. The research was conducted on a sample of 165 SMEs from various regions of Romania. Conceptual definition of the variables used in research relates to concrete explanation of the variables and operational definition refers to alternatives that can characterize these variables.

Manner of collection of information is the questionnaire. As a tool for information gathering questionnaire was used due to its flexibility given the variety of types of questions, and the various ways they can be put.

Research questionnaire includes a total of 89 questions, all closed. The role of open questions is to find out the firm's opinion with respect to various matters. The questionnaire is presented in Appendix 2. The order of addressing the questions was established as the "funnel" in questions with a high degree of generality and continuing with questions increasingly more specific.

The sample is represented by SMEs in Romania. Data were collected through survey method undisguised. The research took place from 20 February to 5 June 2014, from Monday to Friday between 08: 00-18: 00.

The sampling method used in this research is the simple random. Sampling by this method is the most common in practice because of the advantages they present. It is easy to implement in a short time, which is a major advantage for its application in the market and at the same time offers the same possibility of including the community researched the research sample. To determine the sample size, we used the following formula:

$$N = t^2 * pq / e^2 \quad (1)$$

Where n = sample size, t_2 = coefficient associated probability of guarantee research result; p = share some attributes they possess researched community; $q = 1 - p$ = that share attributes that are not characterized by a particular attribute; e = margin of error.

We considered a confidence level of 0.05 (corresponding to a probability to guarantee research results 95%) and a margin of error of $\pm 5\%$ for a value $p = 0.3$. Sample size is:

$$N = (t_2 * p * (1-p)) / e^2 = (1.962 * 0.5 * (1-.5)) / (0.05)^2 = 323 \text{ respondents} \quad (2)$$

Rejection rate was 49%, some cannot be used the replies (Griliches Z., 1995),. So it has come to value the 165 response units, considered normal in literature.

3. CONCLUSIONS

The most important conclusions which result from my survey are:

- We haven't identified a direct impact of implementing the management of computer technology on the performances of small and middle scale enterprises. An important part of the firms have obtained better performances, despite the faulty application or even of not applying some instruments, procedures specific for computer technology.
- Regarding the existence of the organisation chart of the IT Department, with the employment of every employee, I have noticed that 85 respondents (52, 7 %) have stated that this exists, while 78 respondents state that it does not.
- Regarding the job status charts for each employee of the IT Department, I have noticed that 123 respondents (74, 5 %) confirm the existence of the charts, while 42 respondents (24, 5%) infirm their existence.
- Regarding the relegation of duties in the job status charts, I have observed that 96 respondents (58, 2 %) confirm the fact that the job status charts describe accurately the relegation of duties in the IT Department, while 69 respondents (41, 8 %) consider this distribution not to be accurate.
- Regarding the distribution of the competences in the job status charts, I have noticed that 88 respondents (53, 3%) state that these describe accurately the distribution of competences in the IT Department, while 77 respondents (46, 7%) deny their existence.
- Regarding the distribution of responsibilities within the job description of the IT department it found that 101 respondents (61.2%) say that their job properly describe the distribution of tasks within the IT department, while 64 respondents (38, 8%) say otherwise.
- Regarding the update job descriptions of employees occupied the positions of IT department found that 143 respondents (86.7%) say that their job descriptions are updated according to the positions occupied by employees of the IT department, while 22 respondents (13.3%) say otherwise.
- Regarding the technique of rotation of posts in the IT department found that 34 respondents (20.6%) say they practice rotation in jobs, while 131 respondents (79.4%) say otherwise.
- Regarding the distribution of responses on the existence of vacancies in the IT department for a long time we revealed that 21 respondents (12.7%) who say they practice rotation in jobs, while 144 respondents (79 4%) believes that there is a unified vision in this area.
- Regarding the performance indicators of human resources in the IT department capable of ensuring this departament.am assessment found that 27 respondents (16.4%) believe that companies using these indicators in practice, while 138 respondents (83.6%) say that although partially known some of these indicators, the company's practice not used.
- Regarding the existence of written policy in the field of data found that 11 respondents (6.7%) confirms the existence and use of pragmatic written policy on the IT department, while 154 respondents (93.3%) say they do not use currently such a written policy, but that

entrepreneurs apply "mental" Some of these policies.

- Regarding the plan exists skills development through training user personnel have identified only nine of the respondents (5.5%) which states that a company uses such a plan (for employees based primarily), while 156 respondents (94.5%) say otherwise.
- Regarding the existence of diagnostic tests performed regularly in the IT department to identify the strengths and weaknesses of this section / department of the company we found that only 37 respondents (22.4%) say that this important instrument scanning the organization uses to the IT department, and 128 respondents (77.6%) denied the use of a scientific basis.
- Linked to inform users about computer company policy we have identified only 21 of respondents (12.7%) stating that no such diligence, while 144 respondents (87.3%) say otherwise.
- Regarding internal audits of business IT Department found that 47 of the respondents (28.5%) apply these audits.
- Regarding the company's staff training sessions on the use of computer applications the IT Department have identified 47 respondents (28.5%) stating that no such training sessions, while 118 respondents (71.5 %) say otherwise.
- With regard to training programs for skills development in the IT users, we found that 24 of the respondents (14.5%) stated that no such training sessions, while 141 respondents (85.5%) believe that the company is not concerned with these issues.
- As regards written plan for infrastructure hardware found in 76% of cases no written plan for infrastructure development hardware for the current year.
- Regarding infrastructure hardware inventory found that 68% of SMEs investigation is no such inventory.
- As regards human resource allocation to achieve hardware infrastructure inventory we found that 70% of surveyed companies have appointed a person with responsibilities in the area hardware infrastructure inventory.
- Regarding the existence of internal procedure of making the inventory for hardware, the analysis reveals that 59% of respondents confirmed the existence of internal operational procedure of making hardware infrastructure inventory.
- Regarding the existence of infrastructure hardware inventory reports, we found that 69% of companies say that there are reports of hardware infrastructure inventory made with regular frequency.
- Regarding the specific type of equipment inventory hardware, the analysis reveals that 68.5% of respondents confirmed that involves inventory accomplishing specific rules and regulations.
- Regarding the existence of procedures related to the lifecycle of hardware, the analysis reveals that 59% of respondents (14.5%) confirm that there are procedures governing flows of equipment life cycle of infrastructure hardware.
- In terms of hardware infrastructure maintenance plan, we found that 60% of the analysed companies say there hardware infrastructure maintenance plan.
- With regard to updating the computerized network found that 56% of respondents say that there are types of updated computer network of the company.
- Regarding the existence of remote access to the computer network of firms found that 66% of respondents said that there is remote access (for wireless, VPN, etc.) to the company computer network.
- Regarding the existence of monitoring tools remote access to the computer network of the company, the analysis reveals that 70% of SMEs have not investigated monitoring tools remote access to the computer network of the company.

- Regarding the software infrastructure development plan, the analysis reveals that only 30% of SMEs have investigated a written plan for infrastructure development software.
- Regarding the existence of open-source operating systems, we found that 25% of SMEs do not use open source operating systems (because of a legislative obstacles related to the use of such solutions for legal entities).
- Regarding the existence of Intranet network, the analysis reveals that 54% of SMEs have its own Intranet network, but the situation is far from that found in other EU countries, causes using internal network only at this level being generated costs creating and ensuring the functioning of the company and failure online market orientation of many Romanian companies.
- Regarding antivirus-related applications, the analysis reveals that only 46% of SMEs investigated using anti-virus applications.
- Regarding the existence of software inventory found that 79% of respondents do not have a complete inventory of the software.
- Regarding inventory we find out that 82% of cases inventory is performed empirically, without providing sufficient data for a coherent analysis of these applications used by the company.
- Regarding the existence of employees with responsibilities for software inventory, we found that in 54% of cases analysed SMEs have appointed a person who has responsibilities in ensuring inventory software.
- Regarding the inventory reports for infrastructure software we found that 59% of respondents confirming the absence of infrastructure asset reports software.
- Regarding the standard configurations of applications installed on workstations, the analysis reveals that 53% of respondents have standardized configurations software applied on workstations, with obvious beneficial effects related to lower running costs and the principles of rationalization the computer system.
- Regarding the standard configurations of installed applications on mobile devices, the analysis reveals that 72% of respondents do not have standardized configurations software implemented on mobile devices, which implies higher costs of operation and problems arising from the occurrence of information deficiencies.
- Regarding the responsibilities of employees in the integrity of the data, we found that 84% of respondents stated that there defined responsibilities and commitments of IT staff in ensuring data integrity.
- Regarding the data dictionary identified as critical to the company, the analysis reveals that an overwhelming proportion (96%) not using such dictionary.
- Regarding the existence Data Warehouse, we found unfortunately that 80% of respondents do not use data warehouse (Data Warehouse).
- Regarding the procedures for capturing, processing and storing data, we found that 74% of respondents (14.5%) do not use data defined procedures for capturing, processing and storage.
- IT system of quality assurance, the analysis reveals that 79% of people said they investigated there are no plans for quality assurance system.
- Regarding procedures to protect information, the analysis reveals that 87% of SME investigated do not use dedicated procedures to protect sensitive information.
- Regarding the rules and procedures for archiving electronic documents, the analysis reveals that only 35% of surveyed companies apply specific rules and procedures in this area.
- Regarding the procedures for back-up data found that 84% of SMEs do not use such procedures analysed.
- With regard to training programs for security data and information, we found that in 93% of

- the analysed companies not making such training programs in data and information security.
- As regards data protection operational procedures, we found that only 15% of respondents said that the procedure used in practice.
 - Regarding protection programs / knowledge exploitation at the company level, the analysis reveals that only 20% of SMEs applied investigated and programs to protect intellectual capital and knowledge to their levels.
 - Related information classification standards, the analysis reveals that 75% of the analysed companies do not apply to information's grading in accordance with corporate security policy.
 - Regarding the level of security implemented for each standard classification of information analysis conducted reveals that, unfortunately, that 84% of respondents said that there are implemented security levels for each standard classification of information.
 - Related to periodic updating of IT security plan, the analysis highlights that, unfortunately, 81% of companies examined do not have an IT security plan updated regularly and thoroughly.
 - Regarding user authentication procedures, we found that 76% of respondents (14.5%) have written procedures to authenticate users.
 - As regards the procedures for granting access rights, the analysis reveals that only 39% of respondents use written procedures for requesting, granting, suspension and restriction of access rights.
 - Regarding computer network security procedures, the analysis reveals that 85% of companies surveyed that do not apply to computer network security procedures type firewalls. The situation is even more serious because such a system costs are modest compared with the potential benefits.
 - Regarding the existence of infringement procedures for reporting security policy, the analysis reveals that 2/3 of the companies analysed (66% of respondents) are not using reporting.
 - Regarding the existence of procedures related responsibilities for granting rights of access to the system, the analysis reveals that 56% of respondents do not use such procedures, and practices 44% use them company.
 - Regarding the existence of procedures for identifying and documenting the training needs of users on procedures to ensure safety system, we found that only 37% using current practice such procedures identification and documentation of the training needs of users.
 - In terms of data storage on the assessment of data management processes, we found that 65% of respondents deny that stored data on a time horizon to provide sufficient information to assess the chronological data management processes.
 - With regard to updating procedures end-user on ensuring security and data integrity, the analysis reveals that only 32% of interviewees stated that there is a regularly updating end-user on the security, availability, processing and data integrity.
 - As regards monitoring procedures, the IT manager, system performance data management, the analysis reveals that 43 of the respondents (26.1%) stated that there is such proceedings, while 122 respondents (73.9%) say otherwise.
 - Regarding the reaction procedures are recorded when the sub-optimal levels of performance we found that 48 of the respondents (29.1%) said no such reaction procedures while 117 respondents (70, 9%) say otherwise.
 - Regarding the performance evaluation procedures are taken into account in the design of each new application and implementation activities, we found that 51 of the respondents (30.9%) stated that there is such proceedings, while 114 respondents (69 , 1%) say the opposite.

- Regarding the performance indicators of the system, as well as procedures for collecting and reporting data on these indicators consolidation, the analysis reveals that 59 of the respondents (35.8%) stated that no such indicators, while 106 respondents (64.2%) did not compute.
- In terms of indicators for monitoring daily activities in the IT department found that only 19% of respondents say that and implemented monitoring indicators
- Performance indicators related to the integration of the computer system in the benchmarking system, the analysis reveals that 75% of respondents confirming the absence of performance indicators in the instrument integrated information management system benchmarking.
- Regarding analysis procedures planned departure levels of performance indicators IT system we found that 70% of respondents said that there are no procedures in this regard.
- Regarding the internal audit procedure in the information system analysis conducted reveals that 74% of respondents said that there is internal audit procedures in the information system, a very serious situation especially for IT companies with NACE codes related to development software products, which have specific legislation on public procurement.
- Regarding the mechanism for quantifying the economic value of data and information, the analysis reveals that an overwhelming proportion-81% of respondents do not use mechanisms to quantify the economic value of data and information.
- Regarding the issue Help Desk, the analysis reveals that only 13% of respondents say they use the Help Desk for formal management flow management problems.
- Regarding the existence of employees who hold certifications obtained following courses project manager I found that 64 of the respondents (38.8%) say that there are also employees, while 101 respondents (61.2%) stated otherwise.
- Regarding qualifications Project Manager Profile IT department found a positive trend in this area, 52% of respondents stating that there are employees in the IT department who have training courses in Project Management.
- Regarding identification procedures need business found that 53% of respondents do not use such internal procedures for identifying the needs of business users to transform into functional requirements and specifications.
- Regarding scanning business needs of human resource ITC analysis conducted reveals that 58% of respondents have employees with responsibilities for the operational needs of business scanning.
- Regarding the internal contracting procedures for IT projects, the analysis reveals that 61% of entrepreneurs and experts questioned the current operational management used such a procedure.
- Regarding the internal monitoring and control procedures progress of the IT projects found that 43% of respondents confirming the existence and application of these procedures, and 57% are not familiar with it.
- Regarding internal procedures for planning IT projects, the analysis reveals that 64% of respondents said that there is internal procedures in the field of IT projects, leading to coordination problems and achieve goals.
- As regards the existence of the regulatory procedure of the sittings of analysis we found that in most cases (60%) there is no such procedure implemented in SMEs.
- Regarding the internal register of meetings for IT project found that only 45% of respondents said that there is such an internal register.
- With regard to operational meetings' minutes, viewed from a managerial perspective, it appears that only 32% of respondents say they perform those minutes, the remaining 68% stating otherwise.

- Related to SME internal supplier relationship through a single point of input-output reveals that 57% of respondents have optimized the process to one single point of input-output with positive results on the efficiency management and reduce possible messages information risk and 44% failed so.
- Regarding the internal register of input-output stream for IT project, the analysis reveals that 47% of respondents usually use this internal register, while 53% say the opposite.
- Regarding the existence of an annual budget formally allocated IT department, the analysis reveals that 55 of the respondents (33.3%) confirms the existence, while 110 respondents (66.7%) say otherwise.
- Regarding the procedures of forecasting IT spending, the analysis reveals that 52 of the respondents (31.5%) say that procedures are forecasting IT spending, while 113 respondents (68.5%) say otherwise.
- Regarding the company's desire to strengthen the IT budget, the analysis reveals that 24 of the respondents (14.5%) say that these procedures are used in practice consolidation, while 141 respondents (85.5%) stating the opposite.
- Regarding the delimitation of the IT department as a cost centre, the analysis reveals that 31 of the respondents (18.8%) say that there is this boundary, while 134 respondents (81.2%) say otherwise.
- Regarding the existence structure adopted standard for IT budget consolidation analysis conducted reveals that 11 of the respondents (6.7%) states that there is a standard structure on strengthening the IT budget, while 154 respondents (93.3%) said the opposite.
- Regarding the existence of IT project budgets, we found that 65 of the respondents (39.4%) say that IT budgets are allocated to projects, while 100 respondents (60.6%) say otherwise.
- Regarding rules of substantiation IT staff costs found that 76 of the respondents (46.1%) said no such substantiation rules, while 89 respondents (53.9%) say otherwise.
- In terms of valuation rules cost of human resources at IT project, we found that 62 of the respondents (37.6%) say that there are rules of evaluation, while 103 respondents (62.4%) considers that there is.

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