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CONTENTS

Multiculturalism, diversity and change

As business has gone global over the past few decades, its role in spreading values has gained importance. Through commerce, trade and investment, and the exchange of ideas and knowledge, business has become a major actor across cultures and people.

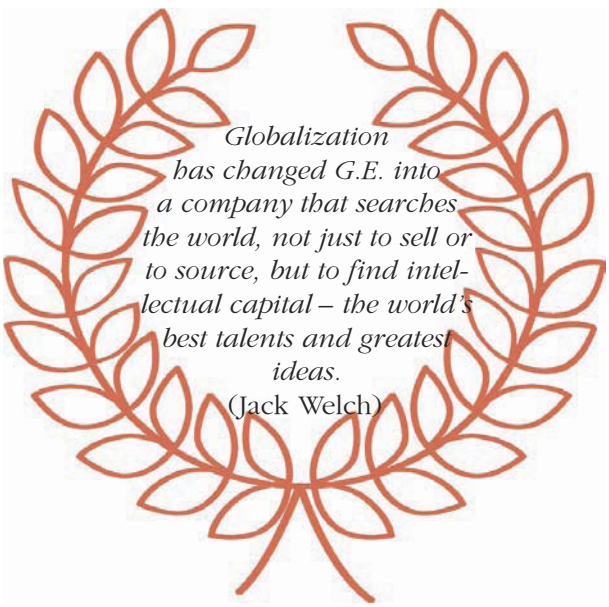
Business is often at the forefront of creating space where people from different cultures meet and cooperate. The process of learning to work together is not always free of tensions, and mistakes are made. But overall, business has become a critical force in support of cultural understanding, building bridges between cultures and people by offering the prospect of economic opportunity.

Most of the developed countries are experiencing an aging of their populations. This increase is due to people living longer and a decrease in the number of children, particularly those in „teen" age groups. Some of the implications of the shifting age of the workforce include the following: retirement benefits will increase in importance, particularly pension and health-care coverage for retirees; retirement will change character, as organizations and older workers choose early retirement buyouts and part-time work; service industries actively will recruit senior workers for many jobs.

The two words that best describe the challenges of HR management are change and diversity. Change and diversity are seen in the following major areas: an increasingly diverse workforce; changing work patterns; industry and occupation employment shifts; education and training needed by a diverse workforce; economic changes resulting from global competition and the growing internalization of contemporary organizations.

Managers must provide an environment that encourages the performance of individuals of differing ages, races, cultural origins, abilities and genders. In addition, varied lifestyles, personalities and other factors affect each individual's performance. Hence, work patterns, training and HR management practices must be flexible to accommodate these diverse individuals.

A growing number of employers have taken steps to manage diversity through HR activities. Training often is at the heart of these efforts. The goal is to



sensitize all employees to diversity issues and the needs of co-workers who are dissimilar in some ways. The main forms of HR diversity at work can be attributed to the following factors: women in the workforce; racial/ethnic diversity in the workforce; age-based diversity; individuals with disabilities in the work force.

Culture constitutes the foundation of group differences. Culture refers to the characteristic behavior of people in a country or region. Culture provides people with an identity – one they retain even when they emigrate and that is retained by their children and grand children as well.

When we talk about culture, we refer to family patterns, religions, customs, political systems, social classes, clothing, food, literature and laws. Understanding the factors that make up a person's culture helps diverse people to deal more constructively with one another. Accepting diversity means more than feeling comfortable with employees whose race, ethnicity, or gender differ from your own. It means more than accepting their accents or language, their dress or food. What it does mean is learning to value and respect cultural styles and ways of behaving that differ from your own.

Implications of the increase in racial and ethnic cultural diversity are as follows: the potential for work-related conflicts between racial/ethic groups and whites will increase; extensive employer-sponsored cultural awareness will be required to defuse conflicts and promote multicultural understanding; greater cultural diversity in dress, customs and lifestyles will be permitted by employers.

Prof. Florin Dănălache, Ph.D
Senior Editor

UNIVERSITIES IN THE BUSINESS ENVIRONMENT

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Abstract

All over Europe and worldwide there is an increasing interest on the university-industry cooperation and the development of more entrepreneurial oriented universities. The aim of this paper is to describe and highlight the steps of a research methodology for the investigation of the university-industry cooperation used in a doctoral thesis. The case study was conducted in the biggest technical university in Portugal, Instituto Politecnico do Porto. For the research methodology there were used 8 in-depth interviews with academics involved in the middle and top management of the institute, in different positions. The content analysis research method was used for the interpretation of the answers. Another resource used for the research was a large international database, giving access to more then 17.000 worldwide online resources, in order to track the best papers issued in the last 7 years (2006-2012) related to the research subject. The results are showing the efforts of our case study institution to „abandon" the „ivory tower university" attitude and to cooperate with the local, regional and national industry, seen as the „real world" for their students. As further research pathways, this research could be completed with comparisons between Portuguese and Romanian universities.

Keywords: university-industry cooperation, triple helix model, entrepreneurial university, university entrepreneurship

JEL classification code: L3 – Firm Objectives, Organization and Behaviour; L26 – Entrepreneurship

When I see the cultural diversity that exists today, I feel that we must defend it.
(Jean-Pierre Raffarin)

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INTRODUCTION

This paper is using a part of a doctoral research developed within the framework of the Politehnica University of Bucharest (UPB) and Instituto Politecnico do Porto (IPP), Portugal.

All over the world, universities and Higher Education (HE) institutions are demanded to find new ways to increase income and financial independence, which could be translated as a potential focus to entrepreneurship and a more entrepreneurial behaviour for this very traditional and conservative institutions. The Polytechnic Institute of Porto (IPP) was created in 1985 and involves seven Schools: Education (ESE); Music and Performing Arts (ESMAE); Engineering (ISEP); Accounting and Administration (ISCAP); Management and Industrial Studies (ESEIG); Management and Technology (ESTGF); and Applied Health Technology (ESTSP). In 2012-2013 over 17000 students attended the seven schools located in six cities within the Porto district.

Instituto Politecnico do Porto (IPP) is the largest and one of the most dynamic polytechnic institution in the country, emerging as first in the Polytechnic ranking and, along with other major universities, is placed in the upper segment of the higher education national ranking. It is a higher education institution that is distinguished by its interdisciplinary nature, within its network of schools having several degrees and covering a wide spectrum of scientific knowledge from engineering to musical arts and theatre, including management, accounting, languages, education, design and health technologies.

The Technology Transfer Office of IPP (OTIC)

Within the IPP there is a structure created to take care of the technology transfer between the seven schools of IPP, the industry and the community. Its name is OTIC (Technology Transfer Office), and presents itself as a link between the academic world from Polytechnic of Porto and the business universe. The main objectives of the structure are: to foster and promote collaboration between the academic world, business and social environment, and to

develop a project to exploit and disseminate innovation, knowledge and entrepreneurship.

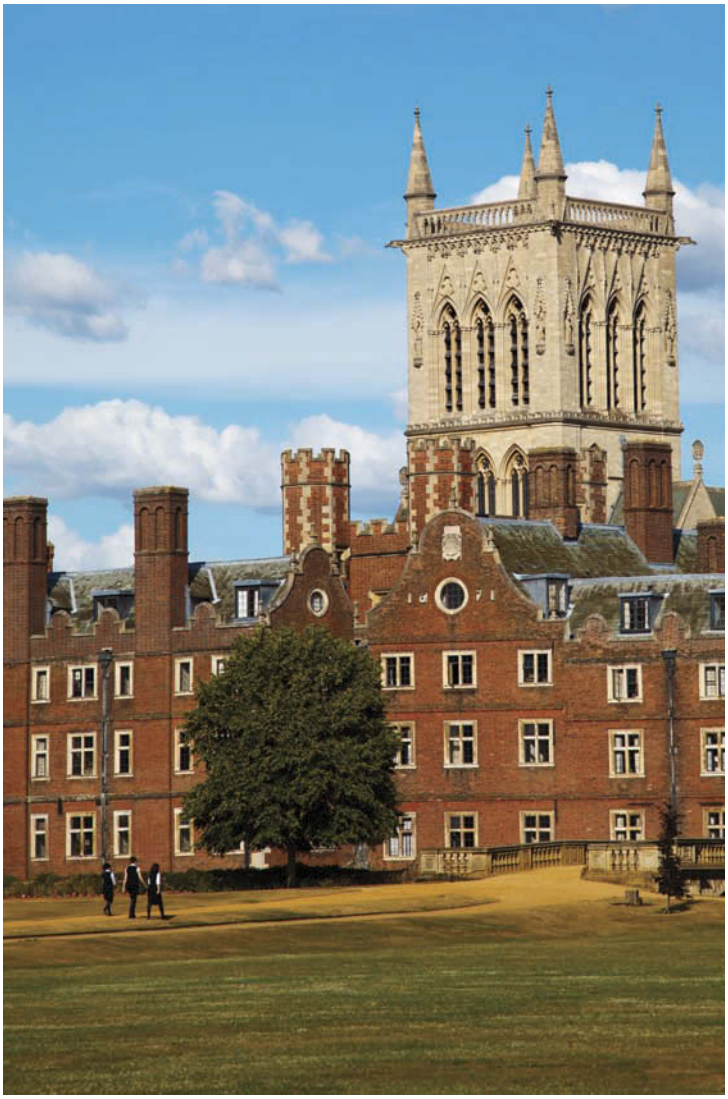
OTIC follows four strategic axes:

1. Entrepreneurship
2. Research and Development
3. Intellectual property
4. Valorization of knowledge

OTIC main activities are: File organization of OTIC; support in the organization of events; translation of documentation; support the application of project funding programs; support the preparation and monitoring of investment plans/funding of approved projects; definition of the strategy to promote the IPP technology; organization of technological disclosure sessions – IPP/industry; support the organization of meetings planned for the Poliempreende (the main entrepreneurial event developed by IPP); support the management of industrial property portfolio of IPP; organization of training activities in IPP; basic advice on Industrial Property; training in Industrial Property; support for protecting the results of R&D activities; support for the negotiation of intellectual assets; monitoring on Industrial property rights; support for finding customers and partners for the commercialization of technologies; activities to encourage entrepreneurship; support the creation of companies; support the preparation of application for projects; management of administrative and financial processes.

Literature review

For the investigation of the study, some sources and theoretical approaches were analyzed, which were used to identify the most relevant papers and articles within the university-industry cooperation and university entrepreneurship field.



A large international research database (www.b-on.pt) giving access to more then 17.000 worldwide resources was investigated in July 2013 in order to select the most relevant papers and articles published in the field of university-industry cooperation in the last 7 years (2006-2012).

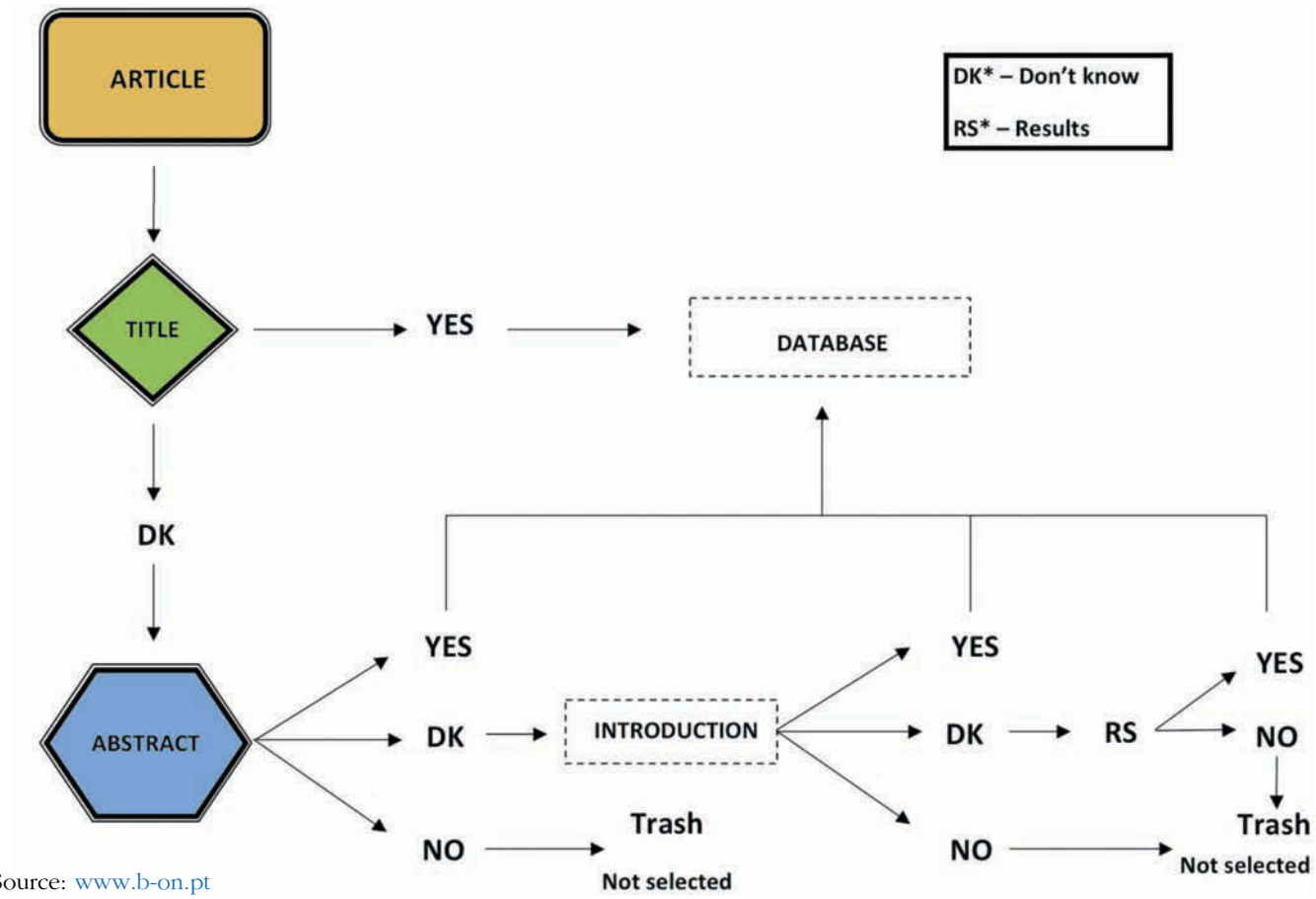
The literature investigation process in the field of entrepreneurial studies revealed important scientific data. The research focused on the university-industry cooperation mainly use and refer to, one important theoretical approach (The Triple Helix Model), proposed by Etzkowitz and Leydesdorff [1], [2], [3], [4].

The importance and relevance of these studies for the proposed research can be noticed in the Triple Helix Model [1], [2], [3], [4], [5], that includes three major interdependent factors: University, industry (economical organizations), and the government. „The networks created between the academics and industry had been identified as the first step in the establishment of the role that the superior education has in the economical growth" [6].

The Triple Helix Model represents a theoretical framework in highlighting the good relation that exists between university, industry and the government, a collaboration that becomes more and more powerful [1], [2], [3], [4]. At different levels in the innovation process this ties appear like a spiral pattern (a triple intermingling helix). Therefore, there can be identified four different dimensions of the Triple Helix Model, as follows: the first one represents the internal transformation inside every helix, translated as supposed mission of the university in the economical growth or in the creation of strategic alliances with the companies [7]; the second one regards the influence of one helix on the other – for example the Bayth-Dole Act, instituted in 1980 in the US had conducted to the creation of a new academic profession in the field of technology transfer, phenomenon generated by changing the rules of the intellectual propriety as a result of a research financed by government founds [7]; the third one is the trilateral networks from the interaction between the tree helixes, and regarding this idea a relevant example is New England Council that has been formed in 1920 with the purpose of reuniting universities, local and central administrations, small and medium companies [7]. The fourth element is represented by a „recursive effect of these different configurations on the helixes", and such an effect can be seen in science, as a change in the academic field, fortified and spread through the governmental policies [7].

Considering this description of the Triple Helix Model and the employment of the theoretical framework on this structure, a research about entrepreneurial university is important in clarifying and explaining the measures taken by the universities regarding structures development, actions and entrepreneurial behavior.

Finally, 98 papers and articles were selected from the field of university-industry cooperation for the period 2006-2012, in order to help us to properly investigate the phenomenon.



Source: www.b-on.pt

Figure 1 – *General framework for the selection of relevant papers*

METHODOLOGY

The main purpose of this research is to identify the ways in which universities manage the cooperation with the companies and industry. The first hypothesis for this study is that university – industry cooperation is accomplished first of all through the research and technology transfer.

Outside the classical structures identified by the literature study (technology transfer offices, patent offices, intellectual propriety offices etc.), there can be revealed an important number of organizational units playing an important role in the university–industry cooperation.

This study is proposing a new methodological design involving research instruments such as: research interviews, qualitative and quantitative content analysis tables, direct observation and document analysis.

In-depth interviews were used as data gathering method on a sample of 8 academic staff involved in the middle and top management of IPP for different important management positions. There have been collected 8 interviews concerning the entrepreneurial behavior of the institute. These interviews have been recorded in July and August 2013, employing also direct observation instruments and documents analysis.

The structure of the questions in the interviews was the following:

Question 1. Which „players" do you think that exist in Higher Education Institutions (HEI) – Industry cooperation?

Question 2. Please describe shortly your roles and responsibilities regarding the enterprise agenda.

Question 3. Please refer to the enterprise strategy and more specifically to: financial, proposition (does the strategy include KPIs?), customer proposition (which is your customer promise?), internal processes, and people perspective (how do you align academics with the enterprise agenda?)

Question 4. Please describe shortly what are the key-issues that affect alignment processes with: funding units, decision units in faculties, knowledge producers, boundary/enterprise units.

Question 5. How would you describe an entrepreneurial higher education institution?

For the interpretation of the answers the authors used the content analysis method, which is a qualitative research technique using the objective, systematic, qualitative and quantitative description of the communication content.

RESULTS AND DISCUSSION

For a more profound approach on this subject and for a better answer concerning how entrepreneurial a Polytechnic Institute can be and how does it link to industry, the texts of the eight interviews have been analyzed with the content analysis research method. Therefore, there have been established few registration units regarding the selection of terms and concepts related to the general research subject – the entrepreneurial university and university-industry cooperation. For this matter it has also been established a frequency analysis that has determined the number of appearances of registration units (words/concepts) in the general framework of the analysis categories (the interviews), and the results were qualitative (via content analysis method), as well as quantitative.

For the content analysis presented in the Table 1, there have been selected a number of 34532 words concerning the entrepreneurial attitude in IPP, and there were established 5 main content variables which lead to a number of identified referential units (Table 1):

Table 1 – *Content variables in qualitative research, concerning the entrepreneurial attitude in IPP*

Main content variables	Number of identified referential units for IPP
VARIABLE 1 – actors involved in the university-industry cooperation	36
VARIABLE 2 – units with decision roles in the university-industry cooperation	30
VARIABLE 3 – managerial strategy	15
VARIABLE 4 – research and knowledge production	9
VARIABLE 5 – university-industry linkage	10

The results presented in Table 1 reveal the importance of a variable over the others. The main conclusion concerning the study on the IPP is that the investigated university acts on generating and financing special units involved in active projects with the industry and business environment.

The texts of the interviews were based on content analysis research method through which had been highlighted how each interviewee is involved in cooperative university – business environment as the main business activity of the university concerned.

The five variables listed in Table 1 were established according to the research interview questions. These research units resulted in bringing together all the questions with reference to the definition of the following: actors involved in the decision-making unit of the university, their roles and tasks (strategies, proposals), roles and responsibilities in the university cooperation with business, management strategy (presence of key performance indicators – KPI's), the link between the university and the business environment (industrial environment research relationship, integrating research into production).

The content of the interviews was evaluated according to the five main variables. All variables were designed to determine which of the factors of the organization of a university are more prominent in the university-industry cooperation. The foundation of these variables implied also the theories presented in the literature review chapter.

These variables aimed at testing the working hypothesis, namely:

H1: „If there is support for university departments to link to the business environment, then the university can be considered more entrepreneurial";

H2: „If universities are including in their development strategies the intensive cooperation with industry/business environment, then they can be considered as having a more entrepreneurial orientation";

H3: „If technical universities have a valuable business proposition (a customer promise), they can be considered as partners with entrepreneurial potential".

To get to our five variables, we followed the classical steps of the qualitative content analysis research method: transcription of interviews from audio to text; reading texts interviews; correction of the texts; selection of items relevant to the research topic „entrepreneurial university" and „university-industry cooperation"; the transformation of selected items into concepts and finally, centralizing the concepts in a comprehensive manner.

From this selection emerged numerous concepts about entrepreneurship degree of the IPP and its relationship with the industry. Thus resulting conceptual definitions from which there were drawn several conclusions about what an entrepreneurial university means and how it manifests towards the cooperation with the industry.

The results were the following: „University based on hierarchy"; „Industrial / business environment involved in projects"; „University involved in project development"; „Receptive industry / business environment"; „Open doors university"; „Industry / business environment is the „outside world"; „IPP-project initiator"; „Selective industry / business environment"; „The role of decision units in IPP is to create strategies for funding and accreditation"; „Companies as sponsors of academic environment"; „University – knowledge producer"; „Industry / business environment – knowledge user"; „Industry / business environment as business partner for universities"; „University as mediator between the student and the „real world"; „Industry / business environment – expertise"; „The responsible university. Business as a place of practice"; „Research – an aim for IPP"; „IPP interested in collaborating with business"; „University promise – to provide customer satisfaction"; „Private companies as a potential sponsor for IPP"; „IPP has to meet business requirements; „Funding – the main internal problem of IPP"; „University – social and economic

involvement"; „Government as an actor involved in academia"; „Companies offering career opportunities for students"; University as a „fortress", an „ivory tower"; „Companies – working models for students"; „The University as an institution open to modernity"; „Accepting change – a long term process for IPP"; „University as an indicator of the production of knowledge"; „The role of border units in IPP is to get projects with companies".

Conclusions

The main results of this research are showing the efforts of our case study institution – Instituto Politecnico do Porto, to „abandon" the „ivory tower university" attitude, to cooperate with the local, regional and national industry, seen as the „real world" for its students, and to create structures that could support and improve this cooperation. The development of the Technology Transfer Office (OTIC) and the involvement of this „boundary unit" in the industry / business environment, the strategic planning and efforts to convince more academics to assume active roles in the entrepreneurial projects and activities of IPP, are also highlighting the willingness of the university to get closer to the business area.

Acknowledgements

The authors wish to thank to all interviewees from IPP. Special thanks to the management team of IPP, the management team of ISCAP, the largest school of IPP, the management team of FAIMA Faculty of University Politehnica of Bucharest, and the Doctoral School of FAIMA.

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CULTURE IN VIRTUAL TEAMS

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Abstract

Virtual teams are becoming more used because specialized knowledge and skills are often geographically distributed. The relationship between different types of culture and virtual team performance is still unclear. For this purpose, an exploratory research study was regarded as appropriate. This exploratory study examines researchers' perceptions about how cultural differences might influence the virtual team performance. Therefore, our research seeks to address this gap by examining the cultural differences impact on virtual team effectiveness. The research data was collected from 29 students in 2013. Results of hierarchical regression analysis indicated that cultural differences are significantly related to virtual team performance. The findings of this study fill the gap in the literature and offer a relevant source of ideas and solutions for academics and practitioners. We provide a detailed discussion of our findings in the conclusion of this paper and highlight the implications for management and businesses.

Keywords: multicultural virtual team, collaboration, leadership, communication

„Culture makes people understand each other better. And if they understand each other better in their soul, it is easier to overcome the economic and political barriers. But first they have to understand that their neighbour is, in the end, just like them, with the same problems, the same questions."
(Paulo Coelho)

1. INTRODUCTION

Virtual team consists of more individuals geographically dispersed who work together interactively in order to reach common goals. Some members of virtual teams physically meet up occasionally and team members may work in different times. Communication in virtual teams is of extremely high priority. The advanced technology plays a vital role for virtual teams: e-mail, instant messaging, faxing, blogging, voice conferencing (Voice Over IP), social networking, web conferencing, groupware software programs provide the necessary

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infrastructure to work collaboratively. For example, a virtual team is a popular work structure in software development projects.

Culture can be defined as a set of shared experiences, norms, beliefs, values, understandings, thoughts, feelings, behaviours and meanings among members of a team. It is considered as a contextual factor, whose influences on virtual team performance are very important today. Virtual teams can create their own culture leading to the development of unique sets of values and behaviours of its members. In the virtual teams it is difficult to build trust and to manage conflict, because team members lack the ability to interact face-to-face. Virtual teams that are widely dispersed and cross-functional are often faced with lack of synergy among its members, communication difficulties due to cultural variances, conflicts among culturally different members, workdays which differ from one country to another in terms of legal or religious holidays [1].

Relatively few studies address how cultural heterogeneity influences the virtual team performance. Despite the prevalence of cultural impact on virtual teams, it has not been subjected to systematic investigation and analysis. The results regarding virtual teams dynamics are not yet conclusive. Generally, these approaches are treated separately. However, the importance of cultural differences can be seen in a variety of research studies in the field of management in recent years. For example, selecting the right people to serve on virtual teams is critical to a team's success. Virtual team members need to be independent thinkers, tolerate ambiguity, possess strong communication skills, and are willing to take initiatives.

The aim of the paper is to understand the influence of cultural differences on the virtual team performance. There is still opportunity for more systematic investigation and analysis to identify the cultural differences with a significant impact on

virtual team performance. This will address an existing gap in the literature dealing with virtual team effectiveness and influence of moderating factors such as culture and technology. Productivity, profits and customer services are related to the team's performance or effectiveness. Understanding the dynamics of the interactions between cultural differences and virtual teams led to improved team performance. For example, a virtual team needs to have clear goals and a sense of direction. The results are compared with results from previous studies to see the possible similarities and differences. Thus, a lack of trust among members can significantly reduce the effectiveness of virtual teams

This paper is organized in several sections. In the following section, the paper performs a literature review to allow the design of a conceptual model of research, with moderating effects of education and technology on virtual team performance. In this section, the authors also develop hypotheses focusing on factors affecting virtual team performance. In section three, the research model and measurement items are presented. In section four, the authors empirically test the research model using a data set collected from the sample. In the final section, a discussion of the results and elaborate implications, limitations, and future research needs will be provided.

2. LITERATURE REVIEW AND HYPOTHESES

A review of the literature reveals that cultural diversity is a critical predictor of team effectiveness, but empirical findings that support this claim for virtual team are rare [3]. To date, only a few studies

have investigates the importance and impact of cultural heterogeneity on virtual team collaboration and performance. In practice, it is known that multicultural virtual teams frequently involve individuals from different cultures. Hinds and McGrath [4] focused on geographically distance impact on distributed team performance. They argue that virtual team may not be able to manage ambiguity and uncertainty effectively. The spatial separation's effect might reduce the collaboration among virtual team members caused by different interest, values and beliefs. However, virtual team members must collaborate to accomplish tasks and common goals.

A virtual team is a group of people geographically dispersed who interact through interdependent tasks guided by common purpose that works across space, time and organizational bounders using information and telecommunication technologies to coordinate its activity and collaborate during group tasks [5]. Virtual teams have members dispersed geographically with typically weak relationships, which use information and communication technologies to correlate their efforts and communication processes.

The virtual team members work together and are typically either a permanent team, or a temporary project team. Individuals working in virtual teams bring expertise, cognitive ability, culture, and the personalities that affect the way the virtual team interacts. Virtual team members from different cultural background communicate and act differently. Their

work roles and responsibilities change when team members move from one team to another. Virtual team members rely heaving on technology to mediate their interactions. They also need sufficient task-related knowledge and skills. For example, they need to have skills to work collaboratively in virtual environment and a tolerance for ambiguity to deal with the unstructured problems.

In virtual teams members come from an individualism culture. Individuals from such a culture have weak ties and tend to achieve tasks individually but they assume personal responsibility. On the other hand, in a high collectivistic culture, individuals have strong interpersonal ties and they are interested of the collective achievement and responsibility. Also, cultural differences can be grouped in practice and value differences [6]. Every situation has an impact on team performance. The coordination dynamics within the team will differ especially when there are the cultural barriers. For example, people in the Northern Europe tend to be more precise with respect to time and quality. Those in Southern Europe tend to be loose with time. In virtual team, it's very important to respond as quickly as possible [3]. Extraversion is a valid predictor for stimulation social interaction. Extraversion affects interpersonal relations through the quality of social interactions [7].

One of the main benefits of a virtual team is its flexibility to work across different time zones enabling work task sharing accordingly [8]. Virtual team also can save money because it has less need for office space and equipment significantly reducing operational costs. A multicultural virtual team is a team whose members have

different cultural types. Cultural heterogeneity can produce major effects on virtual team collaboration and performance. For example, in many cases people is allocated to projects based on expertise rather than location. Members of these teams can be assembled quickly to exploit emerging opportunities [5]. For this reason, team members have not previously cultivated a history of collaboration. Thus, they have a little prior history. Multicultural virtual teams also have access to a larger pool of skills with no need for relocation [8]. Building trust among team members and overcoming feeling of isolation becomes a challenge for management. Basically, it is important to clearly outline the virtual team structure, processes, roles, and procedures, in order to reduce ambiguity and align expectations.

Collaboration is an important contributor to virtual team performance, since it affects the level of expectation and support behaviour within the virtual team. Social interaction and trust play a key role in the willingness of virtual team members to collaborate, to share tacit knowledge, which in turn fosters creativity and innovation [9]. Team members may be disappointed with the lack of feedback and guidance on their task performance [10]. Socialization may include modelling the team's values and mentoring newcomers in adherence to group norms. Thus, the socialization of new members contributes to building virtual team identity [11].

Effective and efficient cooperation is essential for the success of virtual team. Collaboration mechanisms are based on the utilization of collaborative technologies

and the development of the virtual team's absorptive capacity to optimize the benefits of collaboration mechanisms inside of virtual team. Absorptive capacity refers to the degree to which a virtual team is able to integrate new knowledge and technologies and use them to improve overall performance. Collaboration can be an effective way to reduce travel costs and can encourage more creativity among virtual team members. Thus we predict:

H1: Collaboration among virtual team members will be positively related to virtual team performance

Leadership is the process of inspiring the virtual team members to work hard to accomplish tasks and common goals [12]. It is also the ability of leaders to create a vision that challenges, inspires, and motivates team members to work hard for high-performance. Leadership in a multicultural virtual team environment influence the team conflict, mentoring, flexibility, networking, coaching, positive attitude towards work and the team in itself, job-related decisions, achievement-orientation, task-orientation and team members' effectiveness. Virtual team leader need to influence the behaviour of team's members for the good of the team as a whole. There is a certain inability of leaders to physically observe the virtual team members performance and efforts. Thus, leaders need to investigate the web of relationships that exist. Relationships can have a dramatic effect on performance. Horizontal communication requires a high level of trust within the virtual team. The dynamics of human interaction are saturated with emotional content, the quality of interpersonal relationships is essential to accomplish tasks and common goals. For instance, human capital is not just intellectual, but also social and emotional in nature. Furthermore emotional intelligence is an important leadership capability.

Multicultural virtual team requires team members to act as mentors by supporting, guiding, and providing feedback team members to facilitate high performance [13]. The monitoring becomes more complex when leading a team from distance. Building trust among the teal is the main challenge of a virtual team [14]. Due to the complexity of virtual teams leadership is vital to the success. Creativity is linked to effective leadership. In spite of the recognition of the importance of the virtual team leadership, little empirical research specifically examines the influence of culture on the relationship between leadership and virtual team performance. Virtual team leader's ability to lead has a significant impact on the success of the virtual team performance. The base line hypothesis can therefore be formulated in the following way:

H2: Leadership of a virtual team will be positively related to virtual team performance

Communication is the key element in building trust because it encourages interactions among virtual team members and facilitates the exchange of tacit knowledge. Communication can create barriers to effective virtual team work by creating interpersonal conflict and reducing knowledge sharing. Language barriers and lack of proximity of the virtual team members can generate significant communication difficulties. For example, virtual team communication is faced with a problem because the individual from these teams may not be able to get the cues through body language. Communication is the key element for establishing trust within virtual teams. It is known that a distinct feature of virtual teams is the predominant use of technology-mediated communication. Thus, virtual teams need innovative information technology to be successful. Broadband communication technologies had high productivity, performance and satisfaction. The ability to use a computer to accomplish a task is a significant predictor of virtual team performance. Therefore we hypothesize the following:

H3: Communication among virtual team members will be positively related to virtual team performance

Culture consists of the shared values and beliefs that give members of a virtual team meaning and provide them with rules for behaviour. Culture is important because it indicates peoples how to behave. Personality shapes an individual and team cultural shapes virtual team members' responses and defines what a team can or is willing to do. Culture can either facilitate or limit virtual team performance. Thus, culture can be a source of competitive advantage. Culture can affect the attraction and retention of competent workers [15].

The presence of cultural differences among team members can significantly influences the virtual team performance. Several studies indicate that virtual team members from „collectivistic" cultures, such as Japan, may outperform teams comprising individuals from „individualistic" culture, such as the United States [16]. Virtual teams share individualistic value thrives on independent effort and team members are more favourable of making individual decision.

An acceptable leadership style in one culture may be unacceptable in another. Culture is like glue that motivates and directs virtual team members. The team members who have different cultural value collaborate and communicate selectively. The connections created within the virtual

team are critical to construct a high-performing team. Virtual teams must recognize the cultural differences in order to work efficiently and effectively, and the culture norms that may impact work styles and interpersonal dynamics. Recognizing cultural differences and adapting the communication style, technology and languages is one way of making a virtual team work. For example, physical distance makes it difficult for leaders to engage in relational and task-related behaviours with team members.

Multicultural virtual team composition is often culturally diverse. The potential of the virtual team to exploit market opportunities is mediated by the collaboration, communication, knowledge, and talents of these members, and moderated by culture and technology. Individuals from different cultures differ regarding their communication and group behaviours [17]. On the one hand, cultural diversity increased creativity due to a wider range of perspectives, more and better ideas and reduced opportunities for „groupthink". On the other hand, cultural diversity increases the complexity, conflict, confusion, and ambiguity of communication, or leads to less accuracy in communication [3]. Heterogeneity refers to culture differences, and is likely to be high in a virtual team because team members are more likely to represent different cultures [18].

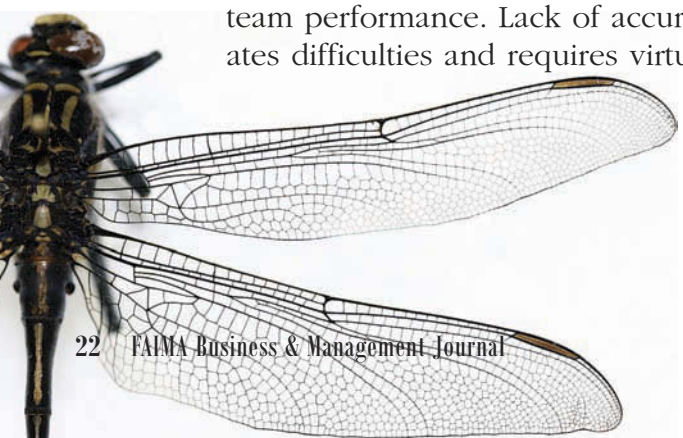
Ethical climate is a predictor of collaboration and positively affects the virtual team performance. Lack of accuracy creates difficulties and requires virtual team members more time and effort in encoding and decoding messages. In this way, the cost of interaction increases. Communication within these teams could lead to misunderstandings due to cultural and language barriers. Therefore, we investigate the moderating influence of cultural differences on the relationships between leadership, communication, collaboration and virtual team performance. This lead to the following hypotheses:

H4a: Cultural differences negatively moderates the relationship between collaborative capability and virtual team performance, the higher the cultural differences, the lower the effects of collaboration on virtual team performance

H4b: Cultural differences negatively moderates the relationship between leadership and virtual team performance, the higher the cultural differences, the lower the effects of leadership on virtual team performance

H4c: Cultural differences negatively moderates the relationship between communication and virtual team performance, the higher the cultural differences, the lower the effects of communication on virtual team performance

Figure 1 depicts the conceptual framework underlying this research, together with the proposed hypotheses. Our theoretical model is predicted on the assumption that collaborative capacity, leadership, and communication directly affect the virtual team performance. Additionally, indirect or moderating effects of cultural differences may exist as well. These dynamic mechanisms underlie the analysis of causal relationships.



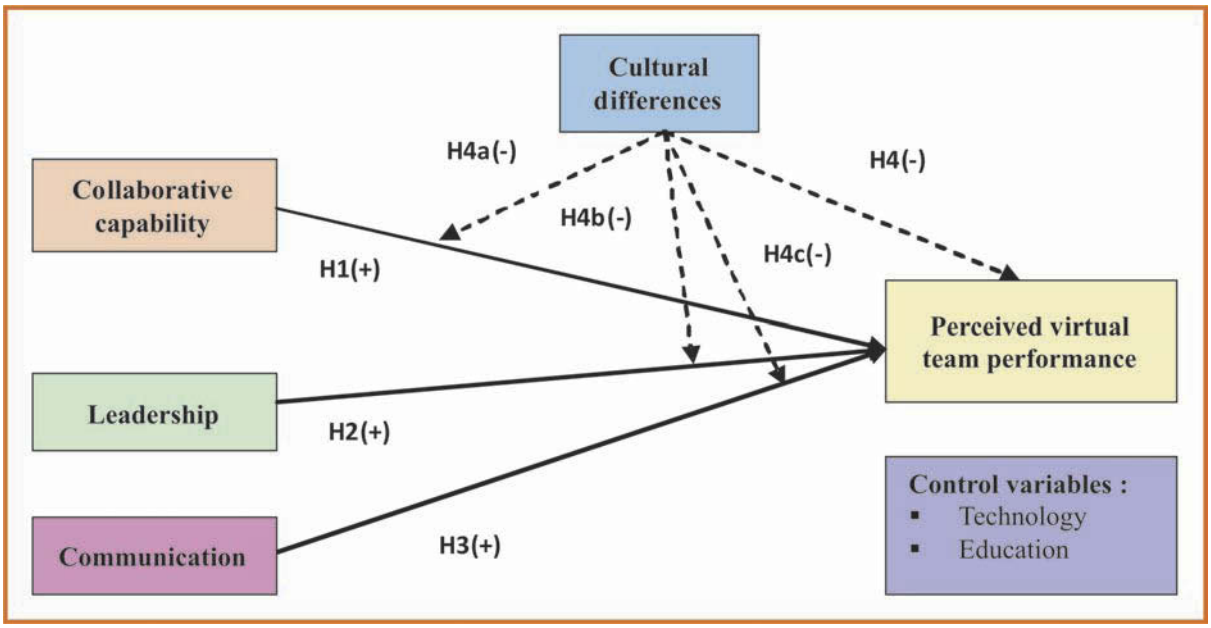


Figure 1 – *The conceptual model for this research and associated hypotheses*

METHODOLOGY

DATA COLLECTION

The present empirical study employed a questionnaire survey to collect the necessary data for testing the validity of the conceptual model. Consequently, the authors created a questionnaire to carry out this study. The questions on the questionnaire are based on the respondents' perception about all constructs that were discussed. Thus, the questions were designed to collect respondents' opinions on the challenges and benefit of working in a multicultural virtual team. The variables included in the questionnaire are derived from empirical observations and theoretical reviews. The questionnaire were scaled on a 7-point Likert scale, with responses ranging from 1 = „strongly disagree" to 7 = „strongly agree". A survey was conducted in December 2013 that targeted students from a master program of study who were involved or known well how virtual teams work.

A total sample of 29 students met the sample-selection criteria. A total of 5 questionnaires were returned, and 3 responses were incomplete. The remaining 21 valid questionnaires were received from respondents, representing a 72 percent response rate. Of the total 21 respondents, 62 percent were men and 38 percent women, with an average age of 25 years and an education level of at least a bachelor's degree (100%). Most respondents had been employed with the company between one and three years (80%), and others more than three years (18%), with an average of 1.25 years (S.D. = 0.24).

Precautions in data collection were taken to ensure reliability. To avoid investigator-induced basis, the respondents filled out the questionnaires themselves. The expectation-maximization algorithm was applied to handle missing data.

MEASURES

Measurement items were adapted from the literature. Multiple items were used to measure each construct. *Perceived virtual team performance* (dependent variable) measures were based on Mortensen and Hinds [19] scale. The original scale was modified to reflect the achieving the team goals, meeting deadlines and budget, and work excellence. Leadership was measured through a 3-item scale adapted from Denison et al. [20]. The original scale was modified to reflect the overall effectiveness of virtual teams, the degree to which the leadership meets the performance standards, and overall leadership success. To measure collaboration capability in virtual team, a scale adapted from Li and Calantone [21] was used. The measure included two items reflecting the trust and the extent to which team members interact with each other. Communication in virtual teams was measured through a two-item scale. The communication scale items asked respondents to report the extent to which they perceived the communication process between members of virtual teams. The most frequently investigated value in multicultural research has been the construct of individualism-collectivism. To measure the cultural differences, the authors investigated the extent to which respondents agree or disagree that virtual team members have significant cultural differences.

The study controlled for several variables that might be associated with virtual team performance, but not of direct interested to this study. The authors therefore incorporated two variables that are recognized as having an influence on the virtual team performance: education level of virtual team members, and technology used to mediate the interaction between team members. To measure the communication technology acceptance, a scale adapted from Davis (1989) was used. The measure included three items reflecting the ease of use of technology, the intention to use technology, and perceived usefulness of technology. Lastly, the education virtual team members were included to account for possible influence on the virtual team performance. In this research, a categorical variable to measure the level of education (no studies, primary, secondary, and university education, or a graduate degree) was used. Cronbach's alpha demonstrated the internal consistency of each construct. All measures of Cronbach's alpha exceeded the 0.6 (Hair et al., [22]).

RESULTS

Table 1 presents the means, standard deviations (S.D.) and correlation coefficients for each of the variables used in this study:

Table 1 – *Descriptive statistics and correlations*

Variable	*Mean*	*S.D.*	1	2	3	4	5	6
Perceived virtual team performance (1)	6.23	2.21	–					
Collaborative capability (2)	5.6	1.84	.23	–				
Leadership (3)	4.6	1.36	.18	.21	–			
Communication (4)	5.62	0.47	.34	.45	.32	–		
Cultural differences (5)	4.78	1.2	.17	.38	.43	.19	–	
Technology (6)	4.3	0.8	.06	.47	.25	.07	.02	–
Education (7)	2.88	1.6	.03	.09	.28	.20	.05	.26

N = 21; Correlations greater than (0.17) are significant at the $p < 0.05$ level

The hypothesized relations were tested using hierarchical multiple regression analysis. This method enables analysis of the proportion of variance that is shared exclusively with each additional variable (Hair et al., [22]). Basically, the authors were interested in determining the proportion of variance contributed by the independent variables such as collaboration, communication and leadership, separate to that of the control variables. The authors were also interested to determine the proportion of variance contributed by the moderated variables (culture differences), independent of that of the main control variables.

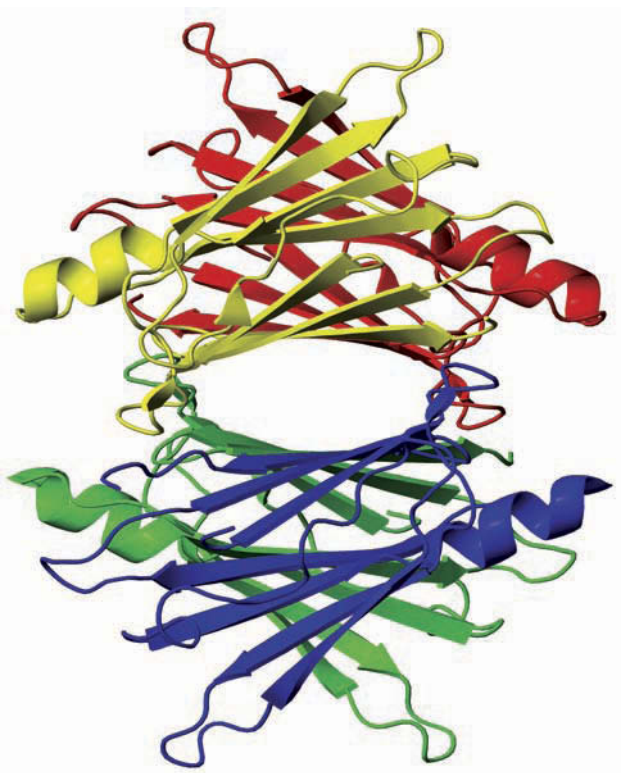
Table 2 presents the results of the multiple regression analysis. This table shows the standardized regression coefficients and change in R^2 across each of the variable. To assess the hypothesized relationships, three models were tested. In Model 1 (control model), there were employed the technology acceptance and the education virtual team members as control variables. Although the communication technology acceptance effect was weakly significant ($\beta = 0.26$, $p < 0.05$), the education virtual team members did not affect the virtual team performance – the coefficient is positive and insignificant ($\beta = 0.12$, not significant):

Table 2 – *Results of multiple regression analysis*

Variables	*Model 1*	*Model 2*	*Model 3*
Control variables:			
The communication technology acceptance	0.26*	0.18	0.09
Education	0.12	–0.09	0.17
Independent variables:			
Collaborative capability		0.33**	0.27**
Leadership		0.19*	0.17*
Communication		0.45***	0.33**
Cultural differences		–0.28*	–0.21*
Interaction effects:			
Cultural differences x Collaborative capability			–0.28**
Cultural differences x Leadership			0.19*
Cultural differences x Communication			0.07
R^2	0.09	0.32	0.36

Note: Two-tailed t tests have been used for all hypothesized variables: *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

Model 2 (independent model) examined the direct effect of collaboration capability, leadership and communication on the virtual team performance. The results of the regression analysis show that collaboration capability is positively and significantly related to virtual team performance ($\beta = 0.22$, $p < 0.01$). This result supports Hypothesis 1, because it underlies a significant interaction effects ($\beta = 0.27$, $p < 0.01$). The coefficient for leadership was also positive and significant ($\beta = 0.19$, $p < 0.05$), respectively ($\beta = 0.17$, $p < 0.05$). This result supports Hypothesis 2. The coefficient for communication was positive and significant ($\beta = 0.45$, $p < 0.001$), respectively ($\beta = 0.33$, $p < 0.01$). Therefore, this result supports Hypothesis 3. Finally, the coefficient for cultural differences was negative and significant ($\beta = -0.28$, $p < 0.05$), respectively ($\beta = -0.21$, $p < 0.05$). This result supports the Hypothesis 4. The direction of the relationship shows that increased level of cultural differences resulted in lower level of virtual team performance.



The moderating effect is captured by including, as an independent variable, the product of each predictors and the moderator variable (cultural differences). Model 3 (interaction model) shows the relationships between all independent variables with dependent variable. Also, this model investigates the effects of the moderating factor. Therefore, it is demonstrated that cultural differences have a positive moderating effect on the relationship between collaboration capability and virtual team performance. The coefficient of the interaction term (cultural differences x collaborative capability) was negative and significant ($\beta = -0.28$, $p < 0.01$). This result supports Hypothesis 4a.

In contrast with Hypothesis 4b, there are positive moderating effects of cultural differences on the relationship between leadership and virtual team performance ($\beta = 0.19$, $p < 0.05$). This coefficient is positive and significant, but Hypothesis 4b was not supported. The results also showed positive moderating effects of cultural differences on the relationship between the communication and virtual team performance. The coefficient for the interaction term (cultural differences x communication) was positive and insignificant ($\beta = 0.07$, not significant). These findings are not consistent with the expected results. Consequently the Hypothesis 4c was not supported. Thus, the moderating effects of cultural differences receive only partial support.

Conclusions

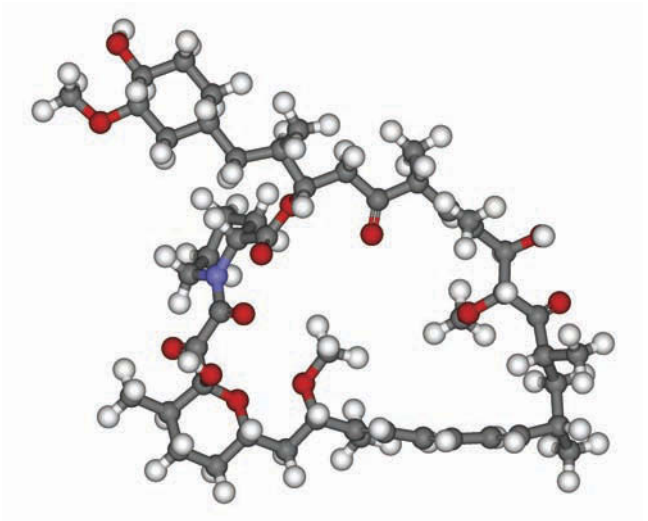
This research was motivated by an interest in understanding how cultural differences could influence the virtual team performance. In view of the increasing

prevalence of virtual teams, especially in digital economy, understanding how efficient and effective virtual teams are created and maintained will remain an important research inquiry. The paper makes a contribution in this direction. Despite many existing studies in the field, there is a lack of systematic research in this area. Complexity of virtual team increases with cultural diversity. The aim of this research is to test the hypothesis whether and how cultural differences contribute to the virtual team performance through investigation the moderating effects of cultural differences on various predictors.

The findings of this study suggest that relationship between collaborative capabilities and virtual team performance is moderated by the presence of cultural differences among the virtual team members. Thus, the higher the cultural differences, the lower the effects of collaboration on virtual team performance. Cultural differences should be taken into account in team building.

Interestingly, the research identified a positive interaction effect of cultural differences on leadership. This indicates that certain cultural differences in virtual teams are beneficial because they could improve the performance. Several studies indicated that virtual team diversity help to increase creativity of its members, but creativity is linked to effective leadership.

The analysis failed to confirm the interaction effect of cultural differences on communication. The empirical evidence indicates that cultural diversity increases the complexity, conflict, confusion, and ambiguity of communication or less accuracy in communication. This finding could



be explained by the fact that students or young researchers are familiar with electronic communication media because they have grown up with such communication technology. Hence, it can be concluded that cultural differences are a weak predictor in explaining the direct effect of communication to the virtual team performance.

Some of the limitations of the research are generic. For example, the study collected cross-sectional data from the sample. This approach limits the possibility of generalizing the results. Also, the study investigated the perception of respondents about virtual team performance; it did not explore the perception of the relationships from leadership and virtual team member satisfaction. Longitudinal studies are needed to determine the effect of time on the results suggested in this paper. Variables used in this study are based on perceptual measures. Future research should consider observed measures of virtual team performance and culture influence. Also, a future research could investigate the cultural differences in self-managed virtual teams.

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RISK PREDICTION IN INNOVATION PROJECTS

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Abstract

The continuous growth of maritime transport and the need to provide sustainable shipping drive proposals for innovative solutions of naval equipment development. This article aims to make a review of risk-based design developments and to attempt to demonstrate that scientific and technological developments are in place for Risk-Based Design to be fully implemented in the maritime industry. The article is presenting the use of Theoretical Methods and advanced Tools in the design methodology. Also, there are given examples of some applications: Bayesian Risk Model for Ship Fire Simulations, Lightweight Composite Sandwich Superstructure, Hull form optimization, Novel Lifesaving Appliances. To be applied properly, this new design concept requires a significant amount of future research based on software modeling and rigorous theoretical methods.

Keywords: Risk based design, risk assessment, innovative solutions, maritime transport safety, naval equipment

1. BACKGROUND

The term Risk Based Design (RBD) is nowadays more and more used in a lot of industries. We must take into consideration the fact that industry's regulation, be it vehicle construction industry, civil or naval industry has been almost wholly prescriptive, which works well in many regards. There are some draw backs in the prescriptive approach: for instance, it does not enable innovation and the size of safety margin is typically not fully understood.

This paper looks at what risk based design is, the benefit of such an approach, the challenges that must to be done for achieving these benefits, and the pitfalls.

„We ought to think that we are one of the leaves of a tree, and the tree is all humanity. We cannot live without the others, without the tree."
(Pablo Casals)

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The desire for cost effectiveness and the ease of contracting against standards for build has also helped develop a robust system of prescriptive rules. For marine vessels which are standard and where there is high confidence that the prescriptive regime achieves a good level of safety, there is little reason to change from a wholly prescriptive approach [1].

Continuous publicized marine tragedies, resulting in catastrophic consequences with respect to human life, property and the environment, force the profession to revive existing ship design approaches and attitude towards enhanced shipping safety. Fortunately, this situation is gradually changing. Under the philosophy of „Design for Safety", the risk-based ship design methodology, has found fertile ground in the past fifteen years. Through systematic integration of risk assessment within the conventional ship design process, safety is no longer a constraint but an objective. To implement risk-based design, risk assessment needs to be continually employed so as to quantify the risk level of the hazard under consideration. [2]

In the last decade, the maritime industry showed a real interest in applying upgrades of the safety standards by adopting pro-active safety measures for future rules and regulations in the frame of a holistic approach to ship's safety. Instead of waiting for the next major catastrophic accident, International Maritime Organization (IMO) and major classification societies decided to move from prescriptive concepts to probabilistic assessment methods.

The use of advanced computational tools permits nowadays the quantification of the risk level of a particular design and its exhaustive comparison with alternatives. In this framework risk is no longer a constraint but a measure of safety performance and design objective which can be used in an optimization procedure. Therefore ship designs can be optimized for minimum risk, while performing with best efficiency and economy. This led to the new scientific and engineering disciplines of Risk-Based Design (RBD).

Risk is the product of the frequency of an event times the associated consequences. The risk-based design approach is an improved alternative to the traditional design process as it integrates safety as additional design objective. It can be observed that the designer has to satisfy an additional requirement that the risk of any feasible design, R_{design}, should be less or equal than the specified acceptable risk, $R_{acceptable}$:

$$(\mathbf{R_{design} \leq R_{acceptable}}) \qquad (1)$$

Different risk categories: of system failure, to human life, to environment or to property, should be treated separately. The total risk is calculated by the sum of the partial risks coming from different damage categories such as explosion, fire, collision or grounding (Figure 1) [4]. Each partial risk can be computed with the help of

risk models like, event trees or Bayesian networks. Risk models expressed by mathematical formulae were developed for fast design optimization [3]:

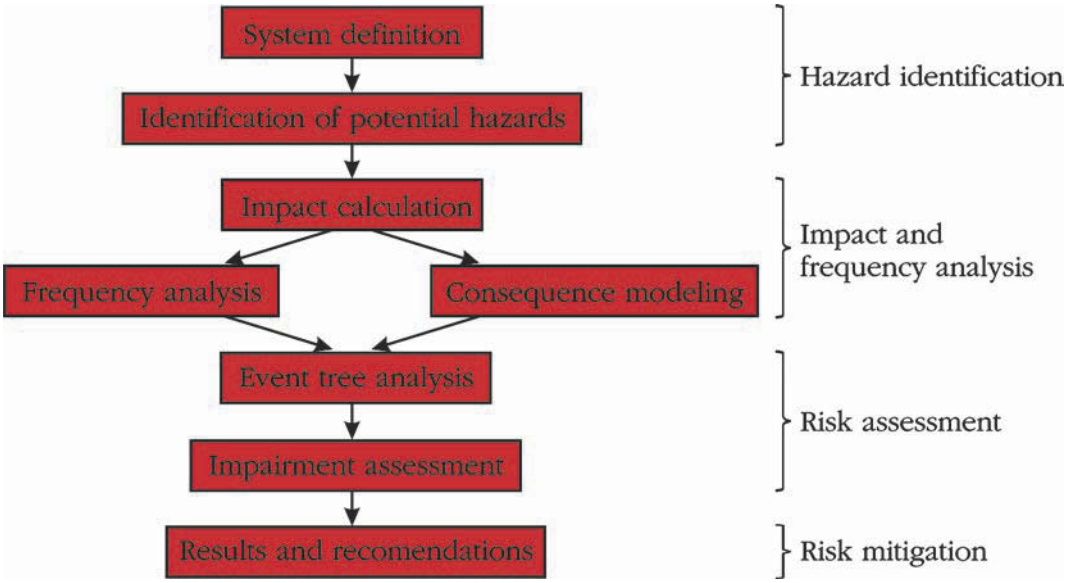


Figure 1 – *Risk based design methodology*

Considering the above, adopting a risk-based design methodology that embraces innovation and promotes routine utilization of first-principles tools will lead to cost-effective ways of dealing with safety and to building and sustaining competitive advantage, particularly so for knowledge-intensive and safety-critical ships, such as the giants of the cruise ship industry being built today; knowledge-intensive, as such ship concepts are fuelled by innovation and safety-critical as with such ship designs safety is indeed a design „driver".

In this respect, the continuously increasing regard for human life and the rapid escalation of passenger ship size have prompted thorough revision of pertinent safety standards to the extent that risk containment, in a way that public confidence is assured, has become a top agenda item at IMO. Setting goals that encourage zero tolerance, with regard to human life loss, demands close scrutiny of all the issues that could upset such expectation, first and foremost, survivability in case of a casualty [5].

2. THE CHANGES INCURED BY RISK BASED DESIGN

The prescriptive approach consists of applying local regulations, industry codes and standards and good engineering practices. This type of approach can be very efficient and well controlled for conventional design cases. From the knowledge of these design rules, of the local regulations and codes and standards framework, one can design a technical solution without the explicit definition of the objectives/goals to be achieved.

The evolution of design practices allows the use of a performance-based approach. This alternate to the prescriptive approach is now proposed in the design rules such as the ISO 19000 series.

The performance-based approach relies on the explicit definition of the safety objectives and performance standards. The design shall be developed to fulfill these objectives in a more flexible manner compared to the prescriptive approach. The design process focuses primarily on the objectives. This allows the development of innovative solutions and optimization of the design (Figure 2). The advantages and disadvantages of each type of approach is summarized in Table 1.

The risk-based Approach combines together a frequency analysis and a consequence analysis in order to evaluate the risk from the potential accidental events. This approach allows managing the risk through the design of the facility and providing opportunities for design optimization. The performance level achieved by RBD is represented in Figure 3 [6].

It should be kept in mind that the optimization of the design through the use of the Risk and Performance-based approach shall be a tool to enhance the general safety of the facility and not a solution for lowering the risk reduction measures through the demonstration that some of them do not provide sufficient benefits regarding the cost involved.

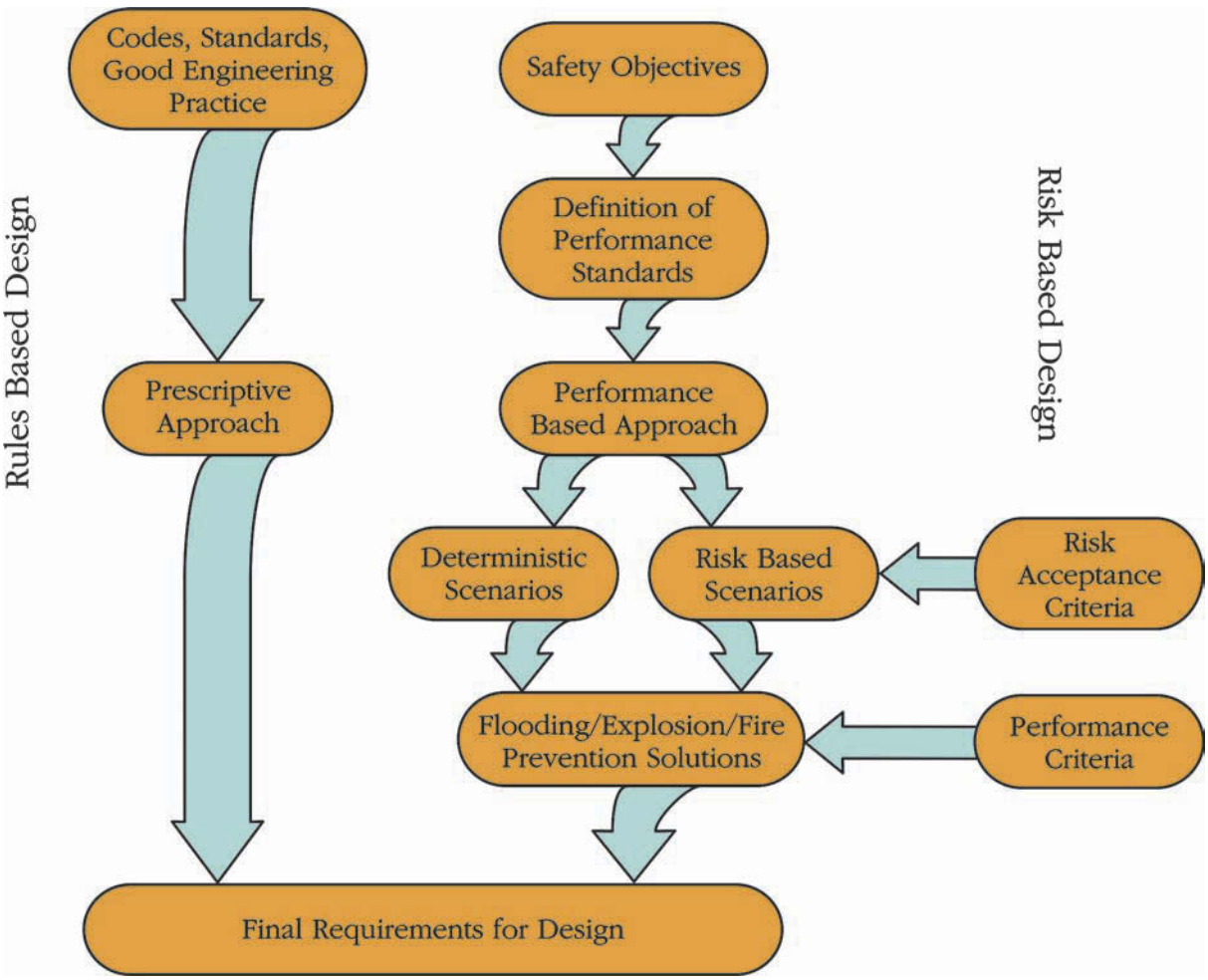


Figure 2 – *Comparison of prescriptive versus performance based approaches*

Table 1 – *Strengths and Weaknesses*

	Prescriptive Approach	Performance based Approach
Positive aspects	- Very efficient for conventional cases - Well-known and well controlled - Straightforward application - Compliance is easy to demonstrate for the designer, to endorse (owner) and accept (authority, classification society)	- More flexible to cope with project specifications - Explicit definition of objectives and associated performance criteria - Optimization of mitigation measures (cost reduction, less time on construction site for implementation)
Negative aspects	- Implicit objectives - Special cases not covered - Long process for acceptance of any deviation to the codes and regulations	- Acceptance criteria may be more difficult to define (by owner or authorities) or acceptance may be more difficult to grant - More resources (skills) needed for each step of the detailed design process - Time consuming during engineering phase (demonstration that the system satisfies the performance criteria) - Safety Management System required during the entire lifecycle of the facility to account for the potential design modifications which can change scenarios

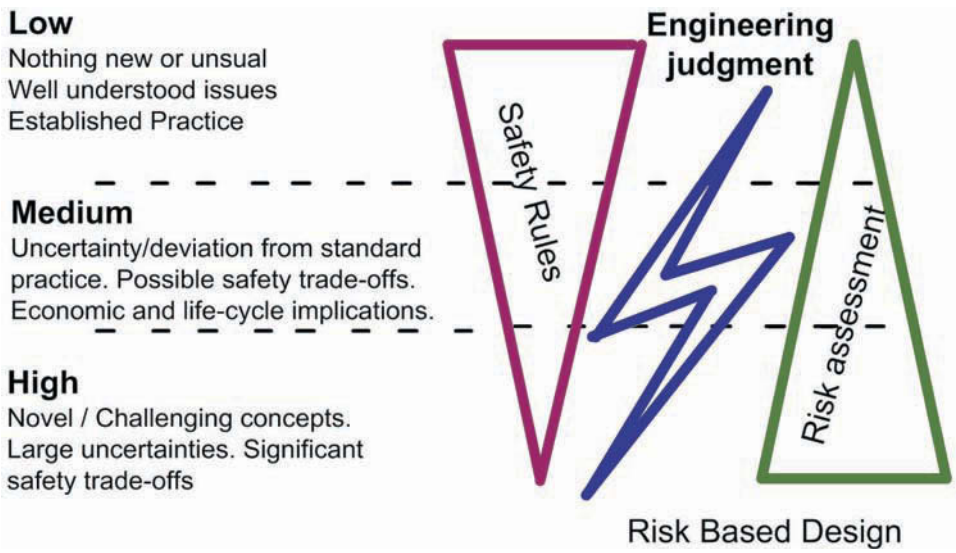


Figure 3 – *Performance level of risk based design*

3. SPECIFIC METHODS FOR RBD

Risk-based ship design demands advanced tools to accomplish the safety assessment of a given design, consisting on Assessment and analysis of system failures, Fast and accurate prediction of flooding, Probabilistic assessment of the strength of ship structures, of intact stability, Prevention of collision, grounding events, of fire and explosion events.

Various theoretical methods and procedures have been used to derive these tools: Bayesian network, Artificial Neural Networks, CFD calculations, non-linear time domain calculations and reliability models, virtual reality models and simulation techniques.

The results are validated by physical model tests and numerical simulations; where possible, simplified models enabling fast calculations are derived and calibrated.

If we are referring to collision and grounding events, we can use tools as Bayesian Networks able to estimate the probability of these types of risks or Artificial Networks, which are discussed for fast prediction of collision and grounding damages. Related to structural reliability, as hull girder loads or a structural failure flooding, the methods/software tools, able to estimate its consequences (damage ship stability, capsize and foundering) are reviewed. The iteration process of RBD is represented in Figure 4 [6]:

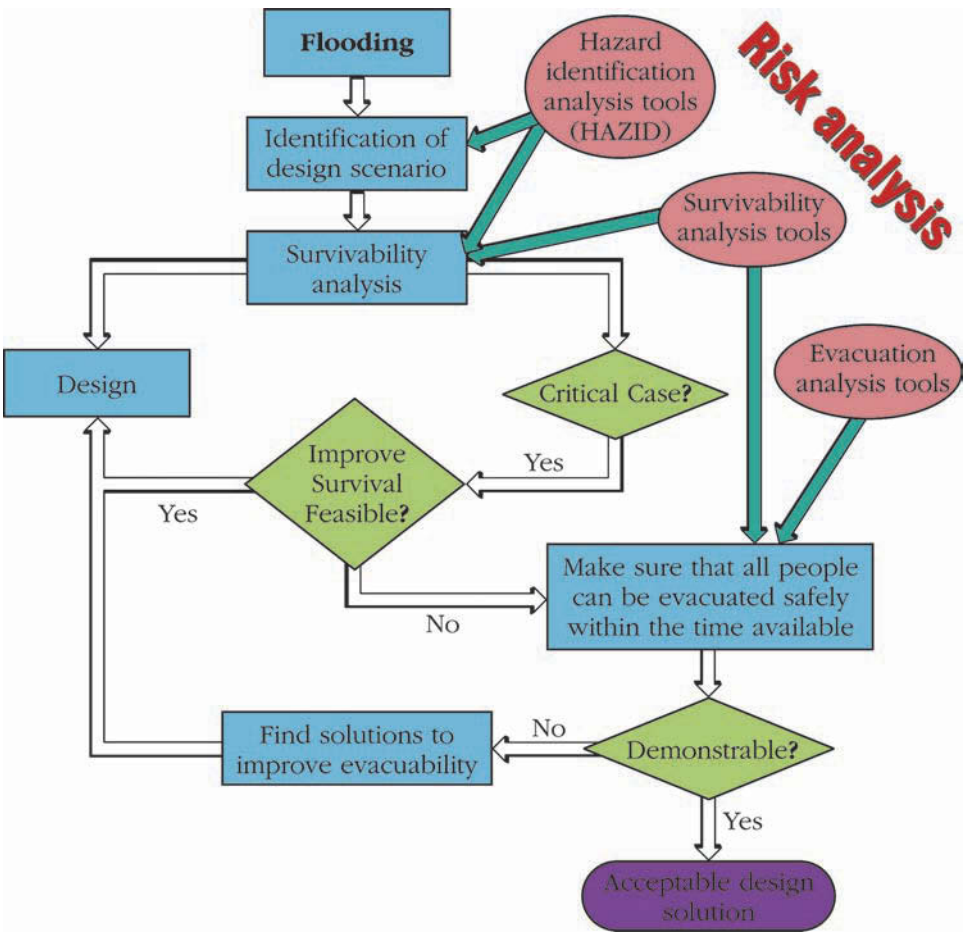


Figure 4 – *Risk based design iteration process*

Also, for damage ship stability, it can be used Monte Carlo method, and each damage scenario is simulated using explicit dynamic flooding simulation by PROTEUS software. The resolution could be as high as necessary (every second of each scenario) accounting for transient cross and progressive-flooding and of course any damage scenario (collision, grounding, raking, etc.). Applications of this method indicate that 500 scenarios would be sufficient (for typical cruise ship/RoPax vessels the absolute sampling error for the cumulative probability of time to capsize derived was of the order of 4-5%).

Another serious type of accident that can occur to a vessel is fire and explosions. Hazard Identification Software is able to predict and illustrate the development of a local fire under rather limiting conditions (Figure 5 [7]):

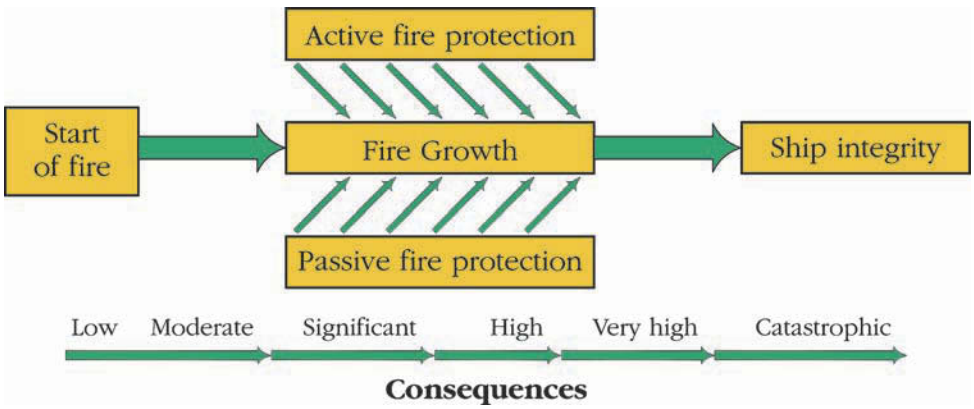


Figure 5 – *Identification process chain – HAZID software*

Increasing complexity in the design of engineering systems onboard ship, especially those incorporating new programmable technologies, computerized tools are being developed that simplify aspects of the engineering and analysis process.

An example of this kind of tool largely automates the synthesis of two types of predictive model of system failure, Fault Trees and Failure Modes and Effects Analyses, by interpreting reusable specifications of component failure in the context of a system model. The analysis is largely automated and therefore reduces the effort required to examine safety, while the underlying algorithms can scale up to complex

systems. Fault Tree Analysis is a flexible tool, equally applicable to quantitative and qualitative analyses, and easy to use and understand. Fault trees themselves are graphical representations of logical combinations of failures, and show the relationship between a failure or fault and the events that cause them.

Apart from using fault and event trees, it is worth noting a promising candidate for risk modeling – Bayesian Networks (BN) due to their inherent superiority to capture sophisticated relationships among physical events. With Bayesian Networks, a dependent relationship is represented by a link between the concerned parameters, and at the same time the probabilities are stored in a conditional probability table attached to each parameter.

A BN is a tool that is capable of describing complex relationships probabilistically and using intuitive visual representations. A generic BN model comprises a set of variables making up the nodes in the network, a set of directly links (with arrows) connecting the nodes to represent dependent relationships. An important advantage of a BN is that it allows probabilistic inference within the network on the basis of the observed evidence of other nodes using the well established Bayes theorem.

The BN technique is gradually being recognized as an effective and powerful tool for risk modeling and pertinent decision support means in the maritime industry. Early investigation confirmed the potential of BNs as a transparent and consistent modeling tool and its application for decision support [8].

4. RISK BASED SHIP DESIGN APPLICATION

Bayesian Risk Model for Ship Fire Simulations

In order to quantify the risk associated to ship fires, a model has been developed, determining the probability of a particular outcome that has been identified by the HAZID and being influenced by several prescriptive and additional risk control measures.

To describe a ship fire by means of a Bayesian Network first the fire incident itself has to be analyzed in order to identify possible scenarios with essential probabilistic parameters, which can be represented by nodes (Figure 6 [9]).

Therefore, the fire is separated into four particular fire stages based on the number of compartments being affected and whether damages to the vessel structure will occur. Every fire stage relates to a consequence, namely, „minor damage", „major damage", „hazardous consequences" and „catastrophic consequences". The probability of suppression or containment of a fire in certain stage is influenced by various other parameters, such as fire fighting measures that can be undertaken. In order to demonstrate the conditional probabilities or dependencies in the network, one can

look at the node „Fire Spread of Goods". This node can have states such as „Very Fast", „Fast", „Moderate", etc.

The main work when using a Bayesian Network is filling the probability tables of the nodes being influenced by each other. This information can be obtained from expert judgments, statistic evaluations, as well as from Fault Tree analyses [10].

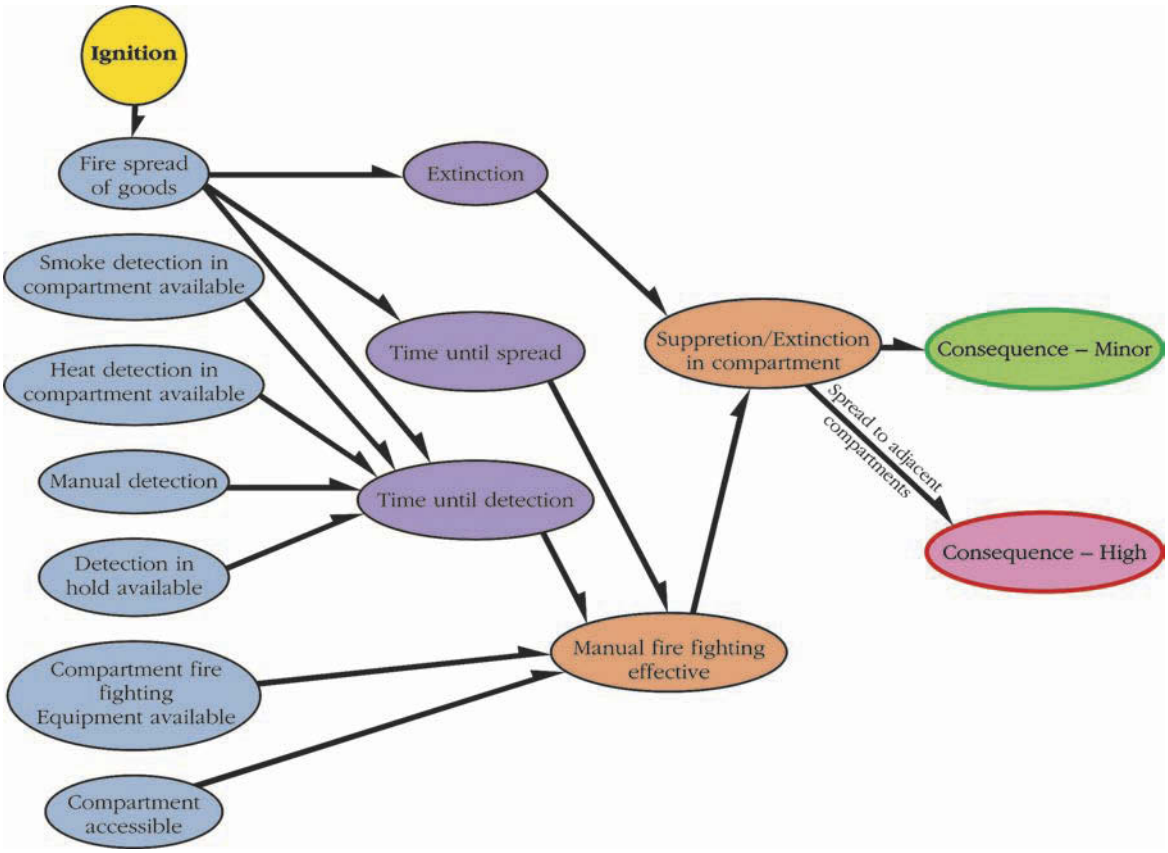


Figure 6 – *Bayesian Network fire simulation*

Lightweight Composite Sandwich Superstructure

The benefits of lightweight composite materials have so far not been available to the merchant ship designer because international regulations require that the structure shall be made of non-combustible materials. However, these regulations allow alternative arrangements that deviate from such prescriptive requirements provided that adequate safety is demonstrated by an engineering analysis.

For a RoPax ship this method has shown that a weight saving of about 60% can be achieved for the superstructure if the traditional steel superstructure is replaced by a lightweight composite design. This estimate accounts for structural fire protection and other risk control measures. An acceptable level of safety was documented for the new risk-based design. This ensures that, as long as the fire protection capacity is not exceeded, the be-havior of the composite superstructure in a fire will be at least as favorable as for steel [9].

Hull form optimization with respect to powering and wash wave. A ship's hydrodynamic performance in terms of speed, powering, sea keeping characteristics, maneuverability is of paramount importance, especially for High-Speed Craft.

From the conceptual point of view, long and slender hull forms are recognized for their favorable resistance and wash characteristics. Increased separation distance of twin-hull vessels will generally result in wave resistance and wash wave reduction.

If such a methodology is to be efficient, a reliable wash wave prediction numerical method has to be available. Although wash wave prediction is not a simple problem, particularly for vessels in the semi-planning and planning condition, recent progress in software tools, permits a good degree of confidence. In Figures 7 and 8 it can be observed the grid definition and resulting hull form for a catamaran vessel and for a mono-hull one [11].

Formulation of the ship design procedure in the framework of a multi-objective optimization problem is not focusing only on wash wave reduction but also on vessel's total resistance, seaworthiness, dynamic stability, which allows the application of formal optimization methods to derive the optimum hull form:

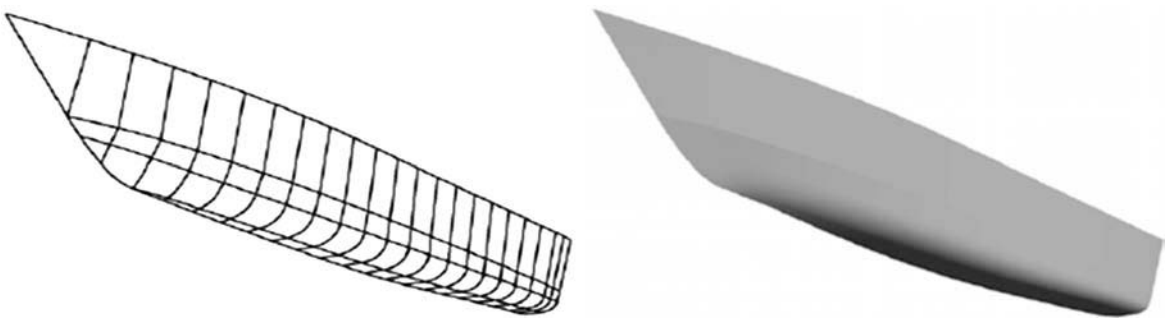


Figure 7 – *Grid definition and resulting hull form for catamaran vessel*

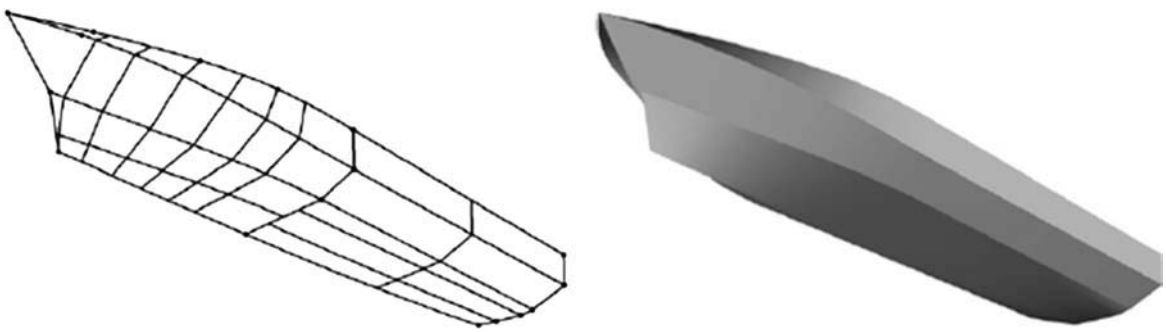


Figure 8 – *Grid definition and resulting hull form for mono-hull vessel*

Novel Lifesaving Appliances for Passenger Ships

Future large passenger ships need new life saving systems as the current standard (150 persons) does not match future needs. Also, the operators require space-saving ad cost-effective solutions, safer than before, or, at least, with an equivalent level of safety, at more competitive prices. The activities carried out were aimed at bridging this gap, proposing new, safe, reliable and really innovative LSA, developed and evaluated on the basis of risk based design methodologies [12].

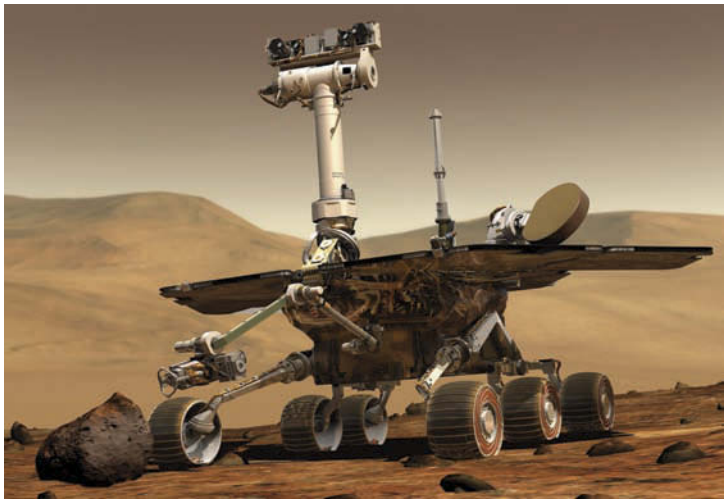
Ballast water management system reliability maximization

A risk management systems approach should be adopted, in which combinations of practices and technologies should be considered more effective and more cost-efficient than reliance on one ballast water treatment technology. Hazard Analysis and Critical Control Points has been demonstrated to be an effective risk management tool in a variety of situations and could be applied also to ballast water management.

Therefore the future work study of this article's author is to explore the use of risk assessment as a way to put strategies for treatment of ballast water into a probabilistic decision-making process. This process should be applied to the entire system of ballast water management and not to just one technique, device or practice. Each step of the process, from taking on ballast water at the port of origin to its discharge into the receiving port, depends upon the others. Risk assessment is a means of treating the entire ballast water management process in a holistic fashion and changes to each step can be evaluated within a defined risk-based process. A holistic approach to ballast water management includes the regulatory environment, the training of personnel, quality control, and environmental sampling.

As the main technological constraints for the development of ballast water treatment technologies, there can be mentioned:

- Existing information about ballast water treatment is limited in data quality, shortcomings in current methods for testing BWMS and reporting results, issues related to setting standards and for compliance monitoring, and issues related to test protocols, including the use of surrogate indicators. As a possible solution can be suggested the exchange of information between different companies that experienced the use of a specific type of technology.
- Limited experience and empirical data on life-cycle costs. The full cost of any BWMS includes not only its initial purchase and installation costs, but also its long-term operational costs. System reliability, durability, cost of spares, and ease of maintenance are factors that not all the time is take into consideration.
- The ability of shipboard systems to meet stringent standards that treatment processing plants (large, heavy, and energy intensive) demand.
- Operation procedures must meet the requirements of control authorities related to health risk for the crew, risk for vessel safety or for marine environment.
- Ship's crew is limited in number and with a strict activity schedule. It is obvious that new equipment installed on board is demanded to be easy operated and maintained. The challenge is to find feasible solutions to all the principal limitations of the current available studies regarding ballast water treatment technologies [13].



5. CHALLENGES AND PITFALLS OF RBD APROACH

In realizing the benefits of optimization using risk based design, there are also some pitfalls that must be mentioned. In industries such as the nuclear industry there is significant investment in validating modeling software. The unwanted consequences of getting the design wrong cannot be tolerated.

In the maritime industry, with the vessel size, complexity and design optimization increase, the asset value also increases. The largest cruise ships today have a capacity of approximately 7500 people. The robustness of modeling validation, data used and so on needs to reflect the potential scale of consequences.

It must be mentioned that there is a high degree of rigor required in managing design changes, to ensure the original optimized design intent is not lost or misunderstood. The challenge comes from having sufficient understanding of the rational used when optimizing the design, a number of years after it has been in service, or after it has been sold [14].

There are some rule makers and designers that drop all prescriptive rule formulations and hazard adopt risk based formulations by hazard, which are borrowed from other industries and may not be appropriate for ships. A reliable risk based approach involves avoidance to cut corners and thus avoidance on relying on a large number of arbitrary assumptions. To be applied properly, the risk based approach requires a significant amount of future research in order to reliably link from first principles the ship risk model with the desired acceptable Risk level [8].

The most important challenges that the designer must take into consideration are:

1. Setting the goals at the right levels. The higher level the more complex it is to effectively demonstrate they have been achieved.
2. Providing confidence to the regulators is a much more onerous task than using prescriptive regulation.
3. There is significant cost and effort involved in realizing through life benefits. Giving the regulators the required level of confidence involves cost and effort expended during the design, ahead of realizing any through life benefits.
4. The organization has to move from one that is operating in passive compliance in meeting prescriptive rules, to one that is embracing active ownership in demonstrating that the goals are being met.
5. The application of a Risk-based approach as the basis for the safety engineering activities requires much more resources (human and computational) in comparison to the prescriptive approach [14].
6. The design work process is somewhat iterative and requires efficient communication between engineering disciplines to avoid rework.

7. The safety studies supporting the risk-based approach provide very detailed results, but the results are subject to some uncertainties/limitations. Therefore, the results shall be checked carefully by the safety engineers and special attention shall be paid to their utilization.
8. Since the application of the Performance-based approach is a recent evolution in safety engineering, its use on real engineering projects requires the development of innovative tools and methodologies as well as the use of more sophisticated software tools.

CONCLUDING REMARKS

This paper proposed a review of the risk based design methodology, used in maritime sector. The first section – Background is offering the most common and important information related to the topic. The second one comes with the comparative analysis between prescriptive and performance based approach.

The Methods section show that risk-based ship design demands advanced tools to accomplish the safety assessment of a given design. Various theoretical methods and procedures have been summarized: Bayesian Network, Artificial Neural networks, Monte Carlo Method. It was essential to give examples of some of RBD applications of in the maritime sector: Bayesian Risk Model for Ship Fire Simulations, Lightweight Composite Sandwich Superstructure, Hull form optimization of high-speed vessels, Novel Lifesaving Appliances for Passenger Ships. In the last period a new target for RBD methodology was proposed: the feasible implementation of Ballast water treatment system onboard. The big challenge is to find realistic solutions to all the principal limitations of the current available studies regarding ballast water treatment technologies.

To be applied properly, the risk based approach requires a significant amount of future research in order to reliably link from first principles the ship risk model with the desired acceptable Risk level.

„When strangers start acting like neighbors... communities are reinvigorated."
(Ralph Nader)

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LEADING MULTICULTURAL TEAMS

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Abstract

Globalization and the development of multinational companies cause managers to face new challenges: those of leading multicultural teams. The aim of our paper is to assess some of those challenges and to create the profile of a good multicultural manager. In our opinion he has to speak one or more foreign languages, needs to be empathic, tolerant, flexible, has to respect values coming from different cultures than his own, and to learn as much as he can about his „adoptive" culture.

Keywords: multicultural team, manager, tolerance, respect, empathy

INTRODUCTION

The qualities of a manager determine the success or failure of an organization. For a long period of time, it was important to answer the question „Which are the main qualities of a great manager". Now, in the globalization era, when assessing a candidate for a management position, another question needs to be answered: „Which are the main qualities of a manager working in a multicultural environment?" In our paper we aim to answer the latter.

As some of us have experience working in a multinational organization, we realized how challenging the management of a multicultural team can be. People communicate differently, they have stereotypes regarding

„We must ensure that the global market is embedded in broadly shared values and practices that reflect global social needs, and that all the world's people share the benefits of globalization."
(Kofi Annan)

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certain groups (for example, in Muslim countries, women), they have different styles of learning and interacting with others. There are studies that explain which are the challenges a manager of a multicultural team has to face. Considering these challenges as a starting point, we create a profile of such a manager, with the traits and skills we consider necessary for his success.

In the first section of this paper, we clarify some concepts regarding management, culture and multicultural teams. In the second section, we present the portrait of a good manager working in a multicultural and/or multigenerational team, the way we see it. The last section concludes, pointing directions for further research.

THEORETICAL FRAMEWORK

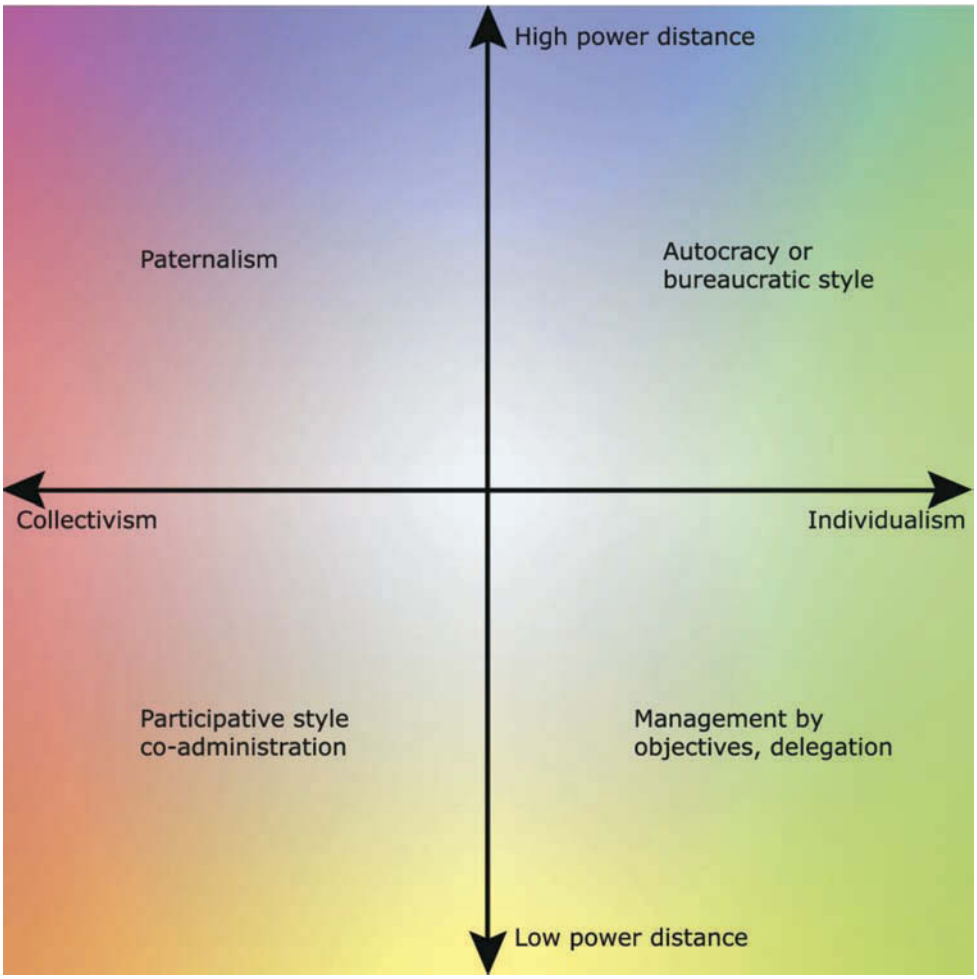
We consider that before outlining the portrait of the intercultural manager, some conceptual clarifications are necessary. First of all, we need to clarify the roles of a manager.

Over time there have been written lots of articles and books on the subject of the manager's roles in the organization. As it is still a largely debated subject and the goal of this article is not to establish the general roles of the manager, we chose to start our research from one of the most influential works in this domain, that of Henry Mintzberg, who argues that in leading a team, the manager finds himself fulfilling many different roles at the same time. He argues that there are ten primary roles or behaviours that are used to categorize a manager's different functions and they are divided up in three major categories. First is the interpersonal category where the manager provides information and ideas, and includes the roles of figurehead (source of inspiration), leader and liaison officer. The second category is the informational one that focuses on processing information and contains the roles of monitor, disseminator and spokesperson. The last is the decisional category that focuses on the use of information, and contains the roles of entrepreneur, disturbance handler, resource allocator and negotiator. If a manager can fulfil all of these ten roles, than he can lead his team and organization to success.

But is the fulfilment of this the classic roles of a manager enough to assure the success of a multicultural organization in a globalized economy? Lately globalization has overwhelmed organizations and leaders within them because of the rapid pace of changes and the necessity for understanding the various communities across the globe. So what are the roles that a manager must fulfil in leading a multicultural organization and what are the skills that a multicultural manager must have?

Before approaching multicultural management, it is mandatory to find out what culture is. There are many interpretations given to this specific concept. The Merriam-Webster English dictionary defines culture as „the beliefs, customs, arts, etc., of a particular society, group, place, or time; a particular society that has its own beliefs, ways of life, art, etc.; a way of thinking,

behaving, or working that exists in a place or organization (such as a business)". Others [1] define culture as „a system of meanings learned and shared by a group member". If we move on to organization related definitions, culture can be considered the sum of „beliefs and ideas about what kinds of goals members of an organization should pursue and ideas about the appropriate kinds or standards of behavior organizational members should use to achieve these goals" [2]. The Hofstede Centre defines culture as „the collective mental programming of the human mind which distinguishes one group of people from another". In management it is common to use the notion of country as a substitute for culture [1]. Cultures and countries are different, but they have some common dimensions, discussed in the 1980's by Geert Hofstede (The Hofstede Centre): power distance – „the extent to which the less powerful members of institutions and organizations within a country expect and accept that power is distributed unequally"; individualism – „the degree of interdependence a society maintains among its members"; masculinity – „what motivates people, wanting to be the best (masculine) or liking what you do (feminine); uncertainty avoidance – „the extent to which the members of a culture feel threatened by ambiguous or unknown situations and have created beliefs and institutions that try to avoid these"; and long term orientation versus short term orientation. In Hofstede's opinion, two of these dimensions are especially relevant when talking about management: power distance and individualism-collectivism [3]. Considering the combined scores for these two dimensions, Hofstede defines four types of leadership, as it can be seen in Figure 1:



Source: Author's creation based on Onea, Tătărușanu, 2012.

Figure 1 – *Leadership types according to Hofstede*

When working in a multicultural environment, these dimensions become a really important aspect to be considered in order to have an efficient cooperation. This leads us to the next concepts that need to be discussed, which are multiculturalism and interculturalism. Lüsebrink [4] defines it as „different cultures cohabitation in a social system during a peaceful and conflict coexistence" [5]. In management, a multicultural team is a „team composed of at least three individuals from different national cultures" [1]. Even if these terms, multi and interculturalism, seem to be very similar, we consider that they are not.

Interculturalism means putting together three or more cultures, while multiculturalism refers to the interaction between these cultures, interaction that in an organizational environment has the purpose to bring more quality to the work required. The success of this approach depends on the manager; this is why we will discuss further the profile of the successful manager working in a multicultural environment. As Popescu *et al.* declare „managing multicultural work teams and the ability to manage diversity will probably be the key skills required for the managers of tomorrow" [1].

Focusing on the literature related to multicultural managers we can find different sets of competencies for successful leaders. Adler [6] argues that the global manager must be able to employ cultural sensitivity and diplomacy, to foster relationships that create respect for all parties, able to communicate clearly, able to solve cultural problems synergistically and able to negotiate across cultures.

Tung et all (1997) finds that one of the most important abilities of the multicultural manager is that of effectively balancing conflicting demands of global integration and local responsiveness, besides the ability to work in teams from multiple functions and disciplines, companies and industries and the ability to manage people from diverse racial and ethical backgrounds.

O'Hara-Devereau and Johansen [7] focus on the importance of using cultural differences in order to gain competitive advantage in a globalized marketplace by using the manager's ability to understand and communicate across multiple cultures, the ability to create and sustain business teams in a global setting and the ability to support the complex process of facilitating teamwork.

In their work London and Sessa [8] developed a nine-dimensional construct of multicultural sensitivity for a successful manager: comfort with other cultures; positive evaluate other cultures; understanding cultural differences; empathy for people in other cultures; valuing cultural differences; open-mindedness; sharing cultural differences with others; degree to which feedback is sought; level of adaptability.

Kuhlmann and Stahl [9] argue that most of the previous work has been carried out in the U.S. and that characteristics of successful multicultural managers differ one country to another. They focus on the

European manager by using a sample of German expatriates, and they make a list of multicultural competencies that are bound to determine success of the manager in a multicultural setting. The competencies are: tolerance for ambiguity; behavioural flexibility; goal orientation; sociability and interest in other people; empathy; meta-communication skills.

A problem that we found and that was also mentioned by other authors, is that there are numerous lists of competencies and skills that a multicultural manager must poses in order to be successful, and that even if some of the competencies are found in more than one list, there is no convergence upon a limited and simple list of skills needed. Besides that, most managers feel that there is much more needed in order to be successful in leading a multicultural organization in a globalized economy than checking all the lists of competencies and skills.

Further we will try to create our own portrait for a multicultural manager.

THE PROFILE OF A MULTICULTURAL MANAGER

First of all, we need to set the subject of our portrait. He or she is either a manager leading a multicultural team (or just a team from a different culture than his or hers), or a manager that needs to work in an international environment, with business partners from different countries. Many of the qualities needed in the first case are also useful in the second case.

The first skill that makes a good multicultural manager is his ability to accept and respect diversity. A good manager, working in a multicultural environment, needs to value diversity, and understand the benefits of learning from one another. Even if management must be in line with the culture and vision of the organization, it is fundamental that different culture needs of team members are addressed properly and there is no stereotyping involved. As Yehudi Menuhin beautifully said, „Bringing peace to earth is a too ambitious project. But we can at least educate children to respect differences, the only thing that allows us to learn. If we were all the same, we wouldn't be able to offer anything to each other". A good manager has to get over prejudices and stereotypes, and has to value good work and good ideas, even if they come from women, young colleagues, or any other member of a group considered as inferior in his home culture. By showing tolerance and objectiveness, the manager sets an example for its subordinates, and teaches them to accept their colleagues with a different cultural background.

If we're talking about learning, we must also mention the fact that managers should take into account that learning styles vary from one culture to another [10]. In our opinion this is a very important aspect of working in a multicultural team. This means that a good manager should adapt not only his attitude, as shown before, but also his ways of training the subordinates, to teach them what they need to know in a way appropriate to their style.

Being able to adapt to the local culture means that the manager has to „assess the culture of the site" [11], in order to understand the business environment and also the cultural, economic and social features of that country. Leaders must understand the cultural profile of their team and of their clients and must not judge cultural differences. Moreover, a mandatory quality of a good manager is the ability to adapt. There are people who simply cannot abandon their cultural background, who cannot accept that other cultures can produce people and things as good as his own culture does, people who are not flexible. They are not appropriate to be managers in multicultural environments.

Another key skill for a multicultural manager is to speak at least one foreign language, besides his mother tongue.

Many conflicts in a multicultural team come from misunderstandings, so it would be very useful for the manager to be able to speak the language of his subordinates. In any case he should at least make sure that the tasks he assigned are understood perfectly, and that rules and procedures are made available not only in English (the language usually used in most of the multinational companies), but also in the mother tongue of the members of the team.

Also related to communication, knowledge on the „adoptive" culture is necessary because it can avoid misunderstandings: not only verbal communication can be tricky, but also the para-verbal and the non-verbal ones. A good knowledge of how to interpret these can save a lot of time and efforts and can avoid conflicts and tensions.

Another important fact about managing multicultural teams is that sometimes the members of these teams are located in different parts of the world and only communicate and work together thanks to the technological development. This kind of management is named „e-leadership" [12]. Leaders of such teams also need to have a good command of technology and be able to communicate in virtual environments, always paying attention that this doesn't distort the communication and the message that needs to be sent.

Besides these qualities and skills, we can approach the subject of multicultural teams from a different point of view.

When we discuss about multicultural teams, we often think about groups formed by members from different cultures / countries. But we also can define culture in terms of different generations. United Nations Joint Staff Pension Fund [13] elaborated a survey in which they classified generations in four categories. Table 1 summarizes the information provided for these four generations.

Table 1 – *Characteristics of different generations*

Generation	Born	Characteristics
Traditionalists	before 1945	• team players • loyal to a single company all life long • respect for authority • obedient • do not discuss rules
Baby boomers	between 1946 and 1964	• main objective: personal growth • sensitive to feedback • optimistic • personal satisfaction is very important for them
Generation X	between 1965 and 1980	• positive attitude • they question the authority • goal oriented • not patient • able to multitask • flexible
Generation Y	between 1981 and 2000	• sociable • heroic spirits • do not know to deal with difficult people • perseverant • self-confident

Source: Authors' creation based on information from [13].

The study identifies generation Z in the same category of Y generation, but we consider that we can find different characteristics for generation born after 2000: they are more than sociable, we can say that they are even social media addicted, they are bright, they communicate very well using high level of technology, they quickly accept differences, being more tolerant than the previous generations.

Managers of multigenerational teams should not only understand and accept differences between individuals, but they must create a work environment that puts value on those differences. They have to be able to understand that young individuals want quick results and they are even able to get them, but in the same time they need acknowledgement for their work. Besides, managers have to know that middle aged workers have to believe in a mission in order to get good outcomes. Furthermore, the old employees are very loyal, but in the same time they do not like uncertainty and they look for to reduce it in their work.

For example, baby boomer managers are used to a work day starting at 8:00 a.m. and finishing at 4:00 p.m. (at least) and they maybe expect from their team to have the same work programme. In the same time, employees from Y generation are flexible and ask for flexibility. They are multitasking, but they want/need to be allowed to do their tasks in their own way. They were taught by their parents to make their own choices, but not without questioning the authority. And the authority is the manager. They do not leave organizations, but they may leave their managers.

Managing multicultural teams (members from different countries, or different regions in the same countries, or different generations, etc.) requires special skills for managers. They have to build a new work environment to improve performance in the company. Managing multicultural teams means managing diversity [14].

Our opinion is that a manager of a multicultural team should be empathic with the members. Empathy is an important part of emotional intelligence which can be defined as the ability to perceive, control and evaluate emotions [15]. Empathy is the ability to understand another person's thoughts, beliefs, feelings, reactions; it means understanding others by entering their world [16]. It is more than just listening, it is responsiveness and awareness. Empathy is an emotional skill and helps managers to be more effective. It does not mean that empathic managers always agree with their team members or change their opinions and beliefs. But they must be active listeners in the working environment: they pay attention to others, they clarify if they do not understand what an employee says, they share and they are active participants in a discussion.

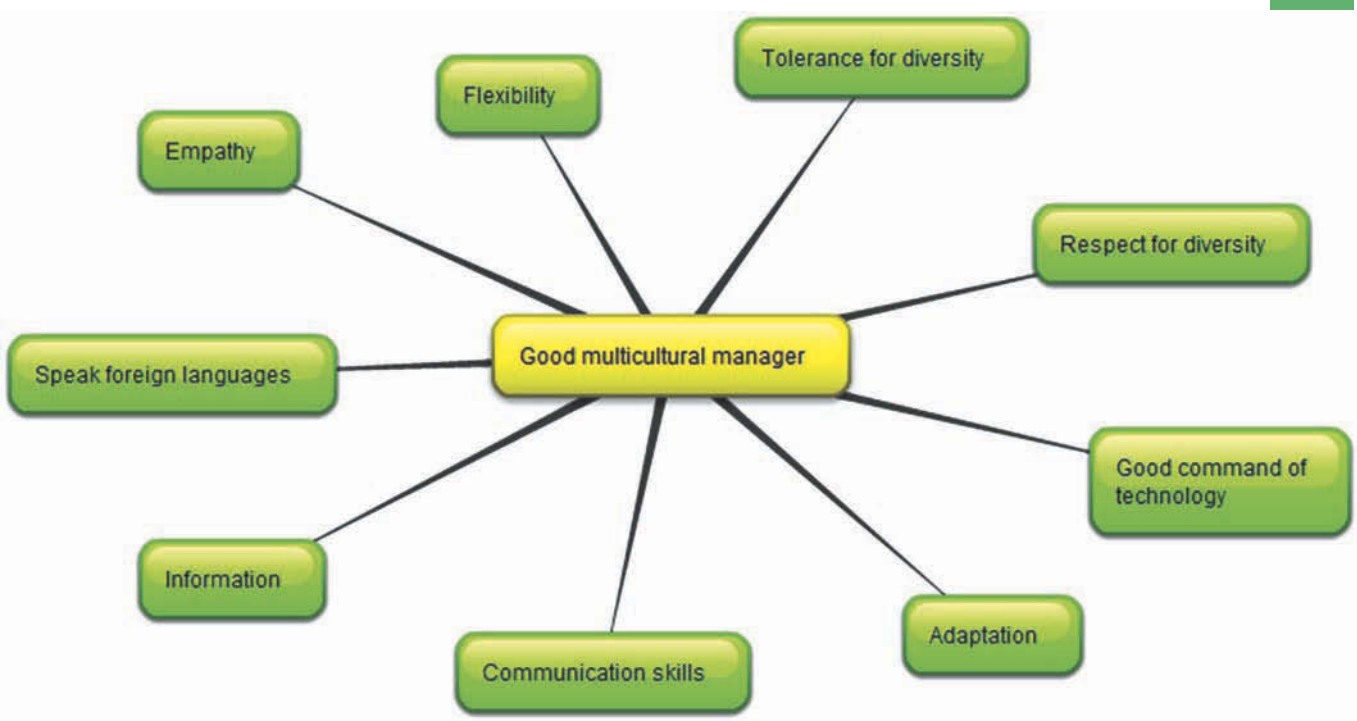


Figure 2 – *Profile of a good multicultural manager*

Improving empathy means improving performances. We consider that there are few ways of improving empathy:

- being curious;
- using more types of questions: open questions, closed questions, questions for clarification, personal questions, general questions;
- cultivating/promoting compassion: always taking into account the effects that decisions have on employees, thinking about the roots of behaviours;

Empathic managers increase their awareness and they improve behaviours in order to get greater performance. Being empathic means not only behaving action oriented, but taking into account the perspectives of all members of the team. Such managers always try to find and maintain this equilibrium.

Global Leadership and Organizational Behaviour Effectiveness Research Program – GLOBE study [17] defined the following types of leadership:

- value-based leadership (charismatic, ability to motivate people, high expectations from others);
- team-oriented leadership (focusing on cooperation, emphasizing team building, finding common goal of team members);
- participative leadership (involving team members in decision making and implementing process);
- human-oriented leadership (being supportive, compassionate and generous);
- autonomous leadership (being independent, individualistic and egocentric);

- protective leadership (focused on safety and security of both leader and the whole team).

We consider that empathic managers combine to a certain extent features of most of the types of leadership mentioned above. They have high values, they focus on cooperation in and outside of the team, they support employees to make decisions and to implement them and finally they try to bring safety and security for the team in order to get better and better results for the company.

Conclusions

In a globalized world, with multinational companies that develop and employ people from all over the world, multicultural teams are not novelty anymore. These teams are difficult to manage, because of the challenges involved by having to work with people with different cultural backgrounds and from different generations. This means that the new situation requires new skills and qualities for managers, who are now multicultural managers.

Our paper presents the necessary characters traits and skills from two points of view. First we explain our opinion on how a multicultural manager needs to be when working in a multicultural environment, and then we move even further, talking about the challenges of working in a different type of heterogeneous team, one that integrates two or more generations. In conclusion, we consider that tolerance, adaptability, flexibility, respect for different people and cultures, empathy, ability to speak one or more foreign languages are nowadays essential skills for a manager.

Further research on this matter should focus on how these skills can be developed and trained in order to improve communication and work results in multicultural teams.

Acknowledgements

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THE MULTIDIMENSIONAL ANALYSIS OF MAINTENANCE ACTIVITY

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Abstract

Maintaining the industrial products in working condition, but also at the qualitative parameters imposed by users requirements, needs periodically maintenance interventions because using of every industrial product, especially in extreme scheme, which all users aim to, has the effect of increasing the wear and, therefore, the number and the volume of damages. The improvement of the maintenance activity and increasing the quality of the industrial products are both current concerns of field specialists, and others. The scientific research presented in this paper show that there are still solutions for both continuous improvement of the maintenance activities and the quality of industrial products improvement. These solutions have resulted from multi-criteria analysis of the maintenance activity.

Keywords: maintenance, quality, multidimensional analisys, competitiveness

INTRODUCTION

The maintenance is not a modern world's discovery. The age of this activity is lost in time, being present throughout the entire history of mankind, whether or not conceptualized. The sure fact is that the development of society, accompanied by a strong revolution in technology has been supported by the development of this type of activity.

The term „maintenance" has a lot of definitions, trying to highlight different aspects. For example, in Grand dictionnaire universel du XIX' siècle by Pierre Larousse, Paris, we can find the following explanations:

- **Maintenir** (to maintain) – defense, protection...

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Also, in the same dictionary, we find the following terms:

- **Entretien** (maintenance) – (what is done in order to maintain a good working condition; the expenditure for...).
- **Reparation** (repair) – the action of reinstatement...

Regarding the same term in Encyclopaedia Britannica we can find the following definitions:

- **Maintenance** – to hold in a existing state...
- **Repair** (repairing) – to restore to the good condition...
- **Entertain** (maintenance) – to maintain in a good condition...

We can observe in this way that there is a significant difference between „maintenance" and „repairing", as notified in Romanian Language Dictionary:

- **To maintain** – to keep something in the same state or shape in a certain moment, to make that to last...
- **To repair** – to make something proper for use, to restore, to maintain...

In the above mentioned dictionary, all terms have their origin as French words, so we consider that the term „maintenance" has its justification in everyday language, with some remarks:

– the maintenance implies activities of maintaining and repairing;
– it is incorrect to admit that only by performing repairing activities means maintenance.

Consequently, the maintenance means a set of technical and organizational activities that aim to ensure obtaining good performance for the considered good (equipment, building, facility, and so on).

Moreover, this view is supported by the French rules of the maintenance field, which clarifies the following point: ...a combination of technical, administrative and of management activities... reinstate or maintain safe operation.

Other additions in respect of such term it would be as the related costs, the lifetime of equipment or risk and reliability in working, but also the expanding the use of terminology in the field of human resources and of the environmental protection.

In the Romanian literature, the term „maintenance" was used mainly after 1989, up to this date is substituted by „maintenance and repair" because political connotations. However, it was established the term „maintainability" which could not be replaced by a Romanian equivalent that can describe the complexity of this indicator.

In conclusion, we consider that the term which will comprehensively characterize the studied phenomenon *is „maintenance" and it will have basic components of maintenance and repair activities, and also administrative and managerial, in their complexity"*. It is believed

that maintenance represents is a higher level to which all organizations should aspire, a new culture and a modern optic, which leads to a maximum efficiency of the economic activity.

Usually, the Romanian organizations apply more „maintenance and repair" than maintenance, especially because in the current economic crisis many of them face a process of involution, which occurs strongly in this area. We could say that „maintenance" is performed only after organizations will go through a long process of transformation and technical, economical and social evolution.

In the following (Figure 1), we introduce the four fundamental responsibilities for this basic function of any modern organization. Therefore, we will try to define briefly the implications of maintenance upon the production activity of organization:

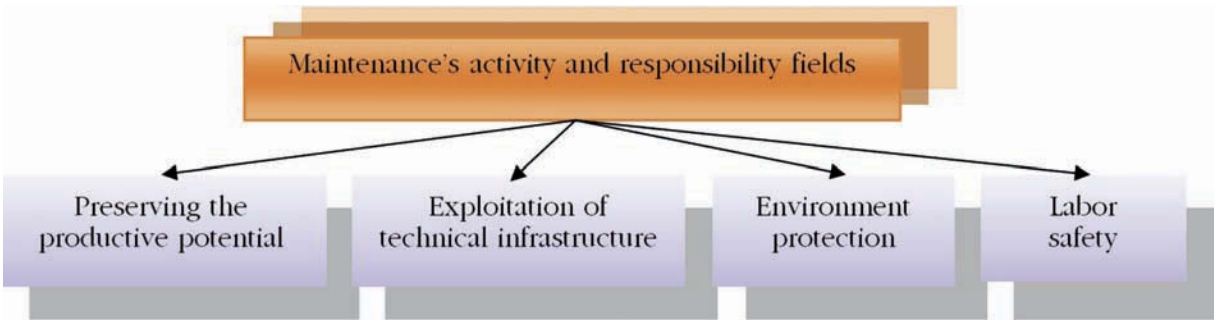


Figure 1 – *Maintenance's activity and responsibility fields*

- Preserving of the productive potential. To preserve the productive potential of the organization, the maintenance responsibilities are materialized in actions. These purely technical activities will be based on specific policies and strategies of maintenance management. The evaluation of effectiveness will be made in accordance with a number of specific indicators for assessing the performance.
- The exploitation of technical infrastructure. Technical infrastructure means the ensemble of sewers, storage and distribution of the needed utilities for company's specific activities (electrical, heating, water, compressed air, steam, gas facilities and so on.).

In the spirit of the activities described above, some authors consider that in this type of activity should be included also

the exploitation of organization's logistics park, in this case the logistic function is combined with the maintenance one. In other approaches, however, the logistic activity is considered itself as the basic function of the organization, assisted by the maintenance function similarly with the production function.

- Environment protection. By its nature, a maintenance service should only perform activities that are consistent with the principles of respecting the man and his environment.

In many approaches for the maintenance management, the quality of service is closely related to environmental implications. In this regard, we remind that *Total Productive Maintenance* retains as its basic objective *„pollution 0"*.

- Labor safety. Labor safety is subject to multiple laws, decrees or government decisions that regulates the operation in complete safety of the equipment and facilities specific to each economic sector. Although the protection rules addresses directly to the persons involved in the management and operation of various types of equipment, we consider the maintenance service has major implications assuring the security through specific activities.

All maintenance activities taking place in an organization, the security of the staff will be considered beyond productivity or cost issues. Moreover, in modern management, labor safety and its rules are considered as active factors of motivating the employees.

Maintenance systems

At the bottom of organizing the development of the maintenance activities there are aspects related to the organization's location, activity profile, the characteristics of existing inputs and so on. The systemic approach requires consideration of the following forms of organizing the maintenance which, according to the assigned resources and pursued objectives, are designed to provide optimal availability of technical systems (Figure 2):

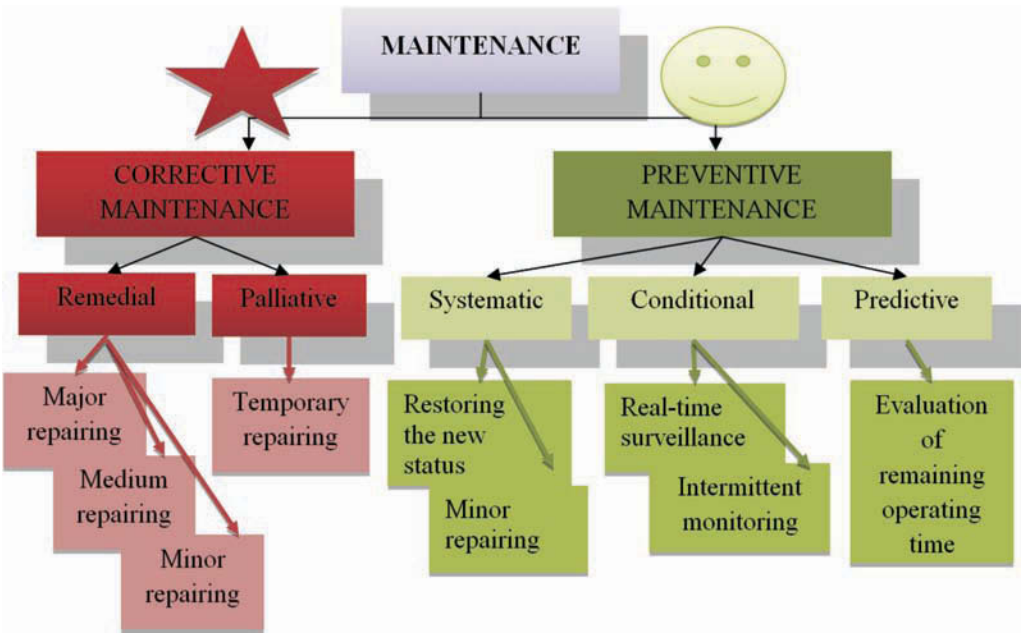


Figure 2 – *The components of the maintenance system and the basic maintenance activities*

- **Preventive maintenance.** The preventive maintenance is „the maintenance which has the object reducing the probabilities of failure or degradation of a good or service". The preventive maintenance types we could refer to are following: systematic maintenance; conditional maintenance; predictive maintenance.

One method of comparing the effectiveness of the systems set out above can be achieved by the maintenance average total cost per time unit.

- **Corrective maintenance.** The corrective maintenance represents „the ensemble of activities done after the damaging of a capital good or after the unexpected degradation of its function". These activities consist in locating the faults and their diagnosis, recommissioning with or without modifications, and functioning in proper condition control. It decomposes in two sub-types: remedial maintenance; palliative maintenance.

If initially the maintenance encompassed only maintenance and repairing activities, the modern approaches complete the concept by adding all technical and organizational activities aimed to the increasing efficiency of using any durable product.

In this situation, the maintenance becomes a more comprehensive concept, integrating the concepts of reliability, maintainability or availability of industrial products.

Quality and competitiveness

By improving the maintenance activity, organizations can achieve the objectives of quality, the most important aspect being to meet the explicit and implicit needs and expectations of the customers.

Realizing a unification of all points of view in terms of quality, and their interpretations, we find that they belong to the three important players in the market:

- *the producer* – compliance with the specifications of products and services;
- *the consumer* – compliance with the expressed and satisfied;
- *the society* – reducing losses and customer, environment and labor protection.

Currently, the quality has become a strategic element of the companies because it determines the highest degree of the competitiveness of products and services, both nationally and internationally. Therefore, we can say that through quality, the customer can achieve a markets regulation, choosing those products that best satisfy his needs and expectations.

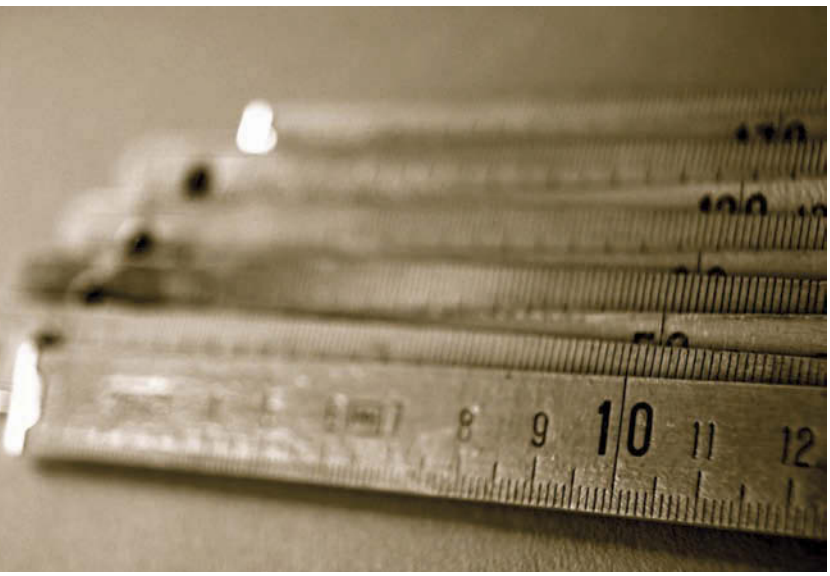
The quality is, first of all, a matter of education because only thus can act professionally, can do things right from the first time. Then, the quality is a matter of culture, which allows understanding its necessity, but also of knowledge of what is best in the world in order to achieve

excellence so much desired today. Third of all, quality can be considered a behavioral problem involving persistence in activity, resumption, recovery and tough work.

The first impact of the quality in society was a diffuse one, occurring in a few thousand years a revealing of the factors related to this, but particularly in terms of philosophical approach.

The second impact, much powerful, is the one it has upon the companies. The problem has led to profound changes in companies' strategy, has allowed the overcoming of traditional schemes in manufacturing approach. Quality has become an innovative factor, in many cases being perceived as single objective.

From this point of view, the quality is a general problem of the company being addressed in terms of management. If once the productivity, flexibility and quality were considered mutually exclusive opposites concepts, that could not be pursued simultaneously, today, the productivity and flexibility have become elements of quality, the new corporate strategy breaking constraints generating dispute between different components.



The third impact of the quality occurs at the individual level. Today, people have become aware of the advantages of the quality and require products and services that satisfy their claims, tending even further towards achieving the quality of life.

From the presentation above, it results follows that this goal, quality, is not only a problem of the company, but a problem of humanity and society and even an international problem, a concept widely distributed worldwide, there must be assurance that the products are qualitative.

Statistical analysis of the maintenance activity

In order to obtain maintenance activity data, it has been used a statistical survey based on a questionnaire. The questionnaire was designed and projected so that problems related to the maintenance activities could be identified, and more. For the final version of the questionnaire, a small group of experts in the maintenance and statistical research has been consulted, resulting in many improvements loops until they got the form sent to respondents. This final form contains a number of 43 questions needed to identify the problems of the maintenance activity and more.

The data obtained from the questionnaire completion by 272 respondents, the sample obtained based on statistical calculations, were collected and processed. For statistical research were mentioned as well as maintenance specialists within industrial organizations as industrial products users who have turned to organizations providing maintenance services.

Thus, in the following, the data obtained from the respondents will be graphically presented in the form of an analysis obtained by the combination of different types of questions.

a) Correlation between the organization, its size and maintenance manual

For this analysis, were analyzed the answers (Figure 3) for the following questions:

2 – Respondent type

3 – The size of the organization

22 – The existence of the maintenance manual

From the total number of 272 respondents, about 21% represented organizations, of which approximately equal proportions of 28%, respondents were working in large organizations (between 200-1000 employees) and 28% very large (over 1000 employees). From the 56% respondents working in large and very large organizations have been chosen the organization as respondent type, figure 3, 50% have the repairing manual, and 50% do not have this manual.

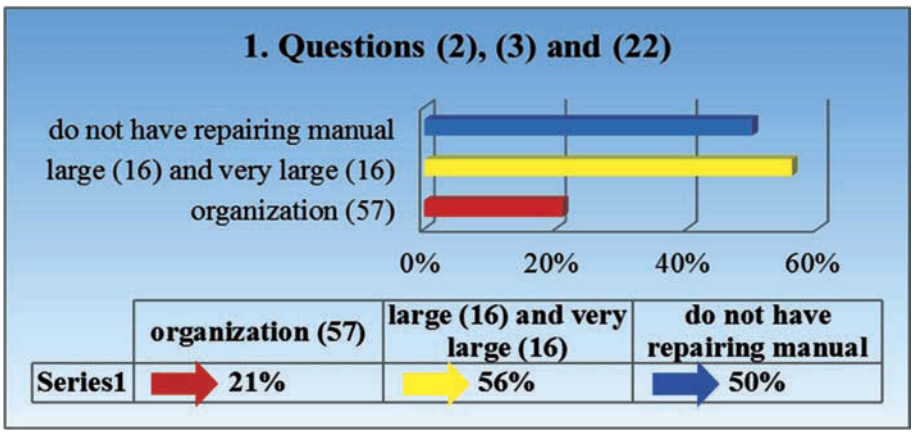


Figure 3 – *Representation of the connection between questions (2), (3) and (22)*

b) Correlation between the organization, its size and maintenance procedures

For this analysis, were analyzed the answers (Figure 4) for the following questions:

2 – Respondent type

3 – The size of the organization

24 – The existence of the maintenance procedures

From the 21% respondents who have been chosen the organization as respondent type, 56% of respondents, equal percentage, 28%, working in large organizations and 28% very large ones, the question (3). From these, 100% has repairing procedures, according to Figure 4.

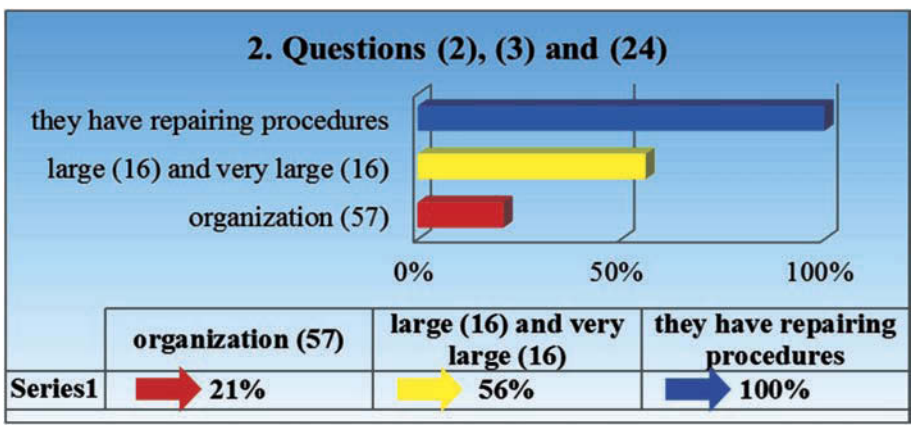


Figure 4 – *Representation of the connection between questions (2), (3) and (24)*

c) Correlation between the organization, its size and influence of maintainability

For this analysis, were analyzed the answers (Figure 5) for the following questions:

2 – Respondent type

3 – The size of the organization

26 – The existence of the maintenance influence

Based on the same information about the respondent type, in which a 21% from the 272 respondents has been chosen the organization, keeping only very large organizations (over 1,000 employees), with a percentage of about 28%, and correlating with the question (26) upon the connection of reliability and maintainability with the quality, it can be observed that: 50% of respondents do not know if the reliability and maintainability have an effect upon product quality and the remaining 50% do not understand if reliability and maintainability have an effect upon product quality, Figure 5.

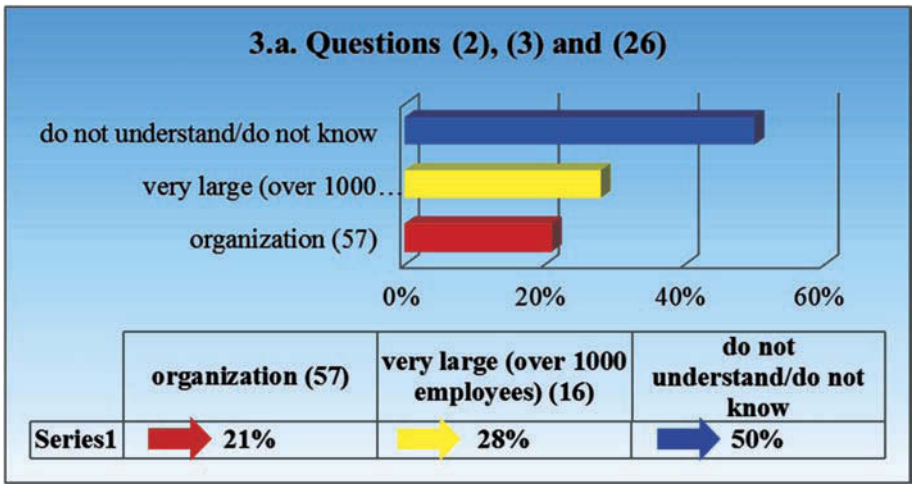


Figure 5 – *Representation of the connection between questions (2), (3) and (26)*

d) Correlation between the organization, its size and the product quality

For this analysis, were analyzed the answers (Figure 6) for the following questions:

2 – Respondent type

3 – The size of the organization

26 – The existence of the influence upon quality.

If in large organizations, 50% do not understand and 50% do not know if the two concepts, reliability and maintainability, has effect upon the quality, in large organizations, which have between 200-1000 employees, this percentage is 0% (Figure 6).

e) Correlation between the organization, its size and stock of spare parts

For this analysis, were analyzed the answers (Figure 7) for the following questions:

2 – Respondent type

3 – The organization's size

31 – The existence of the stock of spare parts.

As you can see in the following, the organization has been kept as the respondent type, at a rate of 21%, Figure 7, and from these have been selected only small organizations with between 10-50 employees, representing as a percentage of about 14%. This way, only 33% of these have stocks of spare parts (Figure 7).

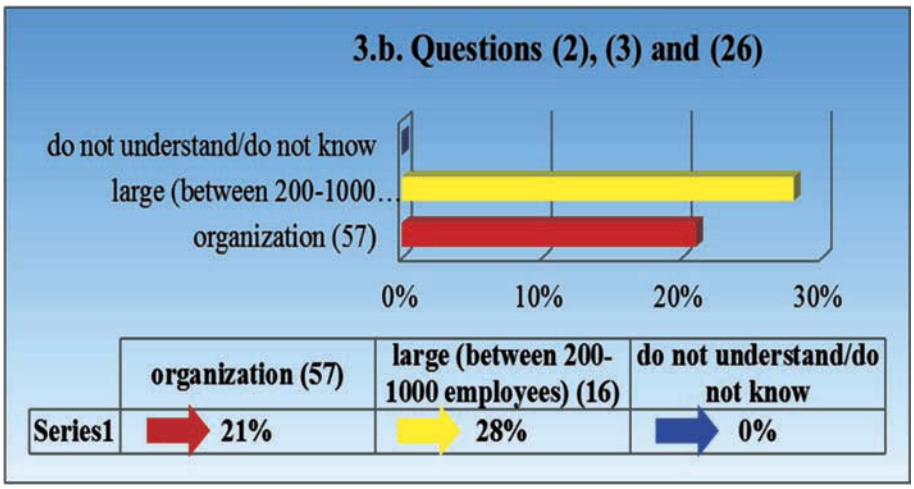


Figure 6 – *Representation of the connection between questions (2), (3) and (26)*

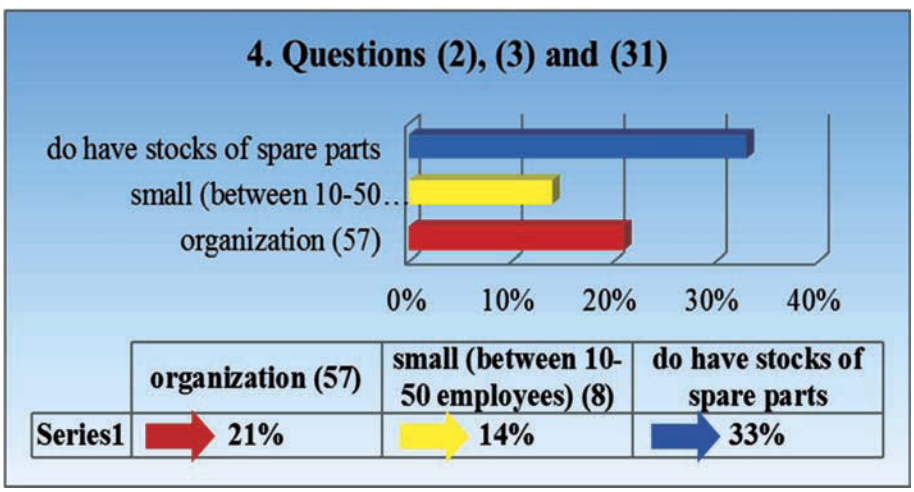


Figure 7 – *Representation of the connection between questions (2), (3) and (31)*

f) Correlation between the organization, its size and TPM knowledge

For this analysis, were analyzed the answers (Figure 8) for the following questions:

2 – Respondent type

3 – The organization's size

30 – The TPM knowledge

A percentage of about 43% of respondents who answered on behalf of the organization, they understand what is TPM, figure 8. Thus, of the 21% of respondents, 25% are part of organizations with 50-200 employees. As stated, 43% understand the concept of TPM, and the rest, a rate of about 57% of respondents do not understand what TPM is or do not answer to this question (Figure 8).

g) Correlation between the organization, its size and TPM use:

For this analysis, were analyzed the answers (Figure 9) for the following questions:

2 – Respondent type

3 – The organization's size

32 – TPM implementation

Still keeping the same type of respondent namely the organization, the respondent pointed by question (2), as shown in figure 9, and the same type of organization,

taking into account its size, a rate of approximately 25% are medium-sized organizations. This way, we can observe that out of these, a significant proportion (79%) does not implement TPM (Figure 9).

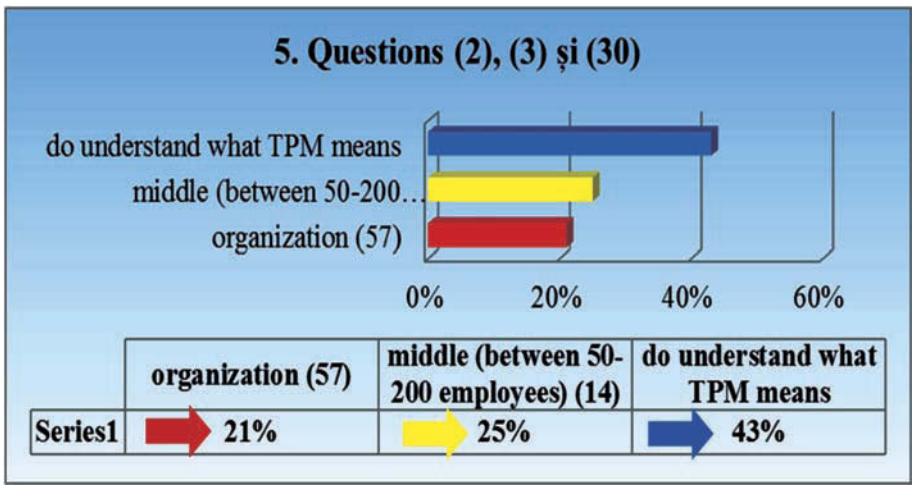


Figure 8 – *Representation of the connection between questions (2), (3) and (30)*

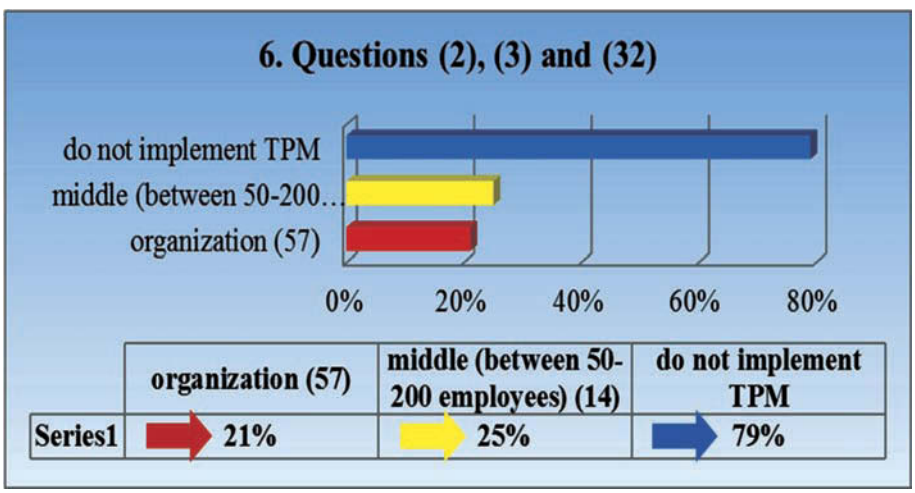


Figure 9 – *Representation of the connection between questions (2), (3) and (32)*

h) Correlation between the organization, the repairing cost and the spare parts price

For this analysis, were analyzed the answers (Figure 10) for the following questions:

2 – Respondent type

10 – The repairing cost

43 – Spare parts price

Further, keeping the organization as respondent type, with a percentage of 21%, 81% of them were thinking about the cost of repairing when they purchased this product. Moreover, a 50% percentage considers that the selling price of the replacing spare part is much more than the production cost, and the remaining 50% thinks that the price is little above the cost. No one believes that the selling price of the replacement part cost is little under the cost (Figure 10).

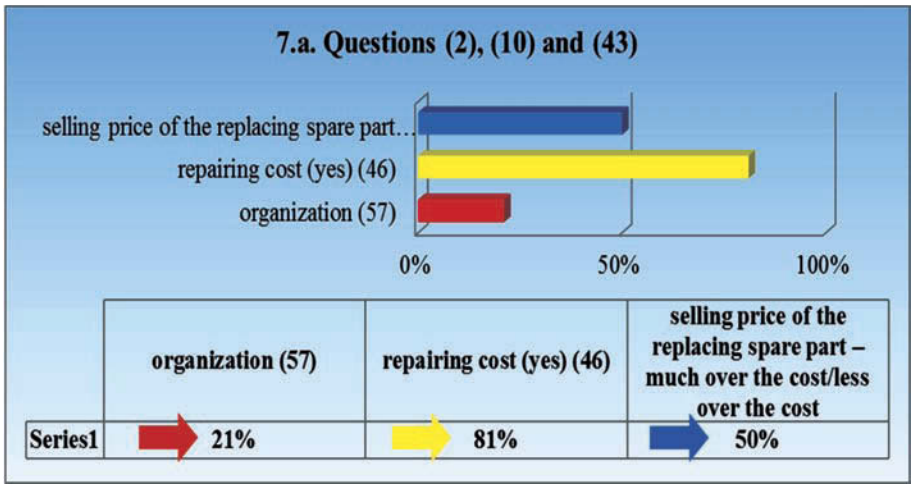


Figure 10 – *Representation of the connection between questions (2), (10) and (43)*

i) Correlation between the organization, the repairing cost and the production price of replacing spare parts

For this analysis, were analyzed the answers (Figure 11) for the following questions:

2 – Respondent type

10 – The repairing cost

43 – The production price of replacing spare parts

The situation is similar for the clients who have appealed to organizations providing maintenance, figure 11, the percentage of 79%, namely 215 of the total sample of 272. Out of these, a 67% they thought of the repairing cost when purchased the industrial product, and considers that the sale price of the replacement spare part is much more above the cost, 50%, and little above the cost, 50% (Figure 11).

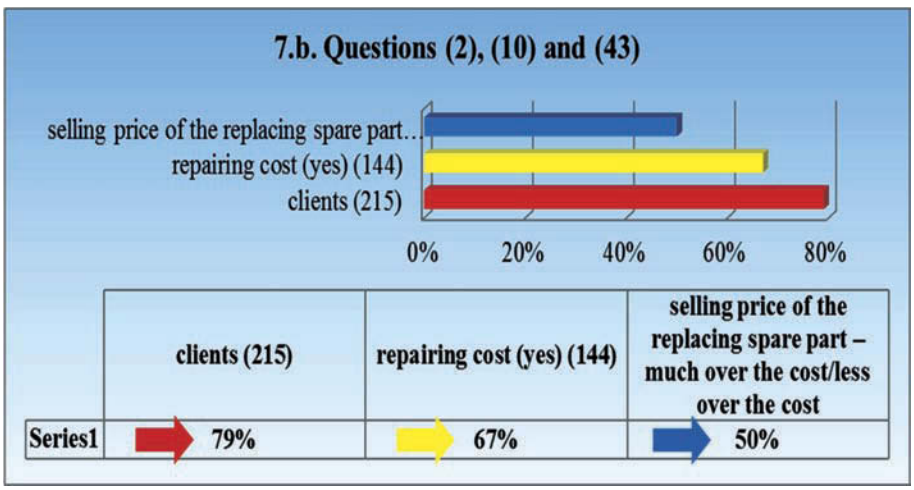


Figure 11 – *Representation of the connection between questions (2), (10) and (43)*

j) Correlation between the product, organization and the maintenance interventions

For this analysis, were analyzed the answers (Figure 12) for the following questions:

1 – Product

2 – Organization

28 – The moment of maintenance interventions

Of the 21% respondents who have been chosen the organization as the respondent type, the question (2), 14% have chosen an industrial product from company, the question (1). Considering the type of implementing the maintenance interventions, the question (28), we find that equally proportions of 41% implements the interventions after failure and 41% intervention after the appearance of a symptom. Only the remaining 18% implements the maintenance interventions upon a schedule, depending on the warranty period (Figure 12).

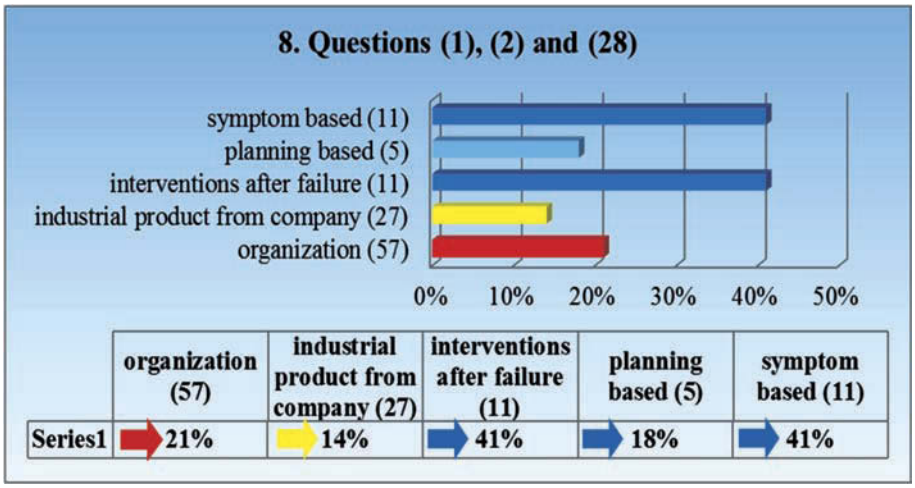


Figure 12 – *Representation of the connection between questions (1), (2) and (28)*

k) Correlation between the product, organization and the maintenance's outsourcing

For this analysis, were analyzed the answers (Figure 13) for the following questions:

1 – Product

2 – Organization

16 – Maintenance outsourcing

Out of the 215 respondents, a percentage of about 58% (125 respondents) have chosen a car as the product. From these, the vast majority (about 81%), thinks one should call for a service for installation of replacing spare parts (Figure 13).

l) Correlation between the product, organization and the warranty period

For this analysis, were analyzed the answers (Figure 14) for the following questions:

1 – Product

2 – Organization

15 – Warranty period

From the 215 respondents (Figure 14), representing a rate of 79%, a percentage of 58% of these, 125 respondents, has chosen as the product a car. The vast majority of them, a rate of about 82%, believes that the spare parts resist during the warranty period.

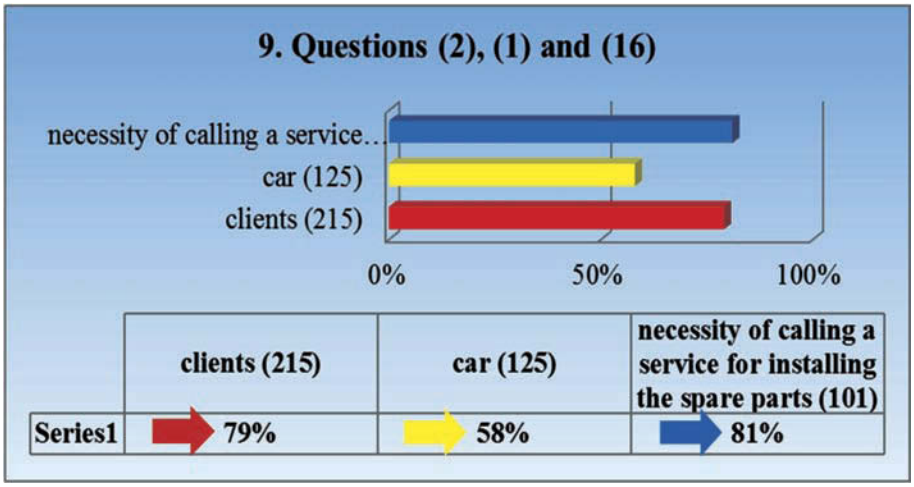


Figure 13 – *Representation of the connection between questions (2), (1) and (16)*

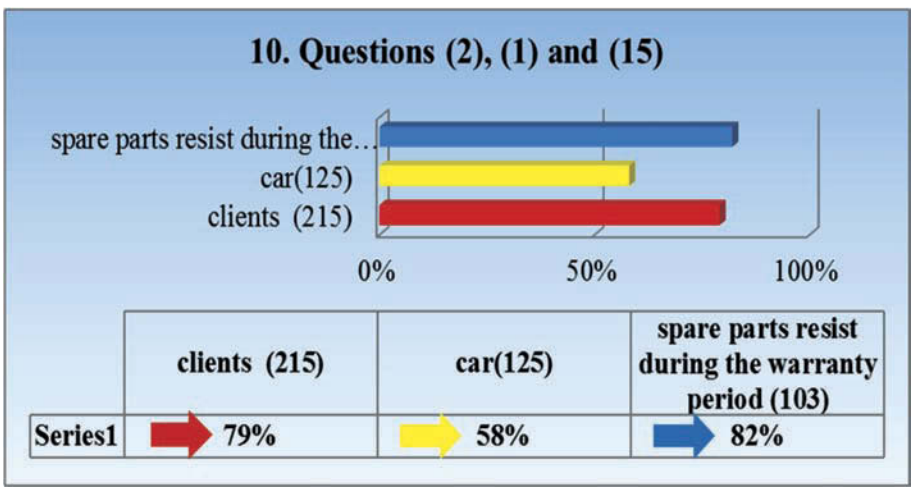


Figure 14 – *Representation of the connection between questions (2), (1) and (15)*

Conclusions

Maintainability should not be confused with maintenance. Initially, the maintenance reunited only the repairing and maintenance activities, but the modern approaches complete the concept by adding all technical and organizational activities aiming for increasing the efficiency of any durable product.

The concept of quality has continuously evolved. Thus, it can be seen that the orientation changed from product to process and then to the client, in order to ensure protection (security) while using the product, plus ecological concerns oriented towards environment.

The quality system is continuously expanding also. If in the past the quality was reaching for the customer and supplier, today, quality is reaching the customer, supplier and society. The study of maintenance, both in specialty literature and in statistical research about maintenance activity shows that, at present, the issue of maintenance is treated only partially, without a clear vision on a global scale.

Regarding outsourcing of maintenance activity, activity highlighted by a very small number of respondents, this requires the existence of various offers in specialized services to ensure an effective outsourcing. At present, however, in our country, this offer specialized in maintenance services, of high quality, is lacking. Across industries, the strategies should be adapted to the existing market for maintenance services. Another interesting conclusion is that the tools and working methods are not identical both in terms of organization size and by comparison with other countries.

Regardless of the approach, we must take into account the range of spare parts. Spare parts suppliers must respect the JIT – Just In Time, otherwise, it must supply all the necessary parts and storing them, which leads to high costs and financial restraint.

In addition, for the benefit of effective communication with spare parts suppliers, human resources from organizations must master both software, for optimal calculation of the necessary spare parts, and technical specialized terms.

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COMPARISON OF TWO EUROPEAN CITY HALLS

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Abstract

The present paper aims to study the quality management system within a public institution, its analysis conducting, if necessary, to the improvement of the services, by developing effective proposals. This paperwork describes the basic concepts of the quality system in public services, with special emphasis on presenting the importance of implementing a quality management system in a public institution. In the end it includes a case study which consists of two parts which served to identify any malfunctions that can affect the quality of services in the specific institution. In this regard, the first step was to achieve a quick overview of some key aspects in providing quality services by comparing the chosen institution, with a body resembling from a developed European country. Subsequently was analyzed the providing service system, by applying the SERVQUAL method. The study ends with a number of proposals and recommendations, developed in order to improve the quality management system in the Romanian public institution. The results of the case study, proved that the institution analyzed, still has a series of aspects that need improvement, the most important one, represented by the human resources involved in providing the services and maintaining a good relationship with the citizens. The questionnaire applied to the customers, revealed a very bad opinion regarding the level in which the public officials, understand their needs and are able to empathize.

Keywords: public institution, quality management, quality of services, SERVQUAL method

„A society that does not recognize that each individual has values of his own which he is entitled to follow can have no respect for the dignity of the individual and cannot really know freedom."
(Fredrich August von Hayek)

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INTRODUCTION

The specific terms with which this article will operate are [1] public institutions and City Hall. The public institutions are all legal entities established by acts of power or disposition of public or local authorities in order to carry out activities without commercial purpose or fulfilling a non patrimonial public service. The City Hall is a functional structure with permanent activity conducted by mayor, deputy mayor and specialized apparatus of the mayor, with the goal to solve the current problems of the local community.

Regarding the quality management in public institutions, it is necessary to take into account some aspects [2]: they must ensure transparency and elimination of bureaucratic structures; services should be subject to the evaluation of the citizens, as public institutions service costs are borne indirectly by citizens. Public institutions have monopoly of certain services by operating in a specific territory and they need to ensure professionalism and public service ethics.

Therefore, Quality Management Systems implemented in public institutions must be adapted to the Public Administration characteristics, not to automatically transpose the methods used in the private sector.

The present study aims to assess the quality of services provided by a Romanian public institution, and formulate a series of recommendations and suggestions in order to improve the quality of the services offered.

The tools used for this analysis were divided into two steps:

Step 1. Benchmarking study. This step was performed to analyze the institution through making a comparison with another similar public institution from a developed European country. A number of indicators considered essential for evidence of failures were selected: number of requests/day, average waiting time in queue, staff age, number of people involved in providing the services, personnel selection process, existence of an appointments system, the total number of Departments.

Step 2. Evaluation of the quality level of services using SERVQUAL method. The SERVQUAL questionnaire is designed to encompass both customer expectations and perceptions regarding the service. It allows assessment, but at the same time it is also a tool for improvement and comparison with other organizations of the sector. This tool is based on the five dimensions of service quality: tangibility, reliability, receptivity, safety and empathy [3]. For each dimension the SERVQUAL, the authors [4] have established certain questions (four or five questions for each dimension) in which the respondent has to state the expectations and perceptions on the service analyzed.

2. THE BENCHMARKING STUDY

In order to conduct the benchmarking study, the Romanian public institution was compared to a German public institution that conducts similar activities [5]. As can be observed from the analysis performed (Table 1), the number of cases solved within one day in the two institutions differ greatly. While the City Hall from Romania may settle an estimated number of 30-35 cases per day, for the City Hall from Germany the number can reach up to 150 people.

Regarding the average waiting time, the difference is significant and affects the quality of services. While a Romanian citizen will wait an average time of 25 minutes for his application to be taken over, a German citizen will wait only 10 minutes.

The human resources also have an important role in determining the quality of services. Comparing the two institutions, it is observed that the predominant age level of the employees in the Romanian institution is between 36 and 45 years, while in the German institution, people between 25 and 35 years of age are prevalent.

Table 1 – *Comparative study between the two public institutions*

		City Hall from Romania	City Hall from Germany
Number of cases/day		30-35	100-150
Average waiting time		25 min	10 min
Distribution of staff by age (%)	25-35	35%	65%
	36-45	50%	25%
	>45	15%	10%
Number of persons involved in providing the services		7	10
Personnel selection procedure		Analysis of documents Knowledge test Interview	Analysis of documents Personality Test Knowledge test Interview
Appointments system		No	Yes
Computerized waiting system		Yes	Yes
Number of Departments		12	5

The selection of personnel is also different. To ensure a high level of quality of a service, the personnel involved in providing it should be rigorously selected and properly distributed. From the analysis of the selection process within the Romanian City Hall, it can be seen that there are no tests to identify the personality and the character of candidates, while in the German City Hall, the personality test is preceded only by analysis of documents, being more important than the written test, which verifies the candidates' knowledge.

Regarding the taking over application method, in the Romanian public institution there is no appointment system to keep a record of persons to be present on that day. This system, however, is very well implemented in Germany, where the citizens can either have access to a ticket order once present in the institution, or to make an appointment through Internet,

at least seven days before the service is intended to be provided. During waiting, the German citizens are directed to a waiting room where they can see displayed on a projector the ticket numbers that are already being processed and the estimated waiting time for the subsequent numbers. Moreover, the waiting room is equipped with screens that provide information of general interest to citizens as social and cultural events and economic information.

Regarding the organizational structure of the two institutions, sizeable differences are also present. While the German public institution has five directions to achieve its entire activity, the Romanian similar institution has a number of 12 directions. This is due to an increased level of decentralization, which slows the settling time of an application and leads to higher levels of bureaucracy.

3. EVALUATION OF THE QUALITY OF THE SERVICES PROVIDED

For this study two questionnaires were developed:

1. A questionnaire to verify the expectations of citizens in terms of providing public service.
2. A questionnaire to check citizens' perception of the quality of services provided by the analyzed institution.

In determining the sample the following formula was applied:

$$n = t^2 * p * (1 - p) / e^2 \qquad (1)$$

where: n – Sample size; t – Theoretical value of accepted probability (t = 1.96 was chosen for a confidence level of 95%); p – The percentage of the population that contain the sampling feature (p = 0.50); e – The error of representativeness permissible limit (5%).

It was considered an estimated number of 700 citizens who seek public services provided by the public institution, within 20 working days (one calendar month). The application of this formula led to the establishment of a sample of 107, 52 people. The budget has allowed the use of two operators and interviews with 45 people.

Following the tabulation of responses to the five general questions we can conclude the following:

- As seen in Figure 1, from the 45 people interviewed, 26 were women and 19 men, representing 60% and 40% respectively.

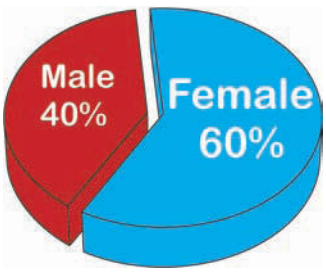

Figure 1 – *Sample structure by gender*

- Regarding the age of the persons interviewed, figure 2 illustrates the following situation: seven people were aged between 18-25 years, 13 people aged 26-35, 18 persons were placed in the category of 36-45, three people aged between 46 and 55 years old, and 4 persons were older than 55 years.

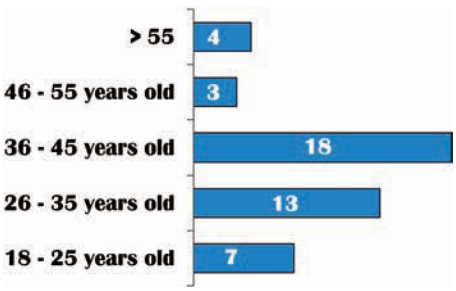

Figure 2 – *Sample structure by age*

Of the 45 people who were surveyed, figure 3 shows that 14 people work in the service sector, one person is self-employed, 8 people are retired, seven people are students, three people have their own business, one person is a lawyer, 5 people are housewives, one person is a physician and 8 people have not said their occupation.

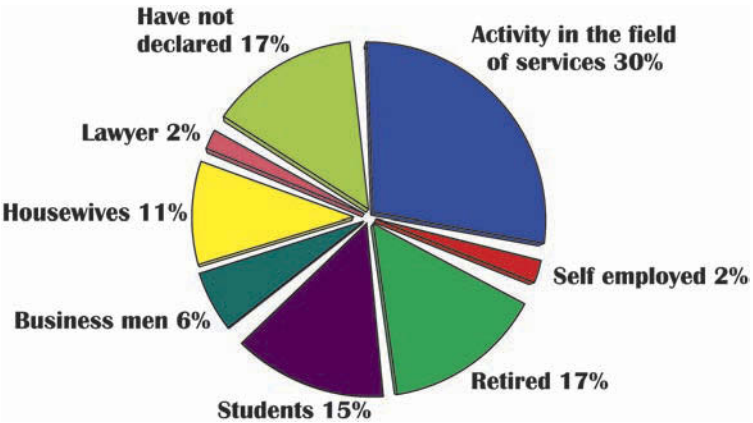

Figure 3 – *Sample structure by occupation*

Regarding the level of education the situation is as follows (figure 4): 15 people have higher education, 17 people middle education, secondary education 9 persons, 4 persons primary education.

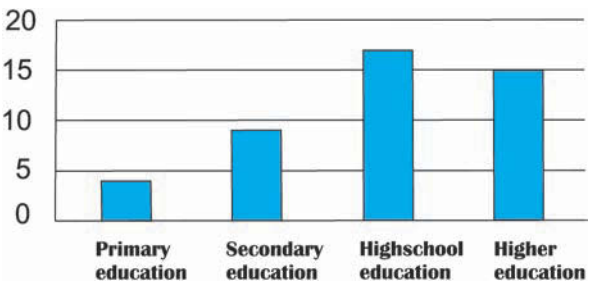

Figure 4 – *Sample structure by education*

With regard to frequency of use of the services offered by the institution in the last 6 months (figure 5), a total of 9 people said „more than 5 times", 11 people stood between 3-5 times, 13 people chose the „2-3 times „ and 12 people have resorted to the institution once in the last 6 months.

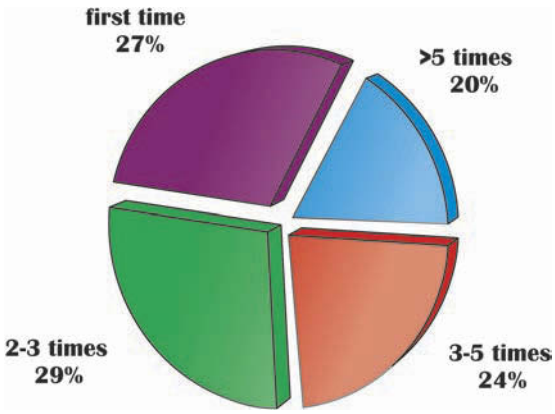

Figure 5 – *Use of City Hall services*

Centralization of the answers at the two specific questionnaires led to the following results:

Table 2 – *SERVQUAL questionnaires results*

Dimension	*Weighted Average Score Expectations*	*Weighted Average Score Perceptions*	*GAP P-E*
Tangibility			
1. The institution has a convenient and accessible location.	6.24	6.92	0.68
2. The parking space is adequate.	6.14	6.2	0.06
3. The institution's employees behave properly.	6	4.06	–1,94
4. The employees have appropriate attire.	5.7	6.02	0.32
5. The institution's employees are well trained.	5.58	3.79	–1.79
6. The institution owns advanced equipment.	5.7	4.2	–1.5
Reliability			
7. The institution program is flexible so that customer needs can be met promptly.	6.78	5.32	–1.46
8. The employees fulfill the required services on time.	6.8	4.5	–2.3
9. The employees show empathy to people's problems.	6.03	5.01	–1.2
10. The employees provide all services required by customers.	5.74	5.8	0.06
Receptivity			
11. The employees of the institution are always willing to help customers.	5.56	4.9	–0.66
12. The employees are always accessible (easy to find) and willing to answer customer questions.	6.02	5.86	–0.16
13. The employees respond quickly and without delay to the customer's requirements.	6.73	4.96	–1.77
Trust			
14. The institution has a good reputation, is reliable.	5.62	5.94	0.32
15. The employees of the institution are always polite, courteous with customers.	6.1	6.26	0.16
16. The employees are competent to solve customer's problems.	5.62	5	–0.62
17. The employees offer trust to the citizens.	5.82	5.06	–0.76
18. The citizens feel safe in the institution (personal and financial security).	6.06	6,5	0.44
Empathy			
19. The employees offer individual attention to each client.	6.14	5.2	–0.94

The results of the study reveal that:

- 13 of the 21 statements present a negative score, which means that citizens' expectations regarding the analyzed indicators are higher than the perception they have on Romanian City Hall services.
- The biggest difference between expectations and perception is unfortunately a negative one represented by the statement on the level of training of employees. Centralized responses revealed that most respondents have a negative perception regarding this issue, the difference between expectations and perception being –1.79.
- The best score is the claim on the location of the institution, which is easily accessible by public transport.
- Overall the citizens have a very bad opinion about employees who provide public services, considering that they do not fulfill the specific needs and do not have the competences needed to quickly resolve their demands.
- A positive score was recorded on the level of safety that citizens feel during their stay in the institution. This is due to numerous guards and video cameras installed.

In conclusion the main issues identified were:

- Long time for waiting in queues;
- Long time for processing an application;
- Poor staff training;
- Lack of appointments system;
- Complicated organizational structure leading to increased time handling the application and increase in bureaucracy level;
- Existence of a hostile environment during waiting;
- A typo in the system of taking orders vouchers due to mistakes made by people choosing to which department to address their demand.

4. PROPOSALS FOR THE IMPROVEMENT OF SERVICES

In order to solve the problems mentioned previously, a series of proposals that act on three main directions was developed:

4.1. Improvements to the taking over demands process

Implementation of an appointment system. This will reduce the waiting time for every citizen. The system should be accessed online by visiting the institution web page, Appointments Section, where the citizens should have the choice of selecting the department where to address the demand by introducing keywords. Subsequently they will receive a serial number, customized according to the department, which will be presented at the counter specified on the receipt, the time and date set.

Introducing a counseling service. As noted previously, one of the problems identified in the analysis of the previous chapter, refers to mistakes that occur in the distribution of order receipts. Once the citizens enter the building institution, they must take an order number on which they will be called subsequently to the counter. This is done by choosing the department where they want to address the request, but most times, they make the wrong choice, reaching the wrong counter. If the application will not be taken over, they have to return to a new order and choose department according to the specifications received from the public

servant. To reduce these errors, the institution should introduce a counseling service, to whom the citizens can address once they enter the building and receive an order number according to the needs they have expressed.

4.2. Improvements to the way in which citizens wait in queues

After taking the order number, citizens are invited to wait on seats located approximately three meters in front of the counter. In this way, it is created a pressure on public officials who will have eye contact with people waiting in queue and the citizens become more impatient to be retrieved in the shortest time possible. A better solution is to create a waiting room, separately to the counters, where citizens will have the possibility of waiting in a less stressful environment. The room should be equipped with screens that show the applications takeover situation and information of general interest to the community. In this way, citizens will be distracted by the attention given to each application taken; distributing their attention to other things which will create the impression that the waiting time is shorter.

4.3. Improvements to the personnel recruitment and selection procedure

The recruitment and selection of civil servants for posts related to Public Relations Service presents certain malfunctions. In order to solve these issues, a proposed solution is appealing to companies specialized in the recruitment and selection of staff.

Another aspect that should not be overlooked is the fact that the selection process should ensure that the candidates fit the position as well as the team structure. In this regard the process should be improved by the introducing performance indicators to be analyzed in the selection phase and by establishing certain psychological criteria to identify those persons that possess personal qualities which make them suitable for working with citizens. In addition, in the selection step a greatly importance should be given to the candidate's involvement in the actions of social nature. The existence of these types of activities demonstrates its openness to social needs and thus the willingness to satisfy them.

Selection methods that can be adopted [6]:

- Work samples. The task should be chosen so as to be representative of the work to be done. It has great validity in assessing the suitability of a person to the post.
- Cognitive tests: differentiate candidates in terms of cognitive skills;
- Situational interviews. These interviews asses the candidates reaction in specific situations with questions like „what would you do in situation X?"

- Personality tests: allow evaluation of features that cannot be obtained by CV or structured interview.

Given that the performance of public institutions depends on the training of civil servants and how they perform their tasks, collaborate and solve problems, some aspects regarding teamwork must considered.

Motivation for a „job well-done" is based on the intrinsic motivation of each individual and his feelings about work. If the civil servant has positive feelings regarding the tasks he fulfills, the work executed will be more effective. In order to achieve this, a proper classification of the civil servant by his personality is required. In this respect it is essential to introduce the Belbin Test which determinates the role each individual has in a team. A management position requires the candidate to possess certain qualities and skills. The Belbin test compiles typology of team members [7]. Used properly, it becomes a tool for dynamic analysis of behavioral typology of team members. Each role describes a tendency to behave, contribute and relate to others in the situation of a common goal. Belbin test application leads to better knowledge of individuals in order to establish the type of activity for which the candidate is most suitable.

Conclusions

The research conducted over the last year shows that through a benchmarking study can be identified solutions to improve the activity of public institutions. Comparison with similar institutions appreciated for the services provided, is a solution to deepen the relation of the public institutions with its citizens. At the same time the development of procedures allows the public institution to develop a quality system and consistently provide high quality services.

The solutions to improve public services also appear from the consultation of the citizens on how qualitative services could be provided and the effective way in which a certain service is provided within an organization.

There is also a need to consider the rules required for a quality service [8]: the service must be a priority for the organization, the provider must be a model to follow, a language specific to the service must be used, the service provided must be measured, to use strong teams, to remove barriers to the provision of the service, to maintain focus on service.

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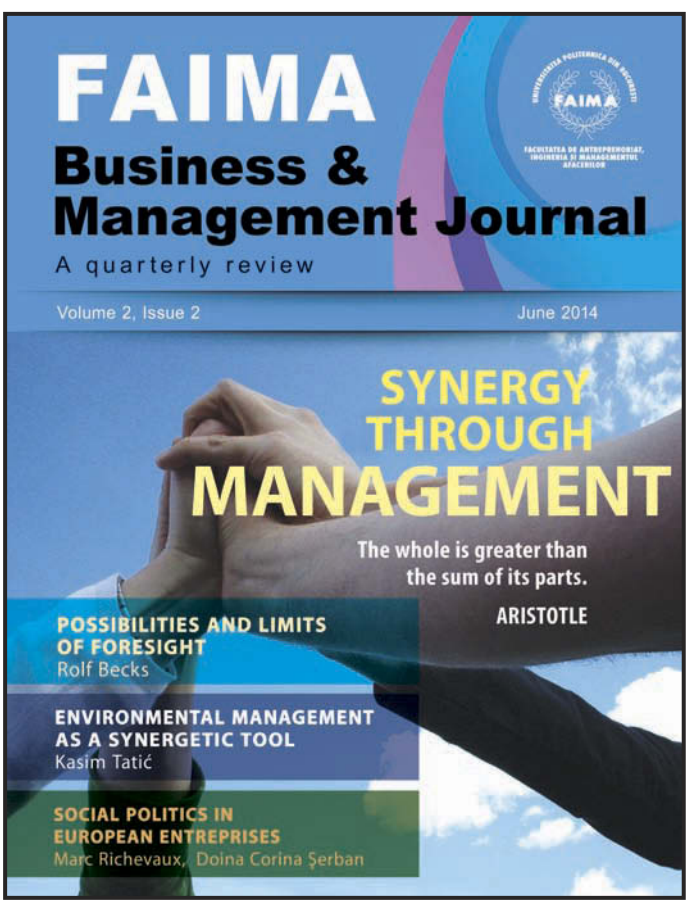
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