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BUILDING FUTURE COMPETENCES

Challenges and Opportunities for Skilled Crafts and Trades in the Knowledge Economy

Vol. 1 | 2

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Vienna, 2020

IMPRINT

Publisher: IAGF – Institute for Applied Research on Skilled Crafts and Trades, Vienna, Austria
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Design: IAGF – Patricia Zethofer

ISBN: 978-3-7089-2014-6
Volume 1 of 2

First Edition, 2020.

Unless otherwise stated, earlier versions of the articles included in this collection have been previously published in the conference proceedings: *Tomé, Eduardo & Kragulj, Florian (Eds.) 2019. Proceedings of the International Conference on Theory and Applications in the Knowledge Economy TAKE 2019. Vienna, Austria. ISBN 978-989-54182-1-3.*

FOREWORD

Vienna, March 2020

In a knowledge-based society, knowledge is the most important resource for a successful development of society, politics and economy.

Especially in crafts and trades, knowledge is passed on over generations in various forms. Besides formally acquired knowledge and skills, non-formal and informally acquired skills play a decisive role.

Against this background, it is a special pleasure for the Institute for Applied Research on Skilled Crafts and Trades, which was founded to promote cooperation between practitioners and science, that so many domestic and foreign scientists publish their scientific contributions on the different forms of the knowledge-based economy in this two-volume collection of articles.

Together with the "TAKE conference", which was successfully held in July 2019, the publication is intended to contribute to a stronger establishment of the scientific discussion regarding small and medium-sized enterprises and their handling of knowledge and learning. In particular, the focus is to be placed on the value of crafts in the knowledge-based economy of today and tomorrow.

Paulus Stuller
President of the Institute for Applied Research on Skilled Crafts and Trades (IAFG)

Reinhard Kainz
Managing Director of the Austrian Economic Chamber's Crafts and Trades Division

FOREWORD

Vienna, March 2020

As robots, automation and artificial intelligence systems perform more tasks and lead to a massive disruption of jobs, what role will skilled crafts and trades play in a shifting knowledge economy?

As of 2020, more than 35% of all Austrian businesses engage in this economic sector and represent 22,5% of the national workforce. As a result, it seems necessary to investigate how technological and social advances, that we already face, will affect the economic sector, and how its businesses will shape the future economy.

Following this intention, last year's International Conference on Theory and Applications in the Knowledge Economy (TAKE) targeted pressing questions that are relevant for both academics and practitioners. The conference was hosted by the Institute for Applied Research on Skilled Crafts and Trades in academic partnership with our division at the WU Vienna University of Economic and Business. It was not only the largest TAKE conference in terms of submissions and participants, but it also clearly delivered on its mission to investigate the knowledge economy, both from a scientific as well as practitioners' perspective. The exceptional collaboration of strong partners from academia and business allowed for bringing together a Viennese mélange of the international scientific community engaging in knowledge-based management and related fields of research as well as entrepreneurs and industry partners that are represented by Austria's largest trade association.

This two-volume collection of articles is a result of our effort to straightly disseminate research findings to a broad audience of practitioners and policy makers alike. Tackling relevant questions of today's and tomorrow's knowledge economy, we compiled selected conference articles of distinguished scholars. While consistently adopting a knowledge and learning perspective, their works cover on a variety of topics, such as microeconomic issues, new ways of professional training, development of soft skills, competition on highly dynamic markets, the effects of organizational culture on knowledge, leadership, the impact of the digital transformation, trends in the green economy, innovation in strategic collaborations, recent trends on the labour market, or knowledge management practices. We hope that you will not only find these articles interesting to read, but that they have a lasting effect on the practice of enterprises engaged in skilled crafts and trades.

Alexander Kaiser & Florian Kragulj
Knowledge-based Management Division
WU Vienna University of Economics and Business

INTERNATIONAL CONFERENCE ON THEORY AND APPLICATIONS IN THE KNOWLEDGE ECONOMY (TAKE) 2019

Between 3 and 5 July 2019, the Institute for Applied Research on Skilled Crafts and Trades (IAGF), in cooperation with the Knowledge-based Management Division at the WU Vienna University of Economics and Business hosted the fourth International Conference on Theory and Applications in the Knowledge Economy (TAKE). The TAKE conference can be seen as one of the top three knowledge management conferences in Europe. For the first time, the conference was organized in partnership between academia and business, which emphasizes the intention of the conference community to deliver on pressing issues relevant for practice. Under the general theme "Building Future Competences – Theory Meets Practice", this year's edition reached a new peak. With more than 100 participants from 27 countries and 16 conference tracks, it was the largest TAKE conference to date.

This edition of the TAKE conference paid particular attention to small and medium-sized enterprises. These companies do not only play a crucial role in today's economy – more than 95% of all enterprises worldwide are small or medium-sized – but they also face specific knowledge related challenges. As a consequence, the research interest in them is constantly rising. This particularly holds true for enterprises that engage in skilled crafts and trades, as they even more rely on tacit and non-codified knowledge which is mainly passed on in informal ways.

Besides almost 90 paper presentations, the three-day conference programme included six keynote presentations on knowledge management in small and medium-sized enterprises (Susanne Durst, University of Skövde, Sweden), digitisation (Gaby Neumann, Technical University of Applied Sciences Wildau, Germany), knowledge management in the industry 4.0 (Wilfried Sihn, Vienna University of Technology & Fraunhofer, Austria), theories of the knowledge economy (Johann Kinghorn, Stellenbosch University, South Africa), and a knowledge perspective on Leonardo da Vinci's work (Peter Sharp, Regent's University London, United Kingdom). Alexander Kaiser (WU Vienna University of Economics and Business, Austria) and Andreas Schnider (University College of Teacher Education Vienna, Austria) delivered the opening keynote presentation on "The Net of Competences: An Innovative Framework for Prior Learning Assessment", which dealt with the question of how to measure formal and informal competences.

By organizing the TAKE conference 2019, we intended to establish a lasting environment for the scientific discourse on small and medium-sized enterprises and their dealing with knowledge and learning, and particularly focus on the value of (traditional) craftsmanship in the knowledge economy of today and tomorrow.

Unless otherwise stated, earlier versions of the articles included in this collection have been previously published in the conference proceedings: *Tomé, Eduardo & Kragulj, Florian (Eds.) 2019. Proceedings of the International Conference on Theory and Applications in the Knowledge Economy TAKE 2019. Vienna, Austria. ISBN 978-989-54182-1-3.*

Eduardo Tomé, Florian Kragulj & Heidrun Bichler-Ripfel
Conference Chairs TAKE 2019

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THE ROLE OF LEADERSHIP STYLES TOWARDS THE BCS IMPLEMENTATION

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«This paper is financed by National Funds of the FCT – Portuguese Foundation for Science and Technology within the project «UID/ECO/03182/2019»

An earlier version of this article has been published as a conference paper: Oliveira, C. (2018) 'The Role of Leadership Styles Towards the BCS Implementation', in Tomé, E., Neumann, G., Majewska, J. and Truskolaski, S. (eds.) Proceedings of the International Conference on Theory and Applications in the Knowledge Economy TAKE 2018. Poznan, Poland. pp. 291–302.

RESULTS AND CONTRIBUTIONS OF THE ARTICLE

Research has identified differences of Leadership style in organisations with and without the Balanced Scorecard (BSC). Furthermore this study evidences both, the leadership style of organisations with BSC, such as the role of leaders in gathering the results of strategic indicators and communicating organisational's strategy.

CONCEPTUAL PURPOSE OF THE PAPER

Bearing in mind, the importance of intangible assets, Leadership style is crucial as it promotes and encourages the way collaborators behave, decide and guide organisational success. Consequently, the differences of Leadership style in organisations with and without BSC were identified, in order to guide managers towards the BSC implementation.

CONCEPTUAL GAP

The literature considers the BSC as one of the most acknowledged management tools, by defining organisational strategy throughout all the organisational processes. Following this path, it is relevant for both academics and managers to identify the Leadership style of managers in organisations with and without BSC, as the profile has impact on organisational performance.

EMPIRICAL PURPOSE OF THE PAPER

This investigation brings new light into this management field, so that organisations which intend to implement the BSC are aware about the differences in Leadership styles.

EMPIRICAL GAP

Based on the gap in the literature, the main objective of this research is to identify the Leadership profile of the largest Portuguese export organisations.

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RELEVANCE OF THE CHOSEN THEME

Drawing on accounting literature the adoption of the management tool BSC is still in the process of growth, further studies need to be conducted to understand the Leadership differences in other types of organisations or other national cultural contexts.

IMPACT OF THE AREA

The rate of successful BSC implementation could be improved as Leadership has a crucial role towards communication and performance.

METHODOLOGY

This quantitative study, based on questionnaires seeks to identify differences between the Leadership style.

Keywords: Balanced Scorecard, Organisational Culture, Leadership Style

KEY FINDING(S)

- This research identifies Leadership styles in organisations with and without the BSC implemented.
- The Leadership Style in export organisations that have the BSC implemented is different to the Leadership style of export organisations that do not have the BSC implemented.
- Organisations that have the BSC implemented characterize their leaders as entrepreneurs, while organisations that do not have the BSC implemented classify their leaders as executives.
- These findings are relevant to understand better the Leadership differences of organisation that have the BSC implemented from the ones that do not have BSC implemented.
- Leadership impacts on organisational performance, so the profile of leader has a determinant role.

IMPLICATION(S) FOR THE PRACTICE OF SMEs

- Leadership profile is a way to achieve cultural changes, this research has been able to bring innovative knowledge, highlighting its relevance for both the academia and the organisations. It is recognized that Leadership style has an impact on the implementation and monitoring of management tools as well as on the conduct of organisational performance.
- Organisational culture is mostly encouraged by leaders, since the definition, management, and sometimes even change of culture is one of the most decisive functions of Leadership.
- The differences in Leadership style in organisations that have the BSC implemented from the ones that do not have BSC should be considered when implementing Management tools and monitoring organisational performance.
- Literature states that on hand of the BSC organisations reach higher levels of performance.
- In case of a BSC implementation, managers might guide themselves on these cultural characteristics in order to improve their behaviors. All in all, based on this research, both academics and managers, gain a better understanding of the cultural aspects.

1 INTRODUCTION

Organisational management faces a scenario of constant turbulence and change, which provokes a more competitive and dynamic attitude on the part of managers. Sustained in this dynamism, organisational culture is recognized as a complex phenomenon with relevant influence in the daily life of organisations, especially in turbulent and competitive environments (Barney, 1986). To cope with these changes, organisational culture, according to Barney (1986), consists in a complex set of values, beliefs, assumptions and symbols that define how the organisation monitors its business (Ouchi, 1980; Smircich, 1983). In this sense, it is very important that organisations adapt management strategies to deal with external pressures and constant changes in the environment (Smircich, 1983).

Bearing in mind the relevance of leader's role that has been increasingly emphasized, because their active and crucial role towards the organisation's success as referred by Cameron & Quinn (2005) and Shim, Lusch & O' Brien (2002) managers seek to anticipate problems, their causes and possible solutions (Cameron & Quinn, 1999). Managers feel the need to have management indicators, which do not focus only on financial indicators, as they need a broader and more effective organisational view. The indicators should be interlinked, integrated and aligned to the different perspectives, in order to characterize the strategy and to convey strategic information (Kaplan & Norton, 1993, 1996a, 2001a; Mooraj et al., 1999; Wong-On-Wing, Guo, Li & Yang, 2007).

Beyond the relevance of management indicators, several studies also point out that employee motivation and the efficiency of group work, plays a very important role in organisational values (Shahzad, 2012). Acknowledging this importance Osório (2009) investigated the role of organisational culture in human resources management practices, considering that organisational culture shapes human resources and consequently is reflected in organisational performance. Thus, this investigation aims to understand the role of Leadership styles in organisations without the BSC and with the BSC, such as the role of Leadership styles towards BSC implementation, based on the following research question:

To what extent does the Leadership profile differ in organisations with without the BSC?

Bearing this research question in mind, the following specific objective was defined: Confirm if there are different characteristics in the type of Leadership of the largest exporters without the BSC and the BSC.

Drawing on the relevance of this research topic for both, academics and managers, a quantitative research based on the well-recognized organisational matrix OCAI was performed, to identify Leadership styles.

2 ORGANISATIONAL CULTURE AND LEADER STYLE

Organisational culture resides primarily in Sociology, but it is recognized that the particularity of each organisation has high impact in organisational performance management (Gallagher, Brown & Brown, 2008). Rohit, Fredericke Webster (1989) define organisational culture as the pattern of shared values and beliefs that enables one to understand how the organisation guides its business. Consequently, organisational culture impacts on how people define their personal and professional goals (Lok & Crawford, 2004). In this sense, the way in which employees think consciously and unconsciously, the way they behave, react and understand reality has a reflection on organisational culture (Schein, 1996; Lok & Crawford, 2004).

Oganizational culture has many extensions, as it is influenced by the economic and social environment. Harris and Ogbonna (2002) consider it as one of the most fascinating and evasive topics for management researchers.

Organisational change has several reasons, but especially, may occur during complex processes, such as internationalization processes or shareholders modification (Barreto et al., 2013). In this sense, the way individuals plan their tasks, work towards their goals, face and solve obstacles reflects and characterizes the organisational culture (Heizmann & Lavarda, 2011).

Several researchers and managers have emphasized the importance of organisational culture, there is still no clear definition of the concept as referred by O'Reilly and Chatman (1996) and DiMaggio (1997), consequently meanings are given in accordance to a given group of a specific time-span (Pettigrew, 1979). In a general view, organisational culture consists of collective thinking, which distinguishes members of different groups (Hofstede, 1980), corresponds to ways of dealing effectively with experience and is evidenced through employee behaviors (Brown, 1998). In a global view, Tichy (1982) points out that organisational culture interconnects a given organisation.

Quinn and Rohrbaugh (1981) investigate the differences of organisational effectiveness models, having defined four cultural typologies, namely Mentor, Entrepreneurial, Market and Coordinator.

The **Mentor leadership style** characterizes leaders who tend to take a participatory stance, offering interaction, trust and loyalty. Leader is recognized for the ability to manage teams, for interpersonal relationships, as well as for the development of colleagues. In this type of organisation the leader corresponds to a participatory mentor and facilitator (Whetten & Cameron, 2005) or an organisational figure style that resembles the paternal figure (Quinn, 1984). Thus, in a summary form, the most effective leaders assume parental figures, being mentors and dedicated to building teams (Cameron & Quinn, 1999). Managers of organisations characterized by the Mentor Culture type usually have a prudent, discreet way of managing, with great care being given to ensure training and integration, so that their parental character may even stand out. Managers of this type of organisation are usually seen as mentors and provide a pleasant work environment, based on knowledge sharing, as if it were a family.

The **Entrepreneurial leadership style** is mainly characterized by change and flexibility, motivation factors include growth, stimulation, diversification and creativity in the task. Cameron and Quinn (1999) identify the Entrepreneurial type as featuring leaders who are less compliant of rules, whereas Coordinator-type leaders emphasize and value the rules. There is also a difference between the Mentor type leaders, who support and have a close-knit way of managing, and the market culture type leaders, who assume an imperative and demanding position. They are considered to be competitive, consistent and demanding; they are even seen as executives and technicians, maintaining their focus on results (Cameron, 1985; Cameron & Quinn, 1999).

The **Coordinator leadership style** is related to a profile sustained on leading, competitive, severe and demanding leaders, focused on productivity. In turn, the leader characterized by the Market Culture type, is one that is capable of managing competitiveness, fostering employees' energy and managing the delivery of services. In this context, the leader of this type of culture promotes decision and production (Quinn, 1984). In organisations characterized as of market culture, the most effective leaders are characterized by high dedication to work with a focus on results, and a high ability to negotiate and motivate (Cameron & Quinn, 1999).

Finally, the **Executive leadership type** highlights stability posts, reflects values and norms associated with bureaucracy. The Coordinator Leadership style corresponds to a purely formal and structured environment, and good leaders are valued for their ability to control, coordinate, organize, and provide guidance (Cameron & Quinn, 1999).

Organisational values tend towards a particular cultural style that leads to the competitive behavior of an organisation. Based on the model of Quinn and Rohrbaugh relationships between Leadership and culture are understandable and able to be performed in organisations. Leadership traditionally consists in the identification of personal qualities and characteristics that allow the distinction of leaders from non-leaders. The leader profile is distinctive as it reveals characteristics such as integrity, self-confidence and honesty (Barreto et al., 2013).

However, Leadership is a highly complex phenomenon that encompasses a link between the leader and the social and organisational systems in which they operate. In this sense, Trice and Beyer (1991) have already investigated the different roles played by leaders in a change of organisational culture, having ascertained that the main challenges of the leader lie in integrating and strengthening the organisational culture. Leaders effectively assume a crucial role in organisational culture, given that the way they react either to problems or to reward situations reflects organisational culture.

Culture aggregates organisational phenomena related to contemporary management, focused on competitiveness between companies and the emergence of innovative processes, such as organisational change. Given the need for change, the degree of job satisfaction, namely the positive emotional state, is relevant as referred by Suma and Lesha (2013) although it is recognized that one of the most relevant factors for employee satisfaction is characterized by financial compensation (Suma & Lesha, 2013). In situations that require organisational changes, which imply an adaptation of the organisational culture, the way in which individuals plan their tasks, face and solve obstacles reflects and characterizes the organisational culture (Heizmann & Lavarda, 2011). Thus, based on how they plan and execute, organisations can be characterized based on cultural traits or dimensions (Cameron & Quinn, 1999). Despite the differentiating characteristics among organisations, managers are forced to be as efficient as possible in order to avoid mistakes and their consequences (Cameron & Quinn, 1999) because of intrinsic competition and the macroeconomic environment. The relevance of the role of leaders is, nowadays, crucial for organisational success (Cameron & Quinn, 2005; Shim et al., 2002).

Keeping in mind that Leadership has an impact on job satisfaction, it also has its consequences in organisational effectiveness and economic success (Finkelstein, 1990). Denison, Hooijberge e Quinn (1995), point out that more effective leaders develop capacities to succeed in each of the quadrants of the Cameron e Freeman matrix (1991). Each Leadership style requires a condition of minimum conflict and maximum effectiveness, so that a congruent culture reflects, in turn, the Leadership style of the organisation itself. Organisations develop a dominant culture over time, which is adapted and shaped according to environmental challenges and changes (Sathe, 1983) also individuals belonging to the organisations face threats, uncertainties that sometimes lead them to shape their behavior (Daft & Weick, 1984).

Considering the importance of the Leadership role referred to by Cameron and Quinn (1999) and Whetten and Cameron (2005) based on previous studies, these authors have identified common characteristics of Leadership competencies that characterize management effectiveness. In this sense, Cameron and Quinn (1999) present the most relevant characteristics related to the four types of organisational culture.

3 BALANCED SCORECARD

Managers are pushed to define very clear and effectively their goal, like what's expected, why, what's going to be measured, based on what and how (Drucker, 1954). Bering this need in mind, the literature recognizes, since years, that the orientation only in financial indicators, and a short term view, compromises long term options (Porter, 1992). In order to avoid these limitations and facing the need to include financial and non-financial

indicators, on the medium and long term analysis, the BSC was generated and implemented as an innovative management tool (Kaplan & Norton, 1992). It's one of the most iconic management tools to monitor and balance organisational performance indicators, bearing in mind, that Kaplan and Norton (1992; 1996) referred that organisational management can not focus only on financial indicators, as the financial side, on itself, doesn't generate value. BSC is a multidimensional management tool that aggregates four fundamental organisational management perspectives, such as: Financial Perspective, Internal Perspective, Customer Perspective and Innovation and Learning Perspective (later denominated as Learning and Growth).

BSC is distinct from traditional Management Control tools, as beside of aiming to be a performance measurement tool, it interlinks the actions in accordance to the defined strategy. Besides balancing strategic indicators of different perspectives to each other, BSC interconnects indicators in order to reach the established goals (Chavan, 2009). In this sense, Hu, Leopold-Wildburger and Strohhecker (2017) appeal managers to go beyond traditional reports, namely the Balance Sheet and Profit and Loss Statements, to enable the focus on indicators that are directly related to strategy. Based on this interlinkage of indicators to organisational strategy the cause-effect relationships are easily followed. In this way, it is possible to analyze the medium-term objectives (quarter) and their relationship with performance development (Hu, Leopold-Wildburger & Strohhecker, 2017).

The financial perspective consists in financial measures, such as incomes and productivity, with reflection of economic and financial decision that have occurred in the past (Kaplan & Norton, 1996). The financial perspective reflects the financial backing of the organization, knowing that the primary objective of organizations is financial solvency, such as the expansion of the organization. In case that funding are requested organisations have to demonstrate good financial performance, in order to get support by financial institutions. The main stakeholders of this perspective are considered to be shareholders, as they aim for the highest possible return. Thus, this perspective is considered a pillar, as all cause-effect relationships have a direct or indirect impact on this perspective (Kaplan & Norton, 1996).

It is extremely important to define the focus of the market segment so that the organsation can adapt to the specific requirements. Therefore, a detailed market segmentation is afforded to proceed in accordance to required product range. Organizations should try to go beyond customer's expectations by distinguishing themselves from the competition (Oliveira, 2018).

Going beyond the Financial Perspective, the Customer Perspective features the market segmentation, such as the value creation, in order to satisfy and build customer's loyalty and to obtain better financial returns (García-Valderrama, Mulero-Mendigorri & Revuelta-Bordoy, 2008). Referring to the Internal Perspective that focuses on identification and analysis of critical processes of value creation, related to productivity and efficiency, both in short and long term (Kaplan & Norton, 1992).

Concerning the internal perspective, this perspective is mainly considered by operational managers as they pay special attention to the critical organizational processes, in order to correspond to the required customer's need.

The most critical processes, usually, are related to the innovation process, the operational process, as well as the after-sales processes, as these are the base for customer loyalty. In addition, to meet customer's requirements, managers seek for solutions to meet customer needs, namely dedicated support services, efficient complaint handling, timely and market-driven (Kaplan & Norton, 1996).

Lastly, the Learning and Growth Perspective characterizes indicators related to employees' performance, development of hard and soft skills, such as technological devices and process automatization to enable organisation's growth.

The Learning and Growth Perspective is least emphasized by organizations, although it holds the key to sustainability, because of the focus on developing competences along all Perspectives. Therefore this Perspective is seen as leverage of other Perspectives, as it features also the other three Perspectives, based on the cause and effect interconnections. Bering this interconnection in mind, it is crucial to invest, so that in the future infrastructures, skills and resources correspond to market demands. The market orientation needs to be supported by employee training and based on updated information systems (Kaplan & Norton, 1996).

In this sense, organizations promote organizational culture that fosters in employees the willingness to participate and feel involved, and for this they must have the resources necessary to achieve their goals (Fijałkowska & Oliveira, 2018).

Qualified employees are crucial to raise the upper three Perspectives of the BSC. It is notorious, that the relevance of intellectual capital is growing and organisations are investing even more in information and knowledge systems (Oliveira, 2018).

As mentioned, the primary goal of the BSC, composed by its four perspectives, until mid-90's, had the aim to measure organisational performance. Afterwards, based on the four perspectives, it covered also the growth forecast, research and product development, as well as human resource integration (Kaplan & Norton, 1996). These four perspectives are generally composed by 18 to 25 indicators that enable the comparison, between the defined targets and the actual status, in an individual an aggregated analysis (Kaplan & Norton, 1996, 2000, 2001a, 2001b).

4 METHODOLOGY

Methodology consists in detailing all the steps to achieve a specific research objective, described as an integrated set of norms and procedures that guide scientific research (Lessard-Hébert, Goyette & Boutin, 2010). Thus, the methodology clarifies the procedures that the researcher defines in order to arrive at the reality of the investigation, that is, the verification of its initial questions (Guba & Lincoln, 1994). The epistemological positioning that moves this research resides in the positivist paradigm because it investigates an apprehensible reality (ontology) that in this investigation corresponds to the identification of different leader styles in organisations with and without the BSC. Therefore, the methods of this research correspond to quantitative methods, which

aim to test and prove the theory, explicitly, based on a set of investigation hypotheses. Due to this innovative theme, a quantitative, hypothetical-deductive study of positivist positioning was developed.

As the literature mentions that the BSC is a management tool that is implemented mainly in larger organisations, this study was developed on hand of the 250 largest exporters in Portugal. After the definition of the sample, the questionnaire was developed, supported by the literature and based on the information collected through interviews with four senior managers, in order to obtain feedback on the questions posed, since they have more experience and knowledge of their organisations (Macmillan, Farh & Chen, 1993).

5 DATA ANALYSIS

All questionnaires and their variables were coded carefully and organized into the database to allow statistical treatment in IBM® SPSS®. For the preparation of the statistical analysis a data test was performed through the Normal Distribution Confirmation. Furthermore, the statistical verification based on the confirmation of the normality of the distribution was performed. For this purpose the Kolmogorov-Smirnov test was selected, with the intention to study if the sample can be classified as being part of normal population. On this research most of the variables under analysis do not follow a normal distribution.

After having the initial statistical analysis performed, the following test were performed in order to get to answers to the research question, namely the identification of Leadership supported by Cameron (1985). In this sense all the four questions of the questionnaire related to Leadership syles were testes, knowing that each question corresponds to a hypothesis and that each questions characterizes also a different Leadership style out of the four already explained, namely Mentor, Entrepreneurial, Coordinator and Market Focused.

The first statistical analysis is related to the **Mentor** Leadership style, based on the results obtained in the Mann-Whitney U test (p-value = 0.518> 0.05), it is concluded that, although there are differences between the mentor leader in organisations with and without the BSC, these differences are not statistically significant.

Furthermore, in order to confirm the **Entrepreneurial** Leadership style based on the above mentioned hypothesis, the Mann-Whitney test was performed for independent samples. Considering the results obtained in the Mann-Whitney U test (p-value = 0.023 <0.05), there are differences between the Entrepreneurial leader style in the organisations with and without the BSC and these differences are statistically significant. Organisations without the BSC characterize their leaders as Entrepreneurs and stress the importance of entrepreneurship and innovation, which makes them more likely to take risks.

Regarding the **Coordinator** Leadership style, the result obtained in the Mann-Whitney U test (p-value = 0.994> 0.05), showed that there are differences in organisations with and without the BSC and that organisations with BSC characterizes their Leaders as Coordinators. Their leaders are considered as focused on production and the decisions related to production.

Considering the **Executive** Leadership style, the results obtained in the Mann-Whitney U test (p-value = 0.070> 0.05) highlighted differences which are not statistically significant, even thought, in case that a level of significance at 10% were considered, differences would be confirmed.

6 DISCUSSION AND CONCLUSIONS

Throughout this investigation differences were identified on the Leadership style in organisations with and without BSC, as the profile of the leader in organisations with and without the BSC is significantly different, mainly for entrepreneurial profiles. These findings are relevant to, on one side understand better the Leadership differences of organisations with and without the BSC implementations, as knowing that Leadership impacts on organisational performance, so the profile of leader has a determinant role. Literature states that on hand of the BSC organisations reach higher levels of performance, so on the other side, managers might guide themselves on these cultural characteristics in order to improve their behaviors, in order to reach a more challenging position in the market or prepare themselves for a BSC implementation. All in all, based on this research, both academics and managers, gain a better understanding of the cultural aspects, as emphasized by Schein (2004) and the style of Leadership. Organisations with the BSC consider their leader as an entrepreneur, which may be related, in an intrinsic way, to the Market cultural profile, which characterizes the organisations with the BSC.

On the other hand, organisations without BSC have been characterized by Entrepreneurial Leadership style Schein (2004) states that a deeper understanding of cultural issues related to groups and organisations is essential to understand groups and their priority issues for both leaders and their Leadership. This understanding is relevant because organisational culture is mostly encouraged by leaders, since the creation, management, and sometimes even change of culture is one of the most decisive functions of Leadership.

It is in this sense that organisations with BSC characterize their leaders as entrepreneurs (with a statistical significance of 5%), while organisations without BSC classify their leaders as executives (with a significance level of 10%).

This research thus fulfills its specific objectives responding to the research question insofar as it identifies Leadership styles in organisations with and without the BSC. Considering that the Leadership profile is a way to achieve cultural changes, this research has been able to bring innovative knowledge, highlighting its relevance for both the academia and the organisations. It is recognized that Leadership style has an impact on the implementation and monitoring of management tools as well as on the conduct of organisational performance.

The differences in Leadership style in organisations with and without the BSC should be considered when implementing Management tools and monitoring organisational performance.

7 FUTURE RESEARCH AVENUES

This research confirmed that the Leadership style in organisations with and without the BSC in Portugal is different, such as that Leadership style has an important role towards the BSC, so that it will be pertinent to carry out the same study in other geographies and to compare the results. In addition, we consider that this quantitative

study can be solidified through the triangulation of data, including interviews in real work context, to determine the managers' perception about the different styles of Leadership. Furthermore it might be of interest to assess the employees' perception of the leaders' cultural profile.

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WHAT THE WEST CAN LEARN FROM CENTRAL & EASTERN EUROPE: SOFT SKILLS SPILLOVERS AND REVERSE KNOWLEDGE TRANSFER

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An earlier version of this article has been published as a conference paper: Hrdličková, J., Ferenčíková, S. and Bardy, R. (2019) 'What the West Can Learn From Central & Eastern Europe: Soft Skills Spillovers and Reverse Knowledge Transfer', in Tomé, E. and Kragulj, F. (eds.) Proceedings of the International Conference on Theory and Applications in the Knowledge Economy TAKE 2019. Vienna, Austria. pp. 802–814.

ABSTRACT

The transition economies from the former Soviet sphere, when opening up to the West, required the transfer of knowledge from free market economies in the developed countries. In time, many of these former Soviet countries or satellite countries not only learned the practices of Western economies, but also the opportunities that aligning with the West could bring them. But, as knowledge does not go in one direction but flows in multiple directions, there have been quite a few occasions where reverse transfer of knowledge took place. The paper presents case reports on a Western based MNC that has a strong presence in the Visegrád Four (V4), a cultural and political alliance of the Czech Republic, Hungary, Poland, and the Slovak Republic. It exhibits various forms of knowledge transfer from the subsidiaries back to the parent organization and it also demonstrates how the pattern that underlies the cases fits into the theoretical concepts of knowledge management.

Keywords: Soft Skills Spillover, Reverse Knowledge Transfer, Central & Eastern Europe

KEY FINDING(S)

In our article, three cases of reverse knowledge transfer within the regional TESCO organization were analyzed and described in detail. Lessons learned from these three cases are following:

- Even the smallest daughter subsidiary is capable of creation of the new knowledge transferrable to the other units in the region, and also outside of the region.
- Thorough listening to the needs of customers and local community of producers is the key element to knowledge creation.
- New knowledge creation and its reverse transfer to the regional headquarter would not be possible without the support from the regional management aimed the engagement and creativity of the employees of the Slovak unit and without the managerial support of its dissemination to the other daughter companies in the region.

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- Three analyzed cases served as an example of reverse knowledge transfer within the whole multinational TESCO operations and as the cases for the motivation and appreciation of local units who can address some needs of the customers and community much better than the distant world headquarters.
- Thus, as stated in the title of the article, the Slovak subsidiary served as a cradle of new knowledge for Western British headquarters.

IMPLICATION(S) FOR THE PRACTICE OF SMEs

Reverse knowledge transfer is usually discussed as the process of the transmission of new information, practices or data between the local subsidiaries and the big, central, multinational headquarters. However, this process is much simpler in the case of SMEs – in the last decades we witnessed the growing internationalization of small- and medium-sized enterprises. Many foreign direct investors are coming from Western Europe to Central and Eastern Europe and start and develop their operations here. In their case the reverse knowledge transfer is much easier due to following typical reasons:

- Smaller geographical distance
- Smaller cultural and historical distance
- Less formal company structures and faster approval in case of the application in the central office or daughter companies
- Technological changes and easiness of knowledge transfer in digital era
- Lower costs and higher speed of application of the new knowledge.

INTRODUCTION

With the final fall of the former Soviet Union on Christmas day in 1991, new economies opened throughout the world, but most particularly for countries in Central and Eastern Europe (CEE). Upon the opening of these countries, many multi-national corporations (MNCs) saw opportunities in these new economies and very quickly moved or prepared to move new operations there. However, the move from a planned economy to a market-based economy for many of these countries, as well as the MNCs operating there had not always been easy – 40 to 70 years of Soviet dominance, both economically and culturally did not break down easily. In the transition economies from the former Soviet sphere, former state-owned enterprises became privatized and learned about the practices of a market economy. They communicated this vision and those practices to the larger communities which also took advantage of the *opportunities that aligning with the West could bring them.* This has been

particularly the case with the Visegrád Four (V4; the Czech Republic, Hungary, Poland and the Slovak Republic). One feature these countries share is that they had a substantial industrial base, and even though these industries were only scarcely diversified and were not able to sustain themselves when confronted with the combined loss of markets and the opening to the international law of value (see, e.g., Smith, 1996), this characteristic provided one prerequisite of knowledge transfer, which is absorption capacity (Szanyi, 2017). With absorption capacity existing on both ends, i.e., in the provider and the receiver of knowledge, their roles can easily switch. The cases reported herein are good examples of this. However, there are more preconditions. One other is identification and assessment of capabilities and resources, a concept of the organizational behavior literature (for an overview to this regard see Gold, Malhotra and Segars, 2001). Our paper will first examine the conditions and requirements in knowledge management/transfer and then set forth our three cases.

KNOWLEDGE TRANSFER: A MULTI-FACETED ISSUE

Knowledge transfer is the sharing or distribution of knowledge from one (part of) an organization to another, with the hope that this transfer of knowledge will provide the desired results and that the new knowledge becomes embedded within the organization's fabric (Lucas, 2006). In an international context, the academic literature, historically, has focused on knowledge transfers from parent companies to subsidiaries, and generally very little on reverse knowledge transfer from the subsidiaries to the parent organization (Dunning, 2001; Rugman, 2006; Vahlne & Johanson, 2014). But in our highly competitive global market, competitive advantage depends on the transfer of knowledge at all levels, and in all directions, in the organization. In addition, it is imperative that this knowledge has the potential spill-over effect of increasing the soft skills of the companies' workforce, which subsequently will increase the competitive advantage of the company. This applies to a company's internationalization efforts (Dobosz, 2006) as well as to the efforts of a transition economy to gain a level at par with developed economies: The speed of converting to a market system depends on how a transition economy manages to educate the workforce and to build entrepreneurial spirit (Maksimov, Wang & Luo, 2017). While the V4 are members of the EU and are not transition economies any more, and many multinational corporations have moved their plants and operations to these nations, the knowledge base of these countries, for some time, had still be considered less than the advanced economies of Western Europe and the U.S. (Petrakos, 2009). However, not only is the knowledge base building up, knowledge from these countries is also – in a reverse way – transferred up one level, i.e. to their counterparts from Western Europe and the U.S. We might include Japan and South Korea as well, since, e.g., Kia Motors and Samsung are also present in the V4.

Reverse knowledge transfer has mainly been studied between foreign subsidiaries and their (Western) headquarters or other affiliated companies. The literature on such bottom-up transfer is still limited (Ambos, Ambos & Schlegelmilch, 2006; Criscuolo, 2009; Hakanson & Nobel, 2001; J. Li, Strange, Ning & Sutherland, 2016), in spite of its growing importance to the knowledge generation of multinational corporations and its contribution to global competitive advantage (Frost & Zhou, 2005; Makela, Bjorkman & Ehrnrooth, 2009; Tseng, 2015). One other large stimulus for business-knowledge-building in transition economies are supplier-buyer-relations since the partners in this type of network not only share common interest but also common tools and business processes. And reverse transfer of knowledge certainly happens here, too.

We will examine both facets, but, first, a brief account of the characteristics will be given that embrace both areas of knowledge transfer.

THE ORGANIZATIONAL-LEARNING PROCESS

For transfers of knowledge, theory presumes that the essential prerequisites are absorptive capacity, transferability and possibility of integration (Cohen & Levinthal, 1990). While transferability is a feature related to the type of knowledge that is exchanged, absorptive capacity and integration are connected to people and organizations. Absorptive capacity is a measure of prior knowledge, since it is just impossible to tap into the knowledge required in a specific situation without a minimal stock of prior knowledge (Cohen & Levinthal, 1990; Zahra & George, 2002). Absorption is not cost-free: its pre-condition is to build a capacity to learn and to imitate. From there, knowledge transfer may be viewed as a type of network learning that develops along several stages: "Identification", "experimentation", "reflection", "discrimination", "unlearning" and "communicating" (Lyles & Dhanaraj, 2004). This combines the process models of learning (e.g., Argyris & Schon, 1974; Nonaka, 1994) with the structural models of learning (Badaracco, 1991), and while expounding those models lies beyond the scope of this paper, the authors wish to demonstrate how they are reflected in practice. For that, the six steps are exhibited through the example of an order-processing relation which the parties to the process wish to change. This example comes close to the three cases we present below.

- **Identification:** The partners will easily determine that adding new features to their systems of e.g. replenishment planning, of placing orders and of goods receiving would produce improvements.

- **Experimentation:** The upstream partner as well as the downstream partners in the relation will mostly start with 'guided experiments', allowing a small team of the knowledge provider to instruct some of their employees on how to introduce additional procedures or modified practices. In order to avoid failure through omission or understating the complexities, unsatisfactory outcomes in the experiment will be meticulously screened by all parties, and the employees will feel that the benefits of the experimentation exceeds the cost and time they had to devote to the issue.

- **Reflection:** Past behavior and performance will be unambiguously introspected in the light of the new methods that are being tested. Systematic assessments will be taken of how the new methods would improve the issuance of e.g. purchase orders, commissioning and order picking, and this will open a series of dialogues with all parties to be involved.

- **Discrimination:** From what was learned on the base of experimentation and reflection, directions to go will be identified: E.g., a collaborative replenishment planning alternative may be preferred by one of the partners while another may choose vendor management inventory for a specific range of products.

- **Unlearning:** In order to achieve the expected improvements fast and smoothly, the partners in the network will reframe their past programs to fit with the changing conditions, and the employees will be motivated to "discard

the old knowledge", thus making way for the new responses to the issues which had not had optimal solutions in the past. The employees will regard organizational effort as a distinct reward for their input into the projects.

- **Communicating:** The executives of the partnering organizations will be eager to translate the outcome of the projects within their domains and to develop a shared understanding of the basic concepts. It must become common understanding that sharing process-knowledge does not mean that one party will receive any undue favors or that competition will be edged out. The message will be that process improvements increase the competitive advantage for all members of the projects.

With this background of how theory and practice concur in the field of knowledge transfer we will now proceed to review the two major settings which are of interest to our study.

KNOWLEDGE TRANSFER BETWEEN MEMBERS OF A CORPORATE NETWORK

In a recent literature review, Secches-Kogut and de Mello (2017) define reverse knowledge transfer as a process through which knowledge is transferred from a source that is affiliated (subsidiary) to the recipient (headquarters), and the recipient receives, assimilates and applies their knowledge in order to obtain a competitive advantage. As said above, absorption capacity, the willingness to integrate knew knowledge received and the quality of the knowledge in question play an important role. Knowledge, of which the characteristics may be complexity and tacitness, flows from the source unit to the target unit where the transmission process per se embraces formal and informal mechanisms, as summarized in Figure 1 below.

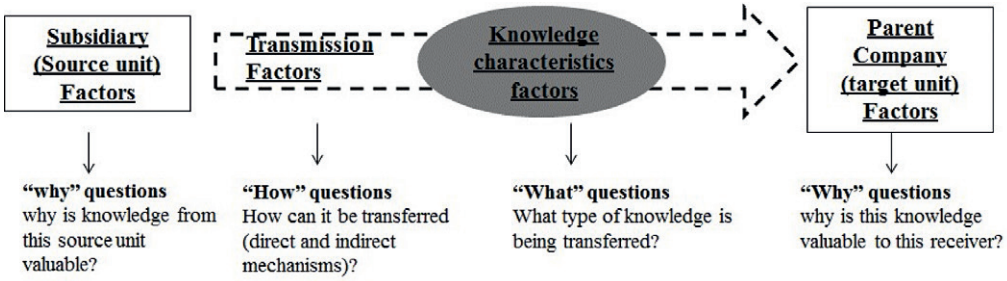

Figure 1: Internal Knowledge Transferring Process within a Multinational Corporation
Source: Gupta & Govindarajan, 2000.

The figure cannot capture all ingredients to the process. One important antecedent pertains to the circumstances under which the knowledge was created in the subsidiary. If the MNC entered the country through an acquisition, it is more likely that it has a stock of knowledge that is ready to be transferred to headquarters (Gupta & Govindarajan, 2000; Najafi-Tavani, Axèle & Sinkovics, 2012); sometimes this even is the very reason for the acquisition. On the other hand, an acquired company has a specific culture and set of values and routines, which differs from that of the acquirer and makes the subsequent transfer of knowledge more challenging.

On the other hand, a subsidiary that was created from greenfield investment will, by nature, depend more on the parent company's knowledge base. If it has a stock of knowledge to transfer to the parent company, this knowledge transferprocess will be easier (Najafi-Tavani, Axèle & Sinkovics, 2012). But whichever the entry mode has been, the process will be harmonized as it most likely has to follow corporate guidelines.

KNOWLEDGE TRANSFER AND BUYER-SUPPLIER RELATIONSHIPS

The most widely practiced knowledge transfers are to be found in supplier-buyer relationships. Here, operational improvement is one important goal of mirroring customer development with supplier development, but there is much more to buyer-supplier relationship building. From a stage, where operational integration mainly dominates the relationship, it can evolve towards a partnership of co-development and early involvement in technology and service strategies. The suppliers may slowly become a strategic source in the process of designing new fields of business. With these changes, the knowledge bases entailed will also change, and with an even closer relationship there will be more interdependence, up to a degree that the risks connected to that interdependence and the pertinent switching cost might be felt to be too high. It has been shown that companies feel less exposed to such risks if the partnering firm is not a large enterprise (Caniëls et al., 2010).

Operationally, the linkages between a retailer, its suppliers ("upstream") and its customers ("downstream") are formed by controlling the logistics. When operating as an integrator, a retailer assumes the task of managing all the logistics in an explicit product range (e.g. office materials) for its customer: the customer specifies its needs, the retailer finds the sources and provides the qualities and quantities at the delivery dates convened upon. Using the information given by its customer, the retailer may also help the customer in defining the replenishment cycles, in replacing outdated specifications, in managing inventory, etc. – and when transferring the data into purchase orders or contracts to the ultimate suppliers, the retailer might also advise them on how to deliver "to measure". The benefits for the retailer's customer go well beyond customized service: Generally, total cost of ownership for all items procured will decrease from the outset, and it will continue to decrease over time. So, the original investment on the part of the customer (adapting order issuance and receiving systems, training the personnel, building adequate storage etc.) will pay off rapidly. The same logic applies for the retailer's suppliers: They will have to invest in updating their order processing, warehousing, picking and commissioning and delivery systems, but there will be a return on this investment shortly through increased business.

For both supplier and buyer, one foremost field of knowledge exchange is marketing. Our three cases that will be presented in the next section are from the retail business, where sharing of marketing knowledge is beneficial to both a large retailer which buys from small local vendors and to these vendors themselves. In general, retailing is perceived as a rather traditional business sector, concerned mostly with making good deals, putting high pressure on suppliers and selling at competitive prices. However, over the last few years, the world of retailing has greatly increased in complexity and sophistication. Retailing has been the industry that has principally fostered breakthroughs in supply chain management and logistics, and it leads other sectors in customer data capturing, data warehousing and data analysis. Advanced econometrics and optimization methods in domains like pricing and integrated marketing communications are developed and employed not only by big retailers like Walmart,

Tesco, Carrefour and Metro (business-to-consumers sector, "B2C"), but also by smaller companies, especially in the business-to-business sector ("B2B"). These methods constitute a knowledge base for which retailing professionals must receive training and expertise insight continually, many of which is provided by the industry itself. Up on that, the business partners collaborating in retail supply chains need to exchange knowledge on innovative processes (and products), and this exchange is an essential part of customer- and supplier-development activities.

In B2C, customer experience is carefully managed to make customers "have fun" and "co-create" (Prahalad & Ramaswamy, 2004), and this is achieved through helpful staff, unique product selection, imparting a sense of discovery, trials before the purchase etc. Translating the pattern into the B2B sector, the participation of customer and vendor in a shared enterprise that involves the abilities of both, will also develop that "sense of discovery": The companies' contact persons will find that life gets easier when they collaboratively apply methods which enhance improved account information, faster placement of orders etc. and thus diminish the cost of transactions. The more they get to know about each other's needs and the more they continue to adapt the service or the service requirements to each other's evolving specifications, the closer they get to each other. This "learning relationship" becomes smarter with every interaction based on a positive experience being built up.

Similarly, both in B2C as well as in B2B, the service provided should supply the "five sources of convenience" (Grewal et al., 2006): Decision convenience, by bringing appropriate information to the customers; access convenience, by assisting customers to find the merchandise they need; transaction convenience by facilitating checkout and returns; benefits convenience by helping customers to understand the advantages of the products and services they buy, and finally post-benefit convenience by empowering the customer to rectify post-purchase problems. In B2C this can be ensured mostly by knowledgeable personnel and advanced store organization, B2B retailers must identify and interact with the individual decision makers and influencers within their customers' organizations, they must adopt account development strategies in order to service as many divisions of a customer as possible, they must customize transactions procedures, and, much more than is the case in consumer marketing, they must teach their customers how to make the most productive use of their products and services. In a nutshell, they must "help clients to manage themselves" (Peppers & Rogers, 2001).

A successful retailer will mirror customer development with supplier development. The knowledge base applied to interacting with customers and to customizing the services and products can also be used to building an optimal supplier-relation. Both ways are often called "vertical knowledge spillovers": The demands and feedbacks from a customer or from a supplier may push and pull the upgrading of a firm's knowledge base and lead to process innovations. Supplier development is primarily focused on transaction improvement, from order processing to warehousing and delivery processes, on inventory management, quality control, etc. – all these aiming at properly and comprehensively matching supply with demand.

When all the knowledge exchange, collaborative development and communally managed transfer processes take place in an environment where large MNCs connect to small and medium businesses in emerging markets

or in transitional economies, there will certainly be some cultural obstacles. Cultural barriers have been recognized as a central challenge in knowledge transfer (Hutchings & Michailova, 2004; De Long & Fahey, 2000). In cross-cultural settings we often find a strong emotional group affiliation among individuals and a high level of suspicion (Hutchings & Michailova, 2004). This behavior has been analyzed in the literature, and it was found that its determinants could include: fear, lack of understanding, unwillingness to value the work of others (Webb, 2011). At the same time, apprehension about failures has been recognized as an important obstacle for knowledge sharing among organizational members. This fair could be even bigger among networks of companies in developing countries (Hutchings & Michailova, 2004).

Moreover, the "in-group" effect could affect the effectiveness among knowledge sharing processes – the opposite, positive feature would be the "willingness to share" effect (Earley, 1993). It has been also suggested that individual group membership is culturally variable and that individualist and collectivist cultures play a central role in recognizing the value of being part of a group (Earley, 1993).

At the same time according to Dixon (Dixon, 2002: 39), "the better that a group of people knows each other, the more that people in the group will call on each other's knowledge". Thus, trust could be considered a key element in knowledge sharing processes. Literature (e.g. Chow et al., 2000) found several differences among Western and Asian managers attitude in this aspect for promoting the knowledge sharing process. Indeed, literature recognizes an important role of interpersonal relationships for leading a network in a transition economy (Peng, 2000). According to Hutchings (Hutchings & Michailova, 2004), this approach could be referred to the existence of an exchange mechanism especially in former communist countries. During communism people had to fight with a theoretical ideology of equality and a substantial reality of differentiation in the distribution system of resources. In this condition, a personal exchange mechanism based on close friendship and trust was developed becoming an inextricable everyday life part.

These aspects pinpoint the role of knowledge spreading in economies that were, like the V4, communist countries. It took quite some time to build a general awareness of the advantages a market-driven economy provides to consumers, businesses, to employees and to the job-market. By using entrepreneurial personal relationships, the action to "spread the word" – and spread the knowledge – seems to be have been more effective. For instance, in Eastern Europe, the small-scale entrepreneurial sector, having emerged as the most dynamic segment of the economy (Fingleton et al., 2003) not only has created jobs and induces growth, it also has a prominent educational function. One issue which has often been named to be the main reason why the process towards a market economy started earlier in Hungary than anywhere else in Central Eastern Europe, is the high per-capita ratio of incorporated firms: As early as in 1992, there were eight incorporated firms for every thousand people in Hungary as compared with Poland, where the ratio was three for every thousand people. The ratio in Czechoslovakia was even lower (Boter, 1994).

In the early stages of conversion after the fall of communism, many SMEs in those transition economies were created from the break-up of large, state-owned enterprises and mass privatization, while others commenced

as start-ups. From these early years of transition, SME entrepreneurs in Eastern Europe have transmitted their vision, commitment and knowledge to their stakeholders such as customers, suppliers and employees. Their willingness to take calculated risks would drive them to do everything possible to influence the odds, and that includes building a team of people with complementary skills. They could also build on what may be regarded an advantage which the former communist countries had over other transition economies. This advantage was that engineering and other technical professions had received sound education and expert training (Behrmann & Rondinelli, 2000). It is these firms who are establishing same-level relations to international firms, and it is them from where the MNCs are either recruiting professionals or acquiring the personnel through buy-outs or purchase of local businesses. Thus, it becomes understandable why knowledge transfer from these economies not only becomes feasible but is increasing (Pérez-Nordtvedt, Mukherjee & Kedia, 2015). Our case reports serve to solidify this tendency.

CASE REPORTS – REVERSE TRANSFER OF MARKETING KNOWLEDGE

Tesco, Ltd., the British multinational groceries and general merchandise retailer is the third-largest retailer in the world measured by gross revenues and has subsidiaries in 11 nations. Since the mid 1990s, Tesco has had a presence in the V4, with approximately 240 stores in Czech Republic, 200 stores in Hungary, 400 stores in Poland, and 180 stores in the Slovak Republic. The case studies centers around Tesco Slovakia and Tesco's Regional marketing department. for Tesco's which is based in Prague for Central Europe and the V4 nations.

Tesco Slovakia or Tesco SK is the largest retail chain in Slovakia. Tesco SK operates two central warehouses which supplies the products for its 180 stores. The large number of its retail outlets are large supermarkets which provide a diverse range of products from food to clothing, to household items. Tesco SK also operates small food outlets called Tesco Express which provides primarily food items. However, whether one is shopping at the large supermarkets (called My Tesco) or the smaller, more convenient Tesco Express, Tesco SK maintains a consistency in both price and quality. Similar to other countries, Tesco SK as a large congromerate is able to provide larger variety and reduced pricing compared to locally based stores with similar products.

Tesco's in the V4 nations has a centralized marketing department which is located in Prague, Czech Republic. Although each of the V4 nations has a marketing managment for their respective countries, these country managers report to the marketing department in Prague. The primary responsibilities for the centralized marketing director in Prague is: communication; research; and pricing; innovations; and the deployment of digital media. In addition, the marketing dierctor in Prague coordinates all strategy and initiatives for the V4 nations.

Case 1: Local Suppliers

Recently, Tesco SK has initiated a program that brings products from local manufacturers onto its shelves. The commercial team initially established a pilot program with local producers of: fruit and vegetable, meat and provision, fish, diary and bakery products. This program allowed local suppliers to deliver their products directly to Tesco stores in their region (prior to this all products were distributed from one of the central warehouses located in the country). A public relation campaign (media and leaflets) supported the sale of local products from Slovakia.

The local products were placed in the stores alongside of national and international know brands and products. The products were identified as locally sourced. The regional producers welcomed the opportunity to deliver their products to Tesco stores. The project not only presented a positive image of Tesco, but increased the awareness of social responsibility of the chain and its relationship with the local communities. Additionally, this initiative to use local suppliers was greatly supported by government bodies from the Ministry of Agriculture.

Following the initial success of the pilot project in Tesco SK, the details of the operation was shared with the market director in the Czech Republic. As the result of the Slovak project, the other Visegard 4 nations of Hungary and Poland replicated the Tesco SK model (adapting it to their local context) and instituted it in their stores in their respective countries.

Case 2: Point of Sales Promo Pricing

In early 2017, the marketing Director in Prague decided to consolidate all Point of Sales (POS) materials used in Tesco stores in all 4 countries. The key objective was to create a similar look and feel with material across all the stores. The project was led by the Tesco Czech team.

In pursuit of this, the Czech team developed a general design for all POS material which covered varied areas in the stores: aisles by an entrance, action alley, aisles for regular product placements, counters bistro, bakery, products, etc. Although the POS materials were eye catching and easily accessible for customers, Tesco SK identified an issue a few weeks after the launch of the project. Some of the images in the POS materials were communicating solely the promotion mechanics; e.g., "promo" or "clearance", while the particular prices were written on the small size shelf labels. Since price is a key decision factor for customers the pricing material needed to be changed. The Slovak marketing team initiated a local adaptation of regional POS materials to inform the customers about the prices of the products. In addition, each POS format was adjusted so that the stores could print the prices directly on POS or on an additional piece of paper that is placed next to the respective POS. Therefore, customers could see the old price, promo price, and the discount in %, unit price. This modification from Tesco SK was subsequently approved by headquarters and all three countries within the Region applied the original Slovak templates of the POS materials only with slight adjustements according to their local specifics.

Case 3: Customer Feedback

Historically, Tesco assessed customer satisfaction at its stores via face-to-face interviews. Briefly, interviewers visited each store three times a month and interviewed customers after they had checked-out and paid for their goods. Procedurally, the interviewers would approach customers after they had paid for their goods, and asked them if they would respond to a few questions about their customer experience. Although face-to-face interviews is regarded as a positive method to illicit customer feedback, the process was generally seen as not only as labor intensive, but very expensive to implement and maintain. In addition, store managers felt that there was a risk of bias due to manner in which the interviewers asked questions (tone, inflection, etc.) which could ultimately skew the results. Therefore, it was felt that a new method to evaulate and assess customer satisfaction was needed.

In pursuit of designing a new method for customer feedback, a select team from Tesco SK initiated a contract with a research agency to develop an online questionnaire that would ultimately be accessible from the Tesco website. Generally, the questionnaire accessed the same topics as the face-to-face interviewers, but it also allowed customers to send individual messages or videos to Tesco regarding their customer experience. In order to incentive customers to complete the survey, customers could earn extra Clubcard points (bonus shopping points) and have a chance to win 150€ for their participation. Although the participation rate of 50 respondents per store with the online survey was slightly below the rate achieved by personal interviews, it was felt that it was sufficient to assess store performance. In addition, this method was also more flexible, and it allowed the feedback to be communicated to the respective stores much faster than the previous method. After initial testing and tweaking of the online questionnaire, the model was shared with the other countries in the Region. The Czech Republic, Poland, and Hungary instituted a large marketing campaign to promote the use of this new method and similar to Tesco SK, they gave extra Clubcard points and prizes to motivate shoppers to complete the online survey form.

CONCLUSION

Our three reverse transfer cases show how unique marketing activities in Tesco Slovakia's subsidiaries can be developed across the region. Specifically, the marketing ideas and practices from Tesco SK drove innovated changes in their operations. Subsequently, these changes were communicated to the Regional Marketing Director in Prague, who then shared them with the other subsidiaries in their region. In addition to the direct benefits that were gained as a result of the implementation of these projects, Tesco witnessed the inferred benefits of the promotion of soft skills transfer as a result of the need to communicate and share ideas and practives across stores in and outside their region.

The knowlege gained in these cases connects to the theoretical considerations on knowledge management found in academic literature – that being that knowlege can be shared and transfered throughout the organization. In our cases we saw that practices such as integrating the local supplier base, reconstructing promo mechanisms, and implementing new customer feedback systems are all activites and practices are part of the social, the structural and the technical infrastructures of interrelation. And even though they differ from location to location, the basic concepts, skills and practives are transferable upwards, downwards, and acorss the whole organization.

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THE EFFECT OF CUSTOMER KNOWLEDGE MANAGEMENT ON ORGANIZATIONAL PERFORMANCE

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An earlier version of this article has been published as a conference paper: Zahari, A. S. M., Wahid, K. A. and Mahmood, R. (2019) 'The Effect of Customer Knowledge Management on Organizational Performance', in Tomé, E. and Kragulj, F. (eds.) Proceedings of the International Conference on Theory and Applications in the Knowledge Economy TAKE 2019. Vienna, Austria. pp. 588–603.

ABSTRACT

Nowadays, the development of knowledge management (KM) does play an important role in the concept of Customer Knowledge Management (CKM). This development shows the rapid change in all areas of life, due to the effects of globalization and the development of highly acclaimed KM. On the other hand, CKM is considered important, because its implementation benefits the field of operations and services, that can improve personal competence, maintain availability knowledge, innovation and product development. Therefore, scholars regard CKM as a strategic resource for businesses to improve innovation, facilitate the detection of new market opportunities, and support long-term customer relationship management (CRM). However, literature suffers from a lack of understanding of customer knowledge's role in improving the performance of organization. Thus, the purpose of the study is to investigate the impact of CKM on organizational performance (OP). This study uses a questionnaire and statistical analytical techniques (Structural Sequential Equation Model) to explore the effect of CKM on OP. The statistical population of this research includes 500 insurance companies in Malaysia. The sample size was estimated 258 people by using Krejcie & Morgan Table (1970) and stratified sampling method was used. Data collection tool is close ended questionnaire with Likert's five-option scale. Therefore, 516 questionnaires were distributed and 180 returned questionnaires were analyzed. Measurement model was analyzed to determine data validity and the hypotheses were tested using structural model. The findings showed that that CKM dimensions namely; Knowledge for customers (KfC), and Knowledge from Customers (KfrC) had a positive impact on the performance of organization and provides competitive advantages. However, knowledge about customers (KaC), indicated insignificant impact with OP. This study provides clear implications related to the theory and contributions to the literature related to CKM as well as in insurance industry. The study also provides invaluable insightfulness to various stakeholders including policy makers, institutional support and insurance agent about the importance of knowledge about customers (KaC), Knowledge for customers (KfC), and Knowledge from Customers (KfrC) in determining the performance of insurance industry. Hence, organizations should acquire valuable customer knowledge in order to enhance the relationship with customers, as well as enhance their performance.

Keywords: Knowledge, Knowledge Management, Customer Knowledge Management, Organizational Performance

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KEY FINDING(S)

- The findings support that CKM dimensions are constructs that consist of three dimensions, namely knowledge for customers, knowledge about customers and knowledge from customers, each of which contributed positively, but not equally, to the organizational performance.
- Result found that all beta path coefficients were positive and in the expected direction and were statistically significant except the beta path coefficient between knoweldge about customer (KaC) in which *t* value is less than 1.645.
- Significant effect of knoweldge for customer (KfC) ($\beta = 0.464$, $p < 0.05$) and knowledge from customer (KfrC) ($\beta = 0.190$, $p < 0.05$) were found on OP. Thus H2 and H3 are supported but H1 is not supported.
- The result reveals that both knoweldge for customer (KfC) and knoweldge from customer (kfrC) are equally important predictors of organization performance (OP) compared to knoweldge about customer (KaC).

IMPLICATION(S) FOR THE PRACTICE OF SMEs

In particular, it emerges that CKM contributes positively to the overall growth of SMEs by enhancing financial, market, technical, human and organizational performance. These results show that we are witnessing an evolving process. Today, SMEs such as insurance companies increasingly have access to new customer knowledge management systems, which do not need significant human and financial investments. This has allowed the reduction of the barriers that have hindered the spread of customer knowledge management practices in SMEs. Therefore, it is possible to say that knowledge from customers is important to keep the knowledge required and to expand the knowledge residing in customers for customers and corporate benefits. Knowledge from customers can be used to facilitate new product development as well as catering for customers' needs and wants. This implies that insurance companies collect knowledge from their customers, disseminate this knowledge inter-functionally and inter-departmentally and respond to customers' needs based on this knowledge; the process will affect this organization in terms of high organizational performance.

This study reveals that customer knowledge management is critical to an organization and has positive impacts on SME performance such as insurance industry. SMEs like insurance companies should adopt knowledge orientation as one of the strategies of SME business. It is possible to say that knowledge from customers is important to keep the knowledge required and to expand the knowledge residing in customers for customers and corporate benefits. Knowledge from customers can be used to facilitate new product development as well as catering for customers' needs and wants.

This study also suggests that managers should be aware of the importance of knowledge creation to SME performance. Managers of SMEs need to facilitate dynamic customer knowledge creation, particularly in the SECI process. Such facilitation can be accomplished by enlarging knowledge through the transformation of tacit knowledge into explicit knowledge; and vice versa (Nonaka, 1994). SME managers also need to nurture an enabling environment that allows sharing and exchanging tacit knowledge to create new knowledge in their organization. Each mode of knowledge conversion requires different approaches for knowledge to be created and shared effectively (Nonaka & Konno, 1998). Employees of SMEs should be motivated to exchange, learn and create knowledge. In addition, employees in SMEs should further be allowed to transform knowledge into strategic knowledge and execution (Nonaka, 1994). This implies that insurance companies collect knowledge from their customers, disseminate this knowledge inter-functionally and inter-departmentally and respond to customers' needs based on this knowledge; the process will affect this organization in terms of high organizational performance.

1 INTRODUCTION

The business world is currently challenged to be able to survive in a business environment which is constantly changing. These challenges require organizations to improve competitiveness in domestic and international markets. In order to be able to survive in the business environment, the organization performs a variety of ways such as product innovation, expanding markets, improving service quality, improving the production process, improving the organization system, and making cost savings. Knowledge is inherent in the organization and in each organization member. Thus, organizations need to view knowledge as a valuable and strategic source in order to remain competitive.

Knowledge management (KM) is an interesting issue since its appearance. Various academics and business practitioners began to develop KM through research and application in business practices. Becerra-Fernandez and Sabherwal (2001) interpret knowledge as a result of one's reflection and experience, so that knowledge is always owned by individuals or groups. There are two critical dimensions that need to understand knowledge in an organizational context, that is, first, knowledge exists in each individual, group or organization; second, knowledge can be seen as something that can be saved, and as a process that is the process of knowing something. Based on two dimensions, knowledge can be divided into tacit and explicit knowledge. Tacit knowledge is knowledge gained from experience, activities done, and hard to define where it is usually shared through discussion, stories. According to Nonaka and Takeuchi (1995), tacit knowledge is interpreted as a knowledge that is personal, specific, and generally difficult to formalize and communicated to other parties. In organizations the process of disseminating/sharing knowledge will help achieve organization goals. Explicit or codified knowledge is defined as knowledge can be transformed in a formal form and systematic language (Nonaka & Takeuchi, 1995). According to them, explicit knowledge is knowledge that has been formulated, usually presented in written form such as regulations, books and literature. The biggest challenge faced by organizations is converting tacit knowledge leads to explicit knowledge, or vice versa. Organizations are required to able to translate knowledge that exists in individuals, groups or teams, and organization becomes evident in the form of products and services produced.

2 LITERATURE REVIEW

2.1 CUSTOMER KNOWLEDGE MANAGEMENT (CKM)

Nowadays, the development of KM does play an important role in the concept of CKM. This development shows the rapid change in all areas of life, due to the effects of globalization and the development of highly acclaimed KM. As a result, the role of science has become more prominent, because only with knowledge, changes that occur can be addressed appropriately. The evidence indicates that is a potentially powerful competitive tool, contributing to improve both companies and their customers. It is a continuous strategic process by which companies enable their customers to move from passive information sources and recipients of products and service to empowered knowledge partners (Gassmann & Keupp, 2012). It incorporates principles of KM and customer relationship management (CRM), but moves decisively beyond it to a higher level of mutual value creation and performance (Gibbert, Leibold & Probst, 2002).

CKM refers to tools that enable framing strategies that help companies derive valuable insights about customers, not from the information gained from knowledge repositories that lie within the organization but from the customers' thoughts and deeds. Customer knowledge, to be precise, is the *"collection of information and viewpoints that an organization has about its customers"*. According to this definition, the role of CKM is to capture and organize customer data to allow it to be shared and discussed across the functional areas of the organization that both directly and indirectly 'touch' customers. But the most critical issue is not managing the information as it is available to an organization at one point of time, the issue in today's competitive world is to understand and predict the future behavior of the customers, which Customer relationship management (CRM) might not be successful in doing. Customer knowledge is not a new concept to many companies. Companies do possess customer knowledge in the form of data within the marketing, sales or customer care processes. But in most cases this is in a fragmented form and therefore there are lot of difficulties in sharing and analyzing this data, which in most cases end up being incomplete. CKM aims at procuring customer data from the past, not just from those who have a direct relationship with customers, but also from those who have an indirect relationship with them. Thus, the information required for CKM stretches through the entire value chain and attempts to procure restore and manage the mission critical information, which could be put to future use. Hence CKM demands systems and processes to gather fundamental information pertaining customers like who they are, what they think and what they do, thus an alignment of KM practices and CRM processes to attain business efficiency. CKM can be called as a strategic process by which companies allow their customers to become strategic partners in their initiative to understand them (customers) better. This is because CKM is not a "one size fits all" approach.

According to Wilde (2011), CKM implementation is expected to fill knowledge gap to the customer. If knowledge is used in the target orientation, this can be needed to be able to be accessed and to share it systematic. By integrating CKM, customers can become active partners for company. The goal is to improve customer orientation and to build relationships customer in the long run. Therefore, transfers between companies and customers are very necessary by implementing CKM. Customers are more integrated than CKM and become partners active knowledge, as a result of knowledge from, to and about customers can used efficiently.

Therefore, CKM can be seen as a systematic process for managing individual's three dimensions of customer knowledge namely; Knowledge about customers (KaC), which can include knowledge of potential customers and customer segments as well as knowledge of individual customers (Ahmad Suffian, 2014). Knowledge about customers is an accumulation to understand the customer's motivation and their address in a personal way. Next is Knowledge for customers (KfC), which can include knowledge for customers about products, markets and suppliers (Ahmad Suffian, 2014). The third dimensions is Knowledge from customers (KfrC), which include knowledge from customers about their ideas, thoughts, specific product preferences, creativity, or experience of knowledge (Ahmad Suffian, 2014). The emergence of customer knowledge can be used by organizations or companies to identify, create, clarify, and distribute knowledge for reuse, discovery, and be learned within the organization.

This study adopted Knowledge-Based View (KBV) as a theory underpin. This is because the importance of the existing knowledge has been given much attention with the introduction of knowledge-based view (KBV) theory. KBV, which comes from the concept of resource-based view focuses on the value of intangible assets and suggests knowledge as critical to a firm's long term success. Therefore, with the implementation of KBV, managers can enhance a firm's capacity to produce and efficiently update knowledge. This study also uses Venkatraman and Ramanujam (1986), theory of organization performance (OP) because there are subjective measurements that can lead to objective measurement. It is a measurement using two dimensions (i.e., non-financial and financial performance). Scholars regard CKM as a strategic resource for businesses to improve innovation, facilitate the detection of new market opportunities, and support long-term customer relationship management. However, literature suffers from a lack of understanding of customer knowledge's role in improving the performance of organization.

2.2 ORGANIZATIONAL PERFORMANCES (OP)

Steer (1975) in his study has identified and reviewed 17 models of organizational effectiveness and integrated the contents concerning the measurement of OP. After reviewing ten different types of measurement, he generalized OP into three dimensions namely; financial performance, business performance and organization effectiveness. It was further supported by Kabiru, Mohd Rizal and Norlena (2012) who claim that OP is assessed by the application of financial and non-financial measurement. According to Venkatraman and Ramanujam (1986), financial performance centers on outcome-based indicators assumed to reflect economic goals, inclusive of accounting-based and market-based metrics. Financial performance includes return on investment, return on sales, return on assets and sales growth. Operational performance refers to non-financial dimensions and focuses on operational success factors that might lead to financial performance (Venkatraman & Ramanujam, 1986). Operational performance includes both product–market outcomes (including market share, efficiency, new product introduction, innovation and product/service quality (Venkatraman & Ramanujam, 1986). Measurement of overall effectiveness reflects a wider conceptualization of performance and includes reputation, survival, perceived overall performance, achievement of goals and perceived overall performance relative to competitors (Lewin & Minton, 1986; Venkatraman & Ramanujam, 1986). Meanwhile, Hanvanich, Sivakumar and Hult (2006) measure OP as a combination of overall performance and innovativeness.

According to Shahzad, Luqman, Khan and Shabbir (2012) and Chenhall (2005), the use of financial and non-financial indicators is generally the most appropriate measurement for the organization in which it is also helpful to enhance protection towards uncontrollable events outside the organizations. Thus, many studies have selected a combination of operational measurement (e.g: non-financial) and financial measures to reflect overall OP (Rhodes, Hung, Lok, Lien & Wu, 2008). Academicians and practitioners give various measurements for financial and non-financial performance in their research to measure OP. Zack, McKeen and Singh (2009), identified product and service innovation, quality, customer satisfaction, retention and operating to measure OP. In addition, Huang, Hsu and Chiau (2011) used efficiency growth, profitability and organizational innovation to identify OP. The findings of previous studies suggested that mixed measurements have been used by scholars and practitioners in examining OP. However, a large body of previous studies focused on financial and non-financial indicators as measurement of OP which provides a basis for the present study.

2.3 CKM (KNOWLEDGE FROM CUSTOMERS)

The concept of CKM as proposed, first by Gibbert et al. (2002) suggested that market opportunities are influenced by knowledge residing in customers. Thus, knowledge from customers is presumed to be a better predictor of CKM. The idea suggested by Gibbert et al. (2002) was supported by Gebert, Gelb, Kolbe and Brenner (2002) who pointed out that the knowledge gained from the interaction with customers can be used to improve customer service and foster the development of new products.

In relation to OP, new product development is one of the dimensions in OP. Gibbert et al. (2002) in investigating Old Mutual, the largest insurance companies in South Africa suggested that knowledge from patients is important for a company. Their study found that customer knowledge is being used by Old Mutual Company to develop new medical insurance products. The development of the new product by Old Mutual Company is based on knowledge and demand from the customers. Their study on more than two dozen companies over the last six years in pharmaceutical and insurance industry revealed that by managing knowledge from customers, organizations are more likely to accurately perceive market opportunities.

A study by Salomann, Dous, Kolbe and Brenner (2005), provides further support for the claim that knowledge from customers can improve OP. Salomann et al. (2005) have conducted an in depth case study on CKM dimensions at Siemens and Electronic companies and found that knowledge from customers has led to the product development and innovation which were described as the performance outcome of the company. As a result, he found that CKM has positive effects on OP. To clarify the relationship technically, this study highlights on the following hypothesis:

Hypothesis 1: *Knowledge from customers positively influences organizational performance.*

2.4 CKM (KNOWLEDGE FOR CUSTOMERS)

Knowledge for customers is transmitted from one direction to support the organization, customers and to make customers better understand the products that the organization offers (Gebert et al., 2002; Smith & McKeen, 2005).

This knowledge flow can help organizations to retain their customers by focusing on customer preferences that are constantly changing and improving the products offered that may eventually lead to the purchase of products by customers (Feng & Tian, 2005). As a result, it helps organizations to retain the current customers and subsequently improve their profits.

Zanjani, Sakhaee and Shahbaznezhad, (2008) in investigating CKM dimensions of 10 companies in Britain found that knowledge for customers has the highest utilization with 42% as compared to 32% and 26% for knowledge about customers and knowledge from customers respectively. These findings were supported by Smith and McKeen (2005) who found that in order to enhance OP, companies such as Google, e-Bay and Amazon are putting more emphasis on knowledge for customers to make their products and services more intuitive and user friendly. However, Zanjani et al. (2008) stated that there are fewer studies that emphasized on knowledge for customers that can lead to the improvement of OP. To assess the relationship, the following hypothesis is derived:

Hypothesis 2: *Knowledge for customers positively influences organizational performance.*

2.5 CKM (KNOWLEDGE ABOUT CUSTOMERS)

Knowledge about customers is a firm's understanding on the background of clients, needs and preferences for product features (Chen & Su, 2006; Feng & Tian, 2005; Gibbert et al., 2002). Customers interact with organizations through a variety of channels such as email and Facebook. Based on the type of channels they interact, organizations can segment their customers and also determine their relationship with them. The use of customer database is very important to keep and update all knowledge about customers. Moreover, this can be done through knowledge derived from the statistical information concerning customers' interaction with the company.

This statement is further strengthened by Gebert et al. (2002), who found that knowledge about customers, markets and other factors can be regarded as opportunities to enable faster and more flexible reactions to threats. Research by Bueren, Schierholz, Kolbe and Brenner (2004), pointed out that if organizations have systems and good database, knowledge about customers can improve the service levels of the organizations and increase OP. From the findings, they emphasized that knowledge about customers is more important as compared to knowledge for customers and knowledge from customers. According to them, without knowledge about customers, an organization could suffer competency shortages with a negative impact on OP.

Smith and McKeen (2005) in their study found that with the use of a customer service workbench, a technology based solution in the organization, it has created customer knowledge database about customers. The company was able to increase 100% its customer base and 50% increase in its sales force. Hence, it is assumed that *Knowledge about customers* influences OP as proposed in the hypothesis below:

Hypothesis 3: *Knowledge about customers positively influences organizational performance.*

3 RESEARCH METHODOLOGY

This study utilized survey research. The questionnaires were used to collect data. A corresponding 5 Likert scale was deployed (1 for "Strongly Disagree"; 2 for "Disagree"; 3 for "Neither Agree nor Disagree"; 4 for "Agree" and 5 for "Strongly Agree"). Prior to pilot testing and main data collection, the questionnaires were pre-tested with several experts in the field and also several insurance companies who could become the prospective respondents. The questionnaires were pilot tested with 81 insurance companies. Using the SmartPLS, the responses of these 30 companies were analyzed for assessing the reliability of the measurements. The recorded Cronbach Alpha for all variables employing multi-items estimated range from 0.65 – 0.88 which suggests that the questionnaires were reliable (Kline, 2011). The populations of the study were 500 Malaysian insurance companies listed in the Bank Negara database. There were 182 companies responded. However, only 180 questionnaires were valid for the data analysis. The remaining 180 were analyzed using Partial Least Square (SmartPLS version 3). This study will first develop and assess the measurement model and followed by the development and assessment of the structural model. Previous studies have indicated a sample threshold of as little as 100 samples for PLS-SEM (Reinartz, Haenlein & Henseler, 2009). Alternatively, one can revert to the more restrictive minimum sample size recommended based on statistical power (Hair, Hult, Ringle & Sarstedt, 2014). We used G*Power to calculate the sample size based on statistical power (Faul, Erdfelder, Buchner & Lang, 2009), suggesting that we needed a sample size of 129 for a statistical power of 0.95 for model testing. Since, our sample size exceeded 129, the power value in this study also exceeded 0.95. Moreover, the minimum power required in social and behavioural science research is typically 0.8. Therefore, in both cases, we can conclude that our sample size was acceptable for the purposes of this study.

The respondents of the study were 180 Malaysian insurance companies, the categories of company consisted of 45 life insurance (25%), 92 general insurance (51.11%), 33 life takaful (18.33%), 9 general takaful (5%) and 1 others (0.56%). In terms of company size, the majority of respondents have employees less than 25 (88 companies, 48.89%), 26-25 employees (15 companies, 8.33%), 51-75 employees (6 companies, 3.33%), 76-100 (13 companies, 7.22%) and more than 100 (58 companies, 32.23%). With regards to company's annual revenue, 145 insurance companies had annual revenue more than USD 12.23 million, 16 companies earned revenue of USD 5 – 10 million and 19 companies whose revenues were less than USD 5 million.

3.1 POPULATION AND SAMPLE SIZE

The population of this study consists of Malaysian insurance companies listed and registered with Bank Negara Malaysia. The type and category of insurance can be divided into Life and General Business Insurance, Life Business Only Insurance, General Business Only Insurance, Takaful Operators Insurance and International Takaful Operator Insurance. Then, all listed insurance companies involving 500 companies serve as the population of the study. At this point, the sample selection was based on the stratified sampling method, using type and category of insurance as the basis for stratification.

Krejcie and Morgan (1970) suggested a table for determining sample size for a given population for reference. Based on Krejcie and Morgan's (1970) table for determining sample size, for a given population of 787, a sample

size of 258 would be needed to represent the population. There are several reasons to justify the selection of insurance companies as the population for the study. First, there has been a growing interest worldwide in the efficiency literature about the insurance industry (Rai, 1996; Fukuyama, 1997). Second, Norma and Nur Edzalina (2011) emphasized that while there have been numerous international studies on the performance of other financial service industries, only a few are related to the insurance industry. Third, a study on the performance of the insurance industry is crucial since the said industry is currently facing many challenges, including increased competition, consolidation, solvency risks, and a changing regulatory environment (Norma & Nur Edzlina, 2011). Fourth, there are a few researches, as to date, on CKM and OP especially in the insurance industry (Salamonn et al., 2005). Thus, they suggested that researchers must establish further evidence on the relationship between CKM dimensions and OP especially in the insurance industry.

The stratified sampling design is a commonly used probability method that is superior to the simple random sampling design as suggested by Noorzan (2010). This is because each of the important segments of the population is represented and is more valuable and differentiated information can be obtained with respect to each group (Sekaran & Bougie, 2010) and sampling error will be reduced (Noorzan, 2010). In ensuring better responses and minimizing the responses' risk, the researcher decided to send 300 sets of questionnaires as better results can be derived from a large sample and the results can be generalized (Hair, Black, Babin & Anderson, 2010).

3.2 OPERATIONALIZATION AND MEASUREMENT OF VARIABLES

The independent variable for this study is CKM, while the dependent variable is OP. These variables were all measured using item scales developed by previous scholars drawn from existing literature. Some modifications were made where necessary to suit the study context. Traditionally, there are three knowledge flows; namely, knowledge for customers, knowledge about customers and knowledge from customers (Gebert et al., 2002; Ahmad Suffian, 2014). These knowledge flows are measured by thirty nine items using five self-rating items on a five point Likert scale, in which thirteen items reflect knowledge for customers, thirteen items measure knowledge about customers and another thirteen items gauge knowledge from customers. These questions items were adapted from Belkahla and Triki (2011). The next component is the dependent variable, namely, OP. This study adopted Venkatraman and Ramanujam's (1986) model based on several justifications. First, there is a unified combination of measurement for performance that consists of financial and non-financial items. For the purpose of this study, OP consists of perceptions of financial outcomes such as sales growth, company return on investment (ROI), company return on assets (ROA), and perceptions of non-financial measurement such as market share, new product introduction and product quality.

4 DATA ANALYSIS AND FINDINGS

Quantitative data were recorded, checked, and cleaned using AMOS software version 21™ to yield composite scores of each scale and were used for statistical analysis. As this study used face-to-face administered questionnaire, hardly any missing value was observed at all. Descriptive analyses were run using SPSS, while the hypotheses were tested using Structural Equation Modeling (SEM) with the aid of AMOS software version 21™.

4.1 ASSESSMENT OF MEASUREMENT MODEL

To examine the research model Partial Least Square (PLS) analysis technique was employed by using the SmartPLS 3 software version 3.2.8 (Ringle, Wende & Becker, 2015). In an effort to refine all structural equation models two stage analytical procedure was employed, where researchers tested the measurement model and structural model recommended by Hair, Sarstedt, Hopkins and Kuppelwieser (2014). Prior to structural modelling, the study has to assess the measurement model of latent construct for their dimensionality, validity, and reliability. Cronbach's (α) and composite reliability were also tested as recommended by Henseler, Ringle and Sarstedt (2015).

The measurement model used in this study included five constructs: knowledge for customer (KfC), knowledge about customer (KaC), knowledge from customer (KfrC), and organizational performance (OP). In assessing a model's reliability, the loading of each indicator on its associated latent variable must be calculated and compared to a threshold. Generally, the loading should be higher than 0.7 for indicator reliability to be considered acceptable (Hair, Ringle & Sarstedt, 2014). Table 1 indicates that most of the indicator loadings on their corresponding latent variables for the respondents were higher than 0.7.

4.2 VALIDITY ASSESSMENT

Validity was assessed in terms of convergent validity and discriminant validity. Convergent validity is the extent to which the scale correlates positively with other measures of the same constructs (Malhotra, 2002). Convergent validity of measurement model is usually ascertained by examining the factor loading, average variance extracted (AVE) and composite reliability (CR) (Hair, Black, Babin, Anderson & Tatham, 2010). All the values were above 0.6, shows the convergent validity of the model. Convergent validity can be evaluated by examining the loading (≥ 0.6), AVE ≥ 0.5, and CR ≥ 0.7 (Kim, 2010). Each item's coefficients on its underlying construct were observed. A test of each item's coefficient was used to assess convergent validity. All values fulfill the required standard, indicating high convergence validity. Table 1 shows the results of factor loadings threshold level of 0.7 as recommended by Hair et al. (2010).

Table 1: Factor loading, composite reliability (CR) and average variance extracted (AVE)

Variables	Loading	C.R.	AVE
KaC	0.811	0.875	0.636
KfC	0.808	0.871	0.629
KfrC	0.890	0.914	0.603
OP	0.807	0.864	0.561

Besides assessing the convergent validity, the study also evaluated the discriminant validity. Discriminant validity can be evaluated by examining Fornell-Larcker Criterion (Fornell & Larcker, 1981). Fornell and Larcker (1981) have suggested examining whether the square root of the AVE for each construct is greater than the correlation between the constructs. Tables 2 shows the results of the discriminant validity assessment of the measurement model using the Fornell–Larcker criterion indicate that the models possess acceptable discriminant validity.

Table 2: Discriminant validity (Fornell and Larcker)

Constructs	KaC	KfC	KfrC	OP
KaC	0.798			
KfC	0.781	0.793		
KfrC	0.667	0.705	0.777	
OP	0.624	0.703	0.607	0.749

4.3 ASSESSMENT OF STRUCTURAL MODEL

We performed bootstraping involved 500 samples whislt our actual sample stood at 180. The SEM results are presented in Table 3. It can be observed that R^2 values for OP is 0.30, suggesting that 30% of the variance in OP is explained by the knowledge for customer (KfC), knoweldge about customer (KaC) and knowledge from customer (KfrC). Table 3 shows that all beta path coefficients were positive and in the expected direction and were statistically significant except the beta path coefficient between knoweldge about customer (KaC) in which *t* value is less than 1.645. To elaborate the significant effect of knoweldge for customer (KfC) ($\beta = 0.464$, $p < 0.05$) and knowledge from customer (KfrC) ($\beta = 0.190$, $p < 0.05$) were found on OP. Thus H2 and H3 are supported but H1 is not supported. The result reveals that both knoweldge for customer (KfC) and knoweldge from customer (kfrC) are equally important predictors of organization performance (OP) compared to knoweldge about customer (KaC). We evaluated for multicollinearity among the variables in our model, and did not find any cause for concern using the criteria of variance inflation factor (VIF), which were all below the suggested value of 5.00 (Hair et al., 2014).

Table 3: Structural Model (Hypotheses Testing)

Hypotheses	Beta	S.D.	T Values	Decision
KaC → OP	0.135	0.111	1.222	Not Supported
KfC → OP	0.464	0.116	4.009	Supported
KfrC → OP	0.190	0.094	2.013	Supported

*Note: significant levels: ** $p < 0.01$, * $p < 0.05$*

5 DISCUSSION AND CONCLUSION

The objective of this study is to investigate the impact of CKM on OP. From multiple regression analysis on 180 samples, the empirical evidence shows that CKM dimensions namely; *knowledge for customers and knowledge from customers* has a significant positive effect on the performance of insurance companies. However, the findings show that knowledge about customer did not have significant effect on OP. This finding arguably links well with the Knowledge Based View (KBV) which postulates that when knowledge is effectively managed, it creates unique capabilities which contribute to improved business performance through innovation (Grant, 1996; Leal-Rodríguez et al., 2013). The results indicate that organizational performance as measured by sales growth, ROI, ROA, market share, product quality and new product development is influenced more by knowledge from customers rather than knowledge for customers and knowledge about customers. These findings are consistent with previous studies that found knowledge from customers about insurance was clearly prominent in CKM dimensions (Gibbert et al., 2002; Garcia-Murillo & Annabi, 2002; Paquette, 2006; Ho, 2009; Rowley, 2002). It is possible to say that knowledge from customers is important to keep the knowledge required and to expand the knowledge residing in customers for customers and corporate benefits. Knowledge from customers can be used to facilitate new product development as well as catering for customers' needs and wants. This implies that insurance companies collect knowledge from their customers, disseminate this knowledge inter-functionally and inter-departmentally and respond to customers' needs based on this knowledge; the process will affect this organization in terms of high organizational performance.

One possible reason to support this finding is the awareness of Malaysian citizens nowadays to buy insurance policies such as life insurance and family insurance. For example, the increasing demand for insurance policies such as conventional and Islamic takaful by Malaysian citizens have caused the insurance companies to market their products and services intensively in order to increase their number of potential customers. The insurance companies have conducted successful campaigns in providing knowledge for customers about their current products.

Moreover, insurance companies have introduced many types of insurance such as family takaful, general takaful, life and general insurance as well as car and home insurance. The introduction of various new insurance products can thus attract new customers and as a result can improve the organization sales growth. It seems that, by using the customer data or profile, insurance companies can make follow-up persuasion in attracting current customers to buy another insurance policy.

6 LIMITATIONS AND FUTURE RESEARCH

Notwithstanding the contributions, there are three main limitations identified and these provide opportunities for future research. First, the sample of this study is limited to insurance industry in Malaysia. Future study could consider other types of business involved in Malaysia, in order to unveil better prediction for the dissimilarity in OP. Second, the sample of only the managers in organizations limits the generalization of the results. In future, studies could incorporate the data from other position in organizations to provide richer interpretation and generalization of the findings. Third, this study only considered some internal factors such as knowledge for customers, knowledge from customers and knowledge about customers. Future research could include other factors mainly related to external forces such as economic development, government support, growth potential, business networking, involvement and competition The inclusion of these factors could enhance the understanding on the contributing factors that affect the performance of organizations.

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TRADITIONAL CRAFTSMANSHIP AS INTANGIBLE CULTURAL HERITAGE AND AN ECONOMIC FACTOR IN AUSTRIA

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An earlier version of this article has been published as a conference paper: Sandgruber, R., Bichler-Ripfel, H. and Walcher, M. (2019) 'Traditional Craftsmanship as Intangible Cultural Heritage and an Economic Factor in Austria', in Tomé, E. and Kragulj, F. (eds.) Proceedings of the International Conference on Theory and Applications in the Knowledge Economy TAKE 2019. Vienna, Austria. pp. 61–64.

ABSTRACT

Traditional craftsmanship in Austria, if it is to survive, is in need of a new self-understanding and increased public awareness of its value to society. Entire occupational fields are threatened with extinction along with their associated bodies of knowledge and skills, and it is high time that these negative tendencies be countered – not only as a sustainable answer to global mass-market production and excessive consumption, but also in the interest of providing future generations with training and career opportunities that are both sensible and promising. The present study surveys the state of traditional craftsmanship in Austria for the first time. On the basis of both qualitative and quantitative data, it seeks to define and analyse the parameters within which traditional craftsmanship exists, as well as traditional craftsmanship's relative degrees of endangerment and future importance in terms of cultural policy and the economy. This study thus represents an essential step towards creation of an esteeming perception of traditional craftsmanship both as cultural heritage and as an economic factor.

KEY FINDING(S)

The major finding of this study is the determination of fundamental values and contents which altogether not only constitute "traditional craftsmanship" as such, but also indicate unmistakably the present and future relevance on a higher level. These parameters and their interrelations have been incorporated into the "Descriptive Model of the Characteristics of Traditional Craftsmanship".

Four core competencies have been identified as essential:

- Inseparability of traditional craftsmanship from the highly skilled or masterly practitioners who carry it forward
- Employment of profound and/or masterly knowledge and skill
- Orientation toward independence and financially successful entrepreneurship
- Training and handing down of experience and practical skills

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In order to qualify as traditional craftsmanship, these four core competencies should be joined by at least one defining parameter out of a set of variables which are either value-based or relational. The degree to which these parameters have to be manifested, is flexible. This flexibility is due to the heterogeneous nature of the various fields of traditional craftsmanship, with their differing outputs and/or services.

There are several results that can be derived from the "Descriptive Model of the Characteristics of Traditional Craftsmanship".

First and foremost, traditional craftsmanship is to be acknowledged as a cultural heritage site well worth preserving, future-compliant while constituting identity as well.

Besides that, traditional craftsmanship generates jobs, stands for an increased quality of life in rural communities and is to be viewed as the underlying force of any local value creation chain. It guarantees local amenities and strengthens the attractiveness of regions as touristic sites.

Therefore traditional craftsmanship makes an important contribution to the overall economical, ecological, social and cultural sustainability. In addition to that, it contributes substantially to an international perception of Austrian culture.

IMPLICATION(S) FOR THE PRACTICE OF SMEs

The findings suggest a variety of measures concerning the image of traditional craftsmanship in society, the competitiveness of businesses practicing traditional trades and skilled crafts and the improvement of specialized qualifications of entrepreneurs and employees.

Measures to positively influence the image of and esteem for traditional craftsmanship in society, thus enhancing the attractiveness and social status of traditional trades and skilled crafts:

- Public presentation of individual entrepreneurially active craftspeople as testimonials to the inseparability of traditional craftsmanship and entrepreneurial personalities
- Public featuring of the winners of craftsmanship awards and competitions in a way similar to how successful athletes are marketed via the media
- Promotion of the esteem accorded to independent entrepreneurialism in craftsmanship-related areas at schools and universities
- Improvement of the image of craftsmanship-related occupations among youth

Measures to improve the competitiveness of businesses practicing traditional trades and skilled crafts, thus contributing to sustainable economic success and higher potential income:

- Reduction of the tax burden, particularly in terms of overall employer costs
- Tax advantages for providers of craftsmanship-related goods and services
- Support for investments by businesses
- Reasonable levels of bureaucracy

Measures to improve the specialized qualifications of entrepreneurs and employees via the incentivisation of training and continuing education:

- Improvement of the incentives for businesses to take on apprentices
- Consistent adaptation of occupational definitions and curricula to prevailing reality in the relevant industries
- Improvements to the quality of vocational schools
- Enhancement of the attractiveness of the dual system of vocational education
- Strengthening of entrepreneurs' managerial skills
- Improvement of the specialised qualifications of entrepreneurs and their employees
- Establishment and development of networks that serve traditional craftsmanship

These measures are not exclusively to be implemented on a political level but by each entrepreneur himself. This process starts with every single entrepreneur's awareness of their cultural, socio-political, and economic relevance in order to be able to communicate it into society by spreading the key message about craftsmanship being much more than just products and services.

1 PURPOSE

The UNESCO Convention for Safeguarding of the Intangible Cultural Heritage from 2003 aims at safeguarding intangible cultural heritage through raising the awareness and promoting its standing in society.

Traditional craftsmanship is one area of the intangible cultural heritage of the Austrian Commission. If it is to survive, it is in need of a new self-understanding and increased public awareness of its value to society. Entire occupational fields are threatened with extinction along with their associated bodies of knowledge and skills, and it is high time that these negative tendencies be countered – not only as a sustainable answer to global mass-market production and excessive consumption, but also in the interest of providing future generations with training and career opportunities that are both sensible and promising.

The following study addresses one of the major reasons for this imminent threat of extinction. That is the public's miss-perception of Traditional Craftsmanship and lack of public awareness of its age-long contribution to society and culture. Traditionial Craftmanship was never limited to merely providing products, but as well has

always been a crucial factor in developing and shaping our culture and society over the centuries. Elaborating these economic, societal and cultural contributions of Traditional Craftmanship in Austria in order to strengthen its position, is the main purpose of this study.

2 MAJOR THEORETICAL FOUNDATION

The Convention defines five domains of intangible cultural heritage, one of them is traditional craftsmanship. During the process of the Convention's ratification and while researching the fifth area "traditional craftsmanship", the Austrian Commission for UNESCO became aware of a Swiss study on the topic – and of the fact that comparable basic research had not yet been done in Austria. The Swiss study aimed to examine the present situation of traditional craftsmanship and to develop specific measures and other recommendations for the preservation of traditional trades and crafting skills (Haefeli et al., 2011).

Traditional craftsmanship is important for the Austrian economy, yet it lacks fundamental research on traditional craftsmanship (WKO, 2015a).

3 APPROACH

The presented study discussed traditional craftsmanship in Austria in several questions, especially the most important are:

- Just what is "traditional craftsmanship" understood to be and/or to what concrete parameters must "traditional craftsmanship" conform in order to be viewed as such today?
- What forms of traditional craftsmanship exist in Austria and how great are the threats to their respective survival?
- What forms of traditional craftsmanship are significant at present and for the future in terms of cultural and social policy and of the economy?

The term "tradition" is used according to the UNESCO-Commission and the Convention for Safeguarding of the Intangible Cultural Heritage, Article 2, Paragraph 1. "Tradition" relates to the English term "transmitted culture" (Barkow, Cosmides & Tooby, 1992). It is a living process, and represents a cultural benchmark to transmit and advance knowledge and skills sustainably over generations. Dynamic traditions do not oppose modernity, on the contrary, such traditions always incorporate modernity. "Culture" internalizes the interplay of dynamics and continuity (Noseck, 2015).

The intangible cultural heritage, transmitted from generation to generation, is constantly recreated and provides communities with a sense of identity and continuity (Noseck, 2015). The study understands *"traditional craftsmanship services"* as the production, installation, maintenance, caretaking and repairment of rather individualized goods in combination with services.

For the study, we used a method mix of qualitative and quantitative methods to acquire data. The design was cyclical through intermerging survey and interpretation, while continuously asserting quality of content and methodology. The qualitative primary data collection had the character of an empirical field study. It included concept, implementation and evaluation based on "the qualitative interview" (Froschauer & Lueger, 2003), focus group workshops and in-depth interviews with 67 experts. Followed by the the analysis and evaluation of all audio materials based on verbatim transcription. The quantitative secondary data collection happened through statistics and literature studies as well as archive research.

4 FINDINGS

Definition of the term "traditional craftsmanship" and the specific criteria that "traditional craftsmanship" must fulfill in order to qualify as such:

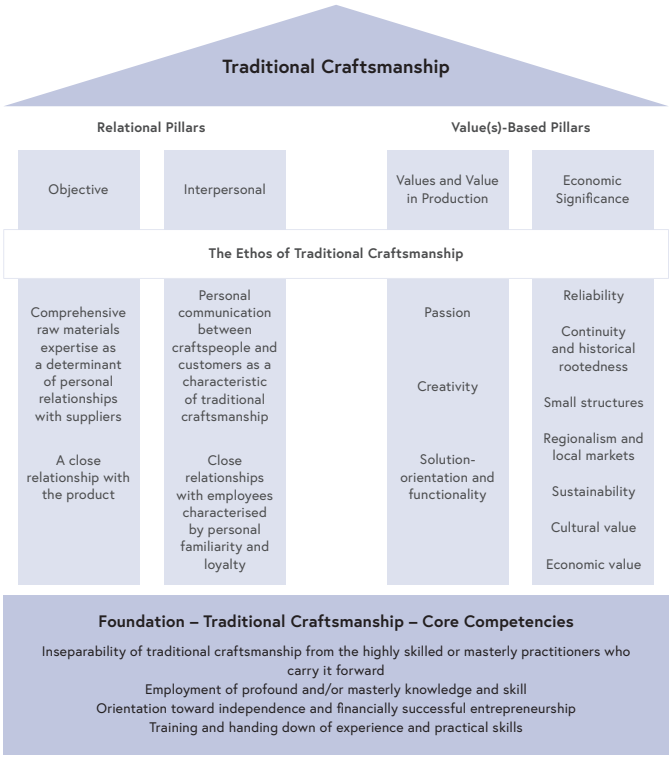

Figure 1: Descriptive Model of the Characteristics of Traditional Craftsmanship

This graphic defines the fundamental values and contents of "traditional craftsmanship". It represents the relationships and interplay between them by visualising a foundation plus relevant relational and value(s)-based pillars. The parameters forming the "foundation" are in constant interplay with the elements that make up traditional craftsmanship's relational and value(s)-based pillars. These elements, in turn, are closely interrelated via mechanisms of causes and effects.

In order to ensure traditional craftsmanship's medium-to long-term survival, it is necessary that all four of the parameters comprising the foundation be fulfilled. If even one of these parameters goes missing, it is no longer possible to speak of traditional craftsmanship in the strict sense. The essential defining parameters of traditional craftsmanship included in the foundation therefore represent indispensable core competencies, competencies without which traditional craftsmanship cannot successfully sustain itself and continue to develop.

In contrast to the essential elements listed in the foundation, the degree to which the elements of the relational and value(s)-based pillars are necessary – and/or of the degree to which they are manifested – is flexible. This flexibility is due to the heterogeneous nature of the various fields of traditional craftsmanship, with their differing outputs and/or services. In addition to production, these also encompass installation, maintenance and care of, and repairs to products combined with service-related components, all of which is frequently rather specialised and/or customised.

Therefore: not every single element of the relational and value(s)-based pillars needs necessarily be present in order to speak of traditional craftsmanship. But on the other hand: the less pronounced the characteristics from the relational and value(s)-based pillars at a business are, the less present practically applied, intangible traditional craftsmanship values are at that business.

In order to qualify as traditional craftsmanship, the four core competencies of the foundation should be joined by at least one essential defining parameter from each of the relational and value(s)-based pillars that is included in the values brought to bear in a business's strategic and operative orientation.

Endangering of traditional craftsmanship in their respective existences
The major reasons behind traditional craftsmanship's endangerment are trade professions' decreasing attractiveness and low social status, especially among young people, combined with constantly decreasing opportunities to earn money and achieve success enjoyed by those who practice traditional craftsmanship on an entrepreneurial basis.

The cultural, socio-political and economic relevance of traditional craftsmanship to the present and to the future
On the basis of their role in the economy, businesses practicing traditional trades and skilled crafts perform a multitude of functions that are sustainable, economic, social, and cultural in nature. Businesses practicing traditional trades and skilled crafts make contributions relating to:

- jobs and apprentice positions in their respective regions,
- supplying the local and regional populace with goods and services,
- the availability of products and services that convey a regional and/or national culture and identity,
- social commitment on location and in their surroundings,
- regional anchoring and networking,
- regional value-added chains,

- tax revenues on the municipal, state and national levels and
- crisis-resistance and autonomy.

Altogether, Austria is home to 151,558 active trade group members, businesses which represent the traditional craftsmanship occupations in the present study (WKO, 2015b).

Each year, these businesses train half of all apprentices. Proportionally, 55.6% of all training business are ones that work in trades and skilled crafts (Dornmayr & Nowak, 2014).

Every third Austrian business with employees is an enterprise that provides craftsmanship services as defined in the present study.

Of altogether 2,264,934 employees in businesses represented by the WKO, 537,418 individuals are employed by businesses that can be categorized as involved in traditional trades and skilled crafts (WKO, 2015c).

5 PRACTICAL AND RESEARCH IMPLICATIONS

Based on the research results, further topics for research can be derived:

- Measures to positively influence the image of and esteem for traditional craftsmanship in society, thus enhancing the attractiveness and social status of traditional trades and skilled crafts,

- Measures to improve the competitiveness of businesses practicing traditional trades and skilled crafts, thus contributing to sustainable economic success and higher potential income,

- Measures to improve the specialized qualifications of entrepreneurs and employees via the incentivisation of training and continuing education.

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COACHING, CULTURE AND GENERATIONAL KNOWLEDGE TRANSFER

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An earlier version of this article has been published as a conference paper: Smetana. J. B., Goris, T. and Lewis, K. (2019) 'Coaching, Culture and Generational Knowledge Transfer', in Tomé, E. and Kragulj, F. (eds.) Proceedings of the International Conference on Theory and Applications in the Knowledge Economy TAKE 2019. Vienna, Austria. pp. 534–544.

ABSTRACT

This conceptual paper will aim at discussing how coaching could be integrated into informal organizational learning and thus help the intergenerational workplace. Over the next decade, a mass exodus will be occurring as the baby boomers retire. Currently, organizations may have up to five generations working side by side. These include the Traditionalists, the Baby Boomers, Generation X, the Millennials, and possibly Generation Z. With increasing globalization in business, coaching and internal organizational collaboration have become critically important. Specifically, when members of a team are diverse in age as well as geography. As a result, leaders must decide on how to enable their staff to work successfully in an extremely fast paced and ever-changing work environment.

Keywords: coaching, intergenerational workplace, organizational learning, informal learning

KEY FINDING(S)

Currently, the findings are grounded in the literature the authors have reviewed. For example, in 2005, Leonard and Swap in their HBS article, Knowledge Coach, mentioned knowledge coaching as a useful tool to teach those who needed mentoring. They go on to mention how Jack Welch, the then CEO of GE, needed to learn about e-business because it was not his area of expertise. He had the company identify someone under thirty who could teach him all he needed to know about e-business.

If it worked then, it could continue to work if organizations and the individuals in them are willing to honestly identify the gaps in knowledge that exist or will exist.

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IMPLICATIONS FOR THE PRACTICE OF SMEs

The implication of intentionally creating mentoring and coaching programs in organizations can help their long-term viability. The constructs of mentoring and coaching are not new to vocational and/or skilled trades training. Apprentices have been learning trades from their teachers/mentors for many years, if not centuries.

Knowledge transfer through coaching could be viewed as an extension of this type of relationship. In the beginning, the novice is trained in the trade. Later, when the teacher is ready to retire, gaps in knowledge should be identified and addressed through knowledge coaching. Every organization has knowledge that is stored with each and every employee. This knowledge is neither written down nor archived. This is the knowledge that needs to be transferred before it is lost.

INTRODUCTION

A majority of organizations are challenged by managing a multi-generational workforce and have to pay serious attention to the issue of how certain operational tasks and practices are perceived and understood by a diverse workforce mass. As the retirement of baby boomers continues, a majority of companies will be deprived of their most knowledgeable sector of employees. This often brings negative consequences to the organizational climate. Thus, to eliminate negative consequences of this process, it is critically important to secure a transfer of knowledge through the use of coaching and mentoring. By using both as tools for the successful transfer of knowledge from one generation to the next. Companies, that need to "maintain excellence" in order to remain competitive including market sustainability should seriously consider employing the use of coaching and mentoring for this purpose.

The purpose of this article is to outline how coaching and mentoring strategies can influence informal learning in regard to generational differences between co-workers. This paper consists of three sections. In the first section, the authors identified inter-generational differences between employees. The second section is devoted to the concept of coaching and mentoring in organizations. The third section offers a different perspective on organizational culture (or subculture) that might affect coaching outcomes. With the ongoing globalization of the workforce, the authors of the paper assure that the present content would be applicable not only to the North American job market, but to other global regions as well.

1 GENERATIONAL KNOWLEDGE TRANSFER/TRANSFORMATION OF WORKFORCE

Currently, there are significant changes in the work environment on the North American job market due to the substantial changes in workplace demographics (Burke & Ng, 2006). Lyons and Kuron (2013), define Generation as a group of individuals who experiences the similar developmental events in their youth. Generational diversity in the majority of workplaces has increased, thus aging factors play a significant role in the functionality of any organization. The pre-retired (and often retired) generation of Baby Boomers, which were born between 1943-1960, are still a large and competent workforce domain in any sector of business or industry.

It needs to be pointed out that the current job market is occupied by an extraordinary number of senior employees. It is not an unusual to find that Baby Boomers are retiring much later in life (Carrière & Galarneau, 2012). Thus, the younger generation starting their career joins a workforce market that is heavily populated by at least three distinctive age groups. In addition to the Baby Boomers, these groups include Generation X, born between 1961-1980 and Millennials 1981-2000, as well as a small number of Generation Z, born after 2000.

Any new generation brings to the job-market a specific skill set, thoughts, behavior patterns, and ethical characteristics that form their overall performance and even productivity in the work place. Since a younger population of workers brings maximum changes, there is a need to pay specific attention to the most dynamic categories: Millennials and Generation Z. The active generation of Millennials often prompts provoking discussions about ethics, values and attitudes in organizational structure (Wok & Hashim, 2013). According to the "State of the American Workforce" report recently conducted by GALLUP (2017),

- Millennials are increasingly confident and ready to leave;
- only 1 in 5 employees strongly agreed that their leaders are setting good direction;
- only 15% of employees strongly agree that their leaders are making them excited about the future of their company;
- only 13% of employees are strongly agreed that their leaders are effectively communicating with the organization;
- It is a big challenge for the workers every day to coming, being engage, and maintain expected productivity that expected by leaders;
- Only 21% of respondents agreed that their performance is managed in a way that stimulates them to do outstanding work.

The majority of Millennial workers approach their roles in a company with a highly defined set of expectations. They want their work to have meaning and purpose. Interestingly, 51% of the workforce currently in jobs are actively searching for a new job or watching for openings. Millennials have the highest rates of unemployment, and those who hold full-time jobs often struggle to pay their bills. In opposition to Baby-Boomers and Generation-X, Millennials reported a high priority for maintaining a work-life balance and personal well-being. This is an important job aspect that influences employees' decisions to stay (or not) with a current employer. In addition, Gallup found that 68% of employees believe they are overqualified for their current job, meaning they have more education than what is required for the role. However, 45% of Millennials are more likely than both Generation-X (31%) and Baby Boomers (only 18%) to say a job that accelerates their professional or career development is 'very important' to them.

Specific attention should be paid to Generation-Z, since they will enter the global job market by 2020. According to Stillman (2017), GenZ currently represents about 72 million total. This is greater than the population of Germany. Therefore, employers cannot pretend that such a category still does not exist in the job market. This population of new workers has very unique characteristics, which were not present in any of the previous generations. According to Stillman (2017), these new-comers exist in "phigital" world, which states it is a combination of both: physical and digital. They took for granted the luxury of technology from the day they were born. Thus, coexistence in both words, physical and digital, is absolutely normal for them. The absence of truthful representation between the virtual world (presented through websites) and the real world is often perceived as unprofessional or even as 'lying to customers'. Whether "the customer" is a client and/or the employee. For example, Generation-Z want to be assured that attending a college, their perception of a digital campus is the same as a physical campus. When pictures on the web are different from the reality, then a speedy conclusion will be made: "this is not my place to be". Furthermore, if a potential employer does not have a sophisticated digital presence, that the GenZer is accustomed to, then there is a high probability that the GenZ job candidate will decline the job-offer by saying "this place is not for me". Another important factor, which makes GenZ unique, is a belief that for a successful career they do not have to go to college, since they are able to problem solve through Google. The population of GenZs are the direct product of consumer-purchasing relationships. Consequently, this philosophy significantly influences their employment choice and relationships within a specific organization. They want to be seen, and if not – they will continue their search for new employer. In these circumstances, every organization needs to rethink their strategies for transforming organizational knowledge and culture from one generation to another. Creating a coaching culture for the generations, in such circumstances, is a critical factor for organizational success.

2 THE ROLE OF COACHING IN KNOWLEDGE TRANSFER

Several factors play a role in how best to "transfer knowledge." First, one might consider the informal learning that takes place in an organization. Second, one needs to consider the organizational culture and it's openness to the generational reality. Third, and finally, the ability of those individuals who should be coaching towards the transfer of knowledge.

First, what is informal learning? Informal learning takes place every day. It is the supervisor and/or mentor taking the time to pay attention to the staff member who is struggling or who simply needs a helping hand. Taking the time to teach a new employee can help both motivate and engage that employee. The message sent by the organization is we care enough to take the time to teach you. From a developmental standpoint, this directly impacts the staff members attitude.

Gilley and Maycunich (2000) review both incidental learning as employees getting "information to do their jobs." What is pointed out is the fact that employees are the ones in charge of "their own practice" (Gilley & Maycunich, 2000: 246). Moreover, developmental learning is defined as follows:

Occurs with an equal emphasis on information exchange, knowledge acquisition and practice, and transfer and

integration at a high level. This kind of learning takes into account the importance of preparation, accountability, and recognition for learning and change (Gilley & Maycunich, 2000: 246).

Thus, coaching could be viewed as a construct to be used by both the organization and the individuals in the organization. From the perspective of developmental learning coaching could be two-fold. For example, a baby boomer who understands the importance of taking the time to build relationships could coach/mentor the millennial. The millennial who knows technology, could coach/mentor the baby boomer. In this way, both would be participating in the exchange and both would be contributing.

Second, how does organizational culture impact the generational reality? It begins with the definition of an organization's culture. If an organization wants their employees to experience a positive generational reality, it will begin with leadership's impact on respect. If leaders promote learning through coaching, then coaching will become part of their organizational culture.

There has been much discussion concerning the definition of organizational culture; some focus was given to it in the development of organizational behavior (Morey & Luthans, 1987). This suits the point the authors are trying to make. By using mentoring as a tool in promoting learning, it becomes an adapted behavior. Schein (1992) has made a distinction between the culture and organizational climate by stating that organizational culture is a much broader concept whereas climate pertains to the day-to-day environment of the workplace.

One international law firm implemented a coaching program and it showed measureable improvements in retention, challenge embracement, and professional and cultural growth (Bianco-Mathis & Schurgin, 2014). The program designated a list of ten coaches who were all experienced professionals. The program consisted of one-on-one sessions known as "coaching boot camps" (Bianco-Mathis & Schurgin, 2014). Coaches met with their coachees every month for an eight-month period. What the program did was it allowed the employees to understand the strategic and learning direction of the firm. The program changed how their employees learned within their environment.

Through reviewing different research studies on organizational learning and compiling data it is identified that when companies encounter a crisis their behaviors go through stages. The stages are weathering the storm, unlearning, and managerial change. During the first stage, the companies try to continue operating as they had been operating, on the assumption that their troubles are caused by temporary environmental conditions. During the second stage, companies gradually discover that the environmental changes have made their past operating methods obsolete, but they have great difficulty finding and adopting new operating methods because they have become so firmly dependent on their past methods. The third stage, managerial change, is the stage that was identified to be necessary for most companies to survive social or technological environmental changes and become a gainful company again.

Similarly, authors Levitt and March bring to light a variety of factors namely, that organizational learning is based on behavioral observations including:

1. That organizational behavior is based on routine.
2. That organizational actions are based on what has occurred historically.
3. That organizations are based on outcomes.

It goes on to discuss learning by doing. Competency traps are discussed as a hurdle in allowing learning organizations to move forward or adapt once they've gotten used to a particular routine. This is where coaching might be the answer.

Coaching is defined by the International Coaching Federation (ICF) as "partnering with clients in a thought-provoking and creative process that inspires them to maximize their personal and professional potential." What this brings to mind is development, learning that in turn helps to engage and motivate. Individuals who continue to learn and develop are more likely to be engaged with their jobs and with their colleagues.

Coaching is a different approach to creating and managing change. It does not seek to direct, but rather discover. This is reminiscent of an "Appreciative Inquiry" connection.

ICF has a set of core competencies that should be used in guiding the coach forward. These include four major categories. They are setting the foundation, co-creating the relationship, communicating effectively and facilitating learning. Each one of these categories has subcategories. These include:

Setting the Foundation

1. Meeting ethical and professional standards
2. Establishing the coaching agreement

Co-Creating the Relationship

3. Establishing trust and intimacy with the client
4. Coaching presence

Communicating Effectively

5. Active listening
6. Powerful questioning
7. Direct communication

Facilitating Learning and Results

8. Creating awareness
9. Designing actions
10. Planning and goal setting
11. Managing progress and accountability

Reviewing these competencies one begins to see the connection between a caring culture and a coaching culture. Having a coaching culture can help enhance organizations by building trust amongst the leadership and the staff. Building awareness, creating shifts in behavior from the perspective of the individual instead of the organization could help the well-being of all involved. At it's core coaching offers both the organization and the individual an opportunity to develop, learn, and build relationships that matter. Engaged employees and teams contribute to the effectiveness of the organization.

Coaching as one with informal learning can allow the organization and the individuals that make up the organization to become more confident by creating success. The predicted changes include changes in people, changes in technology, and changes in the organization (Parsole & Leeham, 2017). These factors will consistently continue to change throughout the future, but how these changes are handled when they happen directly affects the organization. Internal coaches will need to realize how these changes will be addressed and how they will respond to meet these changing needs when the time comes.

Whether coaching baby boomers or millennials, the goal of coaching is key. By coaching, we address the individual's potential irrespective of their age or generation. If coaching can be used as a tool for baby boomers to pass on their knowledge thereby allowing millennials to experience it. Might not the workplace culture be enhanced?

3 ORGANIZATIONAL CULTURE

Culture is one of the most challenging characteristics of a workplace. It is not easily seen nor is it written about in an employee handbook, yet leaders of successful organizations often credit culture as one of the most important drivers of success. Some even go as far as suggesting that culture will trump strategy when it comes to business outcomes. Decades of research supports the impact culture has on influencing the attitudes and behaviors of individuals within an organization. If culture sets the tone for the behaviors and attitudes of employees, how might organizations benefit from a culture supportive of realizing and unleashing individual potential while promoting collaboration amongst employees at all levels?

Today's workforce is primed with opportunities to benefit from the diversity of an intergenerational workforce. When working together as a team, "older workers can see the big picture and draw on experience while younger workers can bring a new edge to spotting trends and integrating technology" (Applewhite, 2019: 152). The blending of differences can lead to increased productivity and innovation through the sharing of knowledge. The key to unlocking this potential lies with breaking down intergenerational barriers and encouraging knowledge sharing within the organization at all levels.

A recent focus has been placed on the use of coaching to address the growing demands organizations are facing today. Coaching is often used as development tool for leaders and high potential employees, but recent research suggests that when coaching behaviors are embedded within an organization and used by all people at all levels, the workplace may benefit from increased job satisfaction, productivity, innovation, collaboration and teamwork

(Anderson, Cylient & Hernez-Broome, 2009; Gormley & Nieuwerburgh, 2014). By widening the scope of coaching from executives to all employees within an organization, a coaching culture is emerging as a promising strategy for addressing the needs of today's diverse workforce.

Though there is currently no universal definition of a coaching culture, a few definitions have been offered. Hawkins (2012) suggests that:

A coaching culture exists in an organization when a coaching approach is a key aspect of how the leaders, managers, and staff engage and develop all their people and engage their stakeholders, in ways that create increased individual, team, and organizational performance and shared value for all stakeholders (Hawkins, 2012: 21).

Building on a review of the literature and an effort to further research, Gormley and Nieuwerburgh (2014) offer the following definition of a coaching culture:

A coaching culture exists within an organisation when it has embedded a coaching approach as part of its strategic plans in a transparent way. Coaching cultures should motivate individuals and facilitate cooperation, collaboration and connection within the organisation and with its external stakeholders (Gormley & Nieuwerburgh, 2014: 99).

Pullen and Crane (2011) suggest that the differing definitions of coaching cultures share three common themes. These include:

1. Coaching is an accepted tool used for developing leaders.
2. Coaching skills are used by leaders for employee development.
3. Employees at all levels use coaching behaviors to interact with each other.

Any strategic change within an organization can be a daunting task. Undertaking a change in culture can be an especially difficult initiative which will require careful planning and implementation. Due to the limited research, there is no agreed upon framework for how to create a coaching culture. Hawkins (2012) and most recently, Spadafore (2019) offer a set of steps to follow for successful integration of a coaching culture. Hawkins (2012) recommends a seven step process for building coaching culture which involves:

1. Bringing in external coaches to begin with top leadership;
2. Implementing internal coaches;
3. Gaining support from leadership;
4. Moving away from formal coaching to team coaching and organizational learning;
5. Integrating coaching into performance management;
6. Establishing a management style of coaching;
7. Implementing coaching as a new way of doing business with all stakeholders.

Spadafore (2019) offers a condensed four step process to building a coaching culture which includes:

1. Understanding what coaching is and what it is not;
2. Strategically aligning coaching goals to organizational goals;
3. Gaining buy-in from leadership;
4. Using the right coaches.

Both offer a similar roadmap to creating a coaching culture. While Spadafore (2019) offers a foundation necessary to for successful implementation, Hawkins (2012) offers a more robust framework or model for undertaking such a change.

Spadafore's (2019) first step could be the key component that will set apart a successful coaching culture from an ineffective one. She stresses the importance for understanding the difference between coaching, mentoring, advising, and managing. Often times when managers are held responsible for coaching the employees, it is misconstrued as a remedial activity to improve performance. An adviser is looked to as a guide when direction is needed and a mentor is assumed to have all the answers due to already having the experience. In a true coaching relationship, the person being coached steers the coaching interactions. (Spadafore, 2019). Spadafore (2019) further argues that because research has shown that people are more likely to follow through on goals and initiatives they set themselves, adapting a coaching style behavior will set the tone for employees at all levels to take responsibility for coaching opportunities and knowledge sharing throughout the organization.

Megginson and Clutterbuck (2006) offer a four stage assessment tool for measuring progress toward creating a coaching culture. The four stages include:

1. Nascent – little to no commitment within the organization. Coaching, if present at all is inconsistent and of poor quality.
2. Tactical – the organization acknowledges the value of a coaching culture, but lacks an understanding of what a coaching culture truly is.
3. Strategic – the organization has made effort toward building a coaching culture, and while the formal coaching process is strong, the informal coaching between all employees is lacking.
4. Embedded – formal and informal coaching occurs at all levels and with all employees. At this stage, coaching behaviors are automatic and employees take the responsibility to provide feedback and share knowledge with all members of the team.

Today, organizations are facing a new reality. There isn't a place to hide. Companies are forced to adapt to the needs of the modern workforce, or they will struggle to find and keep good employees which will impact their customer service. Gallup reports rapid changing attitudes towards workplace culture: employees become customers of the job market, thus organizations have to invest significantly in order to keep and retain employees. Unhappy employees will find another place to work, and will project their unhappiness about a previous employer.

"If leaders want to compete for a modern workforce, they should consider weaving some element of flexibility into their culture" (State of the American Workforce, 2017: 46).

LIMITATIONS

At this point in time, the paper is a conceptual one and the limitations reflect a lack of applied research. Testing these concepts in the real world and seeking to gather evidence may possibly lead to grounded theory.

RECOMMENDATIONS

Culture significantly influences how organizations function, and many studies have addressed the role of organizational culture. Historically, organizations have been studied as cultures and even subcultures. Organizations are seen to have specific cultural qualities (Weber, 1947; Parsons, 1951). They have both formal and informal norms of behavior and, they create their own stories (Van Maanen & Barley, 1984; Martin et al.,1983).

Observing the day to day and the informal communication that takes place within an organization may lend itself to further study concerning how coaching impacts employee knowledge transfer and learning.

CONCLUSION

Both in industry and in academia knowledge transfer and coaching are constructs that continue to come up in current discussions of the baby boomer retirements. Understanding how coaching may be advantageous in helping with the mass exodus of baby boomers would be beneficial. Industry may want to begin implementing informal coaching programs to allow intergenerational relationship building. Leadership can play a role by helping to identify the knowledge gaps and support both the mentors and mentees through the process of transferring the "deep smarts" (Leonard & Swap, 2005) of their organizations.

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THE ROLES OF MARKET KNOWLEDGE MANAGEMENT SYSTEM AND MARKET KNOWLEDGE SHARING ON SMEs' ORGANIZATIONAL PERFORMANCE

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An earlier version of this article has been published as a conference paper: Wahid, K. A. and Zahari, A. S. M. (2019) 'The Roles of Market Knowledge Management System and Market Knowledge Sharing on SMEs' Organizational Performance', in Tomé, E. and Kragulj, F. (eds.) Proceedings of the International Conference on Theory and Applications in the Knowledge Economy TAKE 2019. Vienna, Austria. pp. 691–705.

ABSTRACT

Market knowledge becomes an important factor in creating competitive advantage to an organization. Market knowledge consists of customer knowledge, competitor knowledge and supplier knowledge. Those knowledges should be managed and analyzed by Market Knowledge Management System (MKMS) in order to create an advantage to an organization. The new discovered market knowledge should be shared within an organization so that an organization can identify a new pattern, a new trend and a new preference in a market. However, majority of SMEs in Thailand misunderstood about deploying an information technology. They perceive information technology as a success factor of an organizational performance. The purposes of this study are to investigate the impact of market knowledge on market knowledge management system (MKMS). Second is to examine the effect of market knowledge management system (MKMS) on market knowledge sharing. The study also aims to examine the influence of market knowledge sharing (MKS) on organizational performance (OP). The last objective is to study the mediating effect of market knowledge management system and market knowledge sharing. The study was conducted on 209 Thai SMEs and the data was analyzed using SmartPLS 3. The results showed that customer knowledge (CK), competitor knowledge (COK) and supplier knowledge (SK) have significantly affected Market Knowledge Management System (MKMS). Meanwhile, market knowledge sharing (MKS) has been positively influenced by MKMS. Market knowledge sharing (MKS) also has positively impacted organizational performance. However, customer knowledge, competitor knowledge and supplier knowledge did not have indirect effect on organizational performance. The above findings showed that MKMS and market knowledge sharing did not have mediating effects.

Keywords: Market Knowledge, Market Knowledge Management System, Knowledge Sharing, Organizational Performance

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KEY FINDING(S)

- The findings supported that market knowledge dimensions which consisted of three dimensions, namely customer knowledge, competitor knowledge and supplier knowledge contributed positively to the organizational performance.

- The finding also showed that market knowledge managemnet system (MKMS) and market knowledge sharing (MKS) had to be implemented in an organization. Indierct effect testing showed that MKMS and MKS did not mediate between market knowledge and organizational performance.

- An analysis from Importance Performance Matrix Analysis (IPMA) indicated that market knowledge sharing (MKS) had a high performance and a high importance in contributing to organizational performance by looking at R square value of market knowledge sharing's impact on organizational performance was 34.75% compared to market knowledge management system (6.1%) and market knowledge (27.6%).

IMPLICATION(S) FOR THE PRACTICE OF SMEs

The findings from the above study shows that market knowledge (customer, competitor and supplier) plays an important factor in organizational performance. An organization should acquire knowledge from the market in order to create innovation and competitive advantage. This knowledge is very important for SMEs since they are lacking of resources in terms of capital, human resource and technology.

Knowledge management system becomes an important tool in managing and analyzing market knowledge. Market knowledge must be managed properly and it will become very useful asset for creating innovation. The outcomes of the analysis from market knowledge should be shared and communicated within an organization so that all staff will have the same direction and mission to achieve an organizational goal. Therefore, knowledge sharing becomes an important activity in creating new knowledge among employees as well as a step forward to create a learning organization.

1 INTRODUCTION

The small and medium enterprises (SMEs) sector has an important role to play in developing economies not only in economic development, but also in poverty alleviation and job creation. Also, SMEs have been recognized as an important strategic sector in Thailand for generating high economic growth, reducing unemployment, inequality and poverty. SMEs stimulate private ownership and entrepreneurial skills. SMEs organizational performance is a focal phenomenon in business studies. However, it is also a complex and multidimensional phenomenon. Performance can be characterized as the firm's ability to create acceptable outcomes and actions. For many organizations achieving improved performance is not only dependent on the successful deployment of tangible assets and natural resources but also on the effective management of knowledge. Knowledge has become a key asset and competitive advantage for many organizations operating in increasingly complex and competitive environments. Knowledge is the crucial factor behind sustainable advantage and success for organizations. Very often, the sole survival and success of an organization depends on its ability to harness and use knowledge. Therefore, knowledge, as a key asset, is fundamental to building an organization's competitive advantage.

The knowledge-based economy has brought about significant shifts in the way organizations respond to rapidly changing customer preferences and constantly shifting competition. Market knowledge becomes an important factor in creating competitive advantage to an organization. According to the Knowledge Based View (KBV) theory, market knowledge becomes an external factor which is vital and can affect an organizational performance. Market knowledge consists of customer knowledge, competitor knowledge and supplier knowledge. Those knowledges should be managed and analyzed by Market Knowledge Management System (MKMS) in order to create an advantage to an organization. The new discovered market knowledge should be shared within an organization so that an organization can identify a new pattern, a new trend and a new preference in a market. However, majority of SMEs in Thailand misunderstood about deploying an information technology. They perceive information technology as a success factor of an organizational performance. Therefore, the purposes of this study are to investigate the impact of customer knowledge, competitor knowledge and supplier knowledge on market knowledge management system. Second is to examine the effect of market knowledge management system on market knowledge sharing. The study also aims to examine the influence of market knowledge sharing on organizational performance. The last objective is to study the mediating effect of market knowledge management system and market knowledge sharing.

2 THE LITERATURE REVIEW

2.1 MARKET KNOWLEDGE

According to the stakeholder theory (Freeman, 1984), stakeholders refer to groups and individuals who can affect or are affected by the organization's purpose which include customers, competitors, suppliers, government, NGOs and communities (Day, 1994; Kaler, 2006; Yaziji, 2004; Holmes & Smart, 2009). They are divided into primary and secondary stakeholders. The primary stakeholders are those who are directly involved in a market relationship such as customers, competitors and suppliers. Meanwhile secondary stakeholders, government, NGOs, communities and etc., refer to those who are not directly involved in a market relationship (Ayuso et al., 2011). This research studies only on primary stakeholders.

The voice of the customers is deployed throughout the product planning and design stages (Franceschini & Rossetto, 1997). It will become an input in the product design and development (Zairi & Youssef, 1995). Customers should be the driving force behind product development. A firm which commits itself to superior customer service and integrates customer preferences and needs into its product development strategy has the best guarantee for long-term success (Gatignon & Xuereb, 1997). The new product development process has relied heavily on customer input to evaluate a product innovation's viability, design, and positioning (Zhang & Duan, 2010). Any changes in customers' demands may negatively affect the value of current marketing capabilities.

Competitors are defined as organizations or firms offering products or services that are close substitutes, in the sense that they serve the same customer need (Kotler, 2000). Competitors' knowledge would provide a solid basis of information pertaining present and potential competitors for executive actions. It also can enhance a firm's competitive advantage by allowing it to benchmark with, learn from, imitate, and improve on the products of successful competitors (Drew, 1997). A considerable body of marketing thought suggests that competitor orientation should improve an organization's performance by enabling the organization to position its strengths against rivals' weaknesses (Slater & Narver, 1994). Besides, customers' implicit needs and preferences, an organization also needs to analyze competitors' strength, weaknesses, capability and strategy in order to sustain competitiveness in the market (Narver & Slater, 1990). This rivalry view is also shared by prominent theorists in management and economics, who argue that an organization's performance largely depends on its ability to "beat the competition" either by manipulating an industry's structural parameters, as in competitive forces theory (Porter, 1980), or by developing difficult-to-imitate competencies, as in the resource-based perspective (Barney, 1991). Specific competitor orientation may result from an in-depth analysis of the behavior, products, and strategies (De Luca & Atuahene-Gima, 2007).

2.2 MARKET KNOWLEDGE MANAGEMENT SYSTEM

The delevolpment of knowledge management system (MKMS) makes an organization to retrieve needed information very quickly and on time. Organizations use different information systems to facilitate knowledge sharing through creating or acquiring knowledge repositories, where employees share expertise electronically and access to shared experience becomes possible to other staff (Connelly & Kelloway, 2003). This system is very important especially in service providing organization such as telephone operator department. Any delay in response to customers will make customers dissatisfied with the service. Tsoukas and Vladimirou (2001) found that telephone operators will retreive customers' profile very quickly. Ideally, an organizational member will have all information they needed. Without a solid IT infrastructure, an organization cannot enable its employees to share information on a large scale. Yet the trap that most organizations fall into is not a lack of IT, but rather too much focus on IT.

Information system becomes one of the critical success factors in implementing knowledge management (Hasnali, 2002). The study shows that information system has a significant positive influence on the process of knowledge creation (Lopez-Nicolas & Soto-Acosta, 2010). A study shows that as knowledge sharing increases, the existence of information systems also increases. In other words, information systems and knowledge sharing

are positively related (Al-Alawi et al., 2007). The study in small innovative hi-tech companies shows that the use of information technology (IT) assists in creating new knowledge (Spraggon & Bodolica, 2008). IT represents a valuable tool where individual, group and organizational knowledge are continuously codified, stored, diffused and renewed. It also represents a significant source of organizational learning and knowledge creation.

The study of Yang, Chen and Wang (2012) on the impacts of information technology on knowledge management practice in construction industry shows that levels of IT application are positively associated with projects' levels of knowledge management. Additionally, project outcomes can be achieved with higher levels of knowledge management. The findings also indicate IT application affects project performance in terms of schedule and cost success as well as quality and safety performance.

As IS are being improved and developed, discussions on their effectiveness and evaluation of their success have been continuously debated by researchers, scholars and practitioners (Hussein, Selamat & Karim, 2005). In an attempt to evaluate or measure the effectiveness of IS, various models and frameworks have been proposed and validated in diverse IS implementation settings. Masrek (2007) reformulated the IS effectiveness model by developing four dimensions of IS effectiveness model. Masrek's IS effectiveness model consists of four dimensions: service quality, systems quality, information quality and user satisfaction.

Service quality is defined as the users' subjective assessment that the service they are receiving from the portal is the service they expect. Aspects covering service quality include responsiveness, reliability, confidence, empathy, follow-up service and competence (Ahn, Ryu & Han, 2004). Systems quality is the measure of the portal itself and focuses on the outcome of the interaction between the user and the portal system. Items measuring system quality would include design, navigation, response time, system security, system availability and functionality (Ahn et al., 2004). Information quality is defined as a function of the value of the output produced by a system as perceived by the user (Negash, Ryan & Igbaria, 2003). Measures associated with information quality include content variety, complete information, detailed information, accurate information, timely information, reliable information, and appropriate format (Ahn et al., 2004). User satisfaction is defined as the degree to which users believe that the portal at their disposal fulfils their needs (Ives, Margrethe & Baroudi, 1983). The model developed by Masrek (2007) is adopted in this study.

2.3 MARKET KNOWLEDGE SHARING

Nowadays, the formation and use of new knowledge is necessary to the survival of businesses. Customer knowledge that has been gathered in an organization is of no use unless it is shared with those people who need to know. According to Okyere-Kwakye and Khalil (2011), knowledge sharing has been tagged as the key element within the organizations in the 21st century. Therefore, knowledge sharing has been given great attention by both academicians and practitioners (Wangpipatwong, 2009). They further argued that sharing of knowledge is not easy to implement due to the nature of knowledge. Therefore, employees should have the ability to share, collaborate with others to solve problems, develop new ideas or implement policies or procedures pertaining to sharing of knowledge.

To create knowledge sharing culture, organizations need to encourage employees to work together more effectively to collaborate and to share organizational knowledge more effectiveness, thus, can better perform their jobs (Xiong & Deng, 2008). According to Huang and Huang (2012), effective knowledge sharing among members has become a competitive requirement for organizations. Therefore, the implementation of knowledge sharing among employees can improve an organization as a whole to meet its business objectives.

According to Kang et al. (2008), knowledge sharing is defined as the transmission or distribution of individual knowledge in an organization. Furthermore, individual members of an organization with different ideas, jobs and experiences will create new knowledge by communicating and sharing knowledge (Kang et al., 2008). In relation to this, Haas and Hansen (2007) mentioned that there are two distinct ways of transferring knowledge across organizations which are transferring knowledge between individuals and transferring knowledge through written documents.

Knowledge sharing is thought to be influenced by factors both at the individual and at the organizational level (Hong et al., 2011). In addition, past research has identified individual and organizational factors as the antecedents of knowledge sharing. The antecedents of knowledge sharing can be identified by the following factors such as motivation to share, rewards, opportunities to share, culture and work environment (Ahmadi et al., 2012), motivation (Llopis-Corcoles, 2011), communication (Bratianu & Orzea, 2010), trust between individuals (Ahmadi et al., 2012; Hansen, Rasmussen & Bosse, 2013). A study conducted by Wahid et al. (2019) found that knowledge sharing has a positive influence on organizational performance. However, research by Ahmadi et al. (2012) in Iranian bank found that trust, reward and information technology have a significant relationship whereby the organizational culture failed to support the influence of knowledge sharing to Iranian bank.

2.4 ORGANIZATIONAL PERFORMANCE

Measuring the performance of organization is very important as an indicator to achieve organization effectiveness. The literature on organizational performance shows that there is no single universal measure or common framework that can be used to assess overall organizational performance (Alkalha, Al-Zu'bi, Al-Dmour, Alshurideh & Masa'deh, 2012). Similarly, Alkalha et al. (2012) mentioned that it is difficult to measure organizational performance especially because what is measured changes continually.

Antony and Bhattachatyya (2010) proposed organizational performance a construct that can be used to evaluate and assess the successfulness of organization to create and deliver values to its external and internal stakeholders. As the literature goes, many scholars and practitioners agree that organizational performance can be used as an indicator to evaluate how well an organization achieves its objectives and to assess the efficiency and effectiveness of goal achievement (Al-Dhaafri et al., 2013). Venkatraman and Ramunajan (1986) argued that organizational performance is an indicator, which can measure how well an enterprise achieves its own objectives. Those indicators are sale growth, company return on investment (ROI), company return on assets (ROA), market share, new product introduction and product quality. This study has adapted measurement of organizational performance developed by Venkatrman and Ramunajan (1986).

The above discussion shows that there is a relationship between customer knowledge, knowledge sharing and the organizational performance. Hence, the hypotheses are as follows:

H1: Customer knowledge (CK) has positively influenced market knowledge management system (MKMS).
H2: Competitor knowledge (COK) has positively influenced market knowledge management system (MKMS).
H3: Supplier knowledge (SK) has positively influenced market knowledge management system (MKMS).
H4: Market knowledge management system (MKMS) positively affects market knowledge sharing (MKS).
H5: Market knowledge sharing (MKS) positively affects organizational performance (OP).
H6: Market knowledge management system (MKMS) and market knowledge sharing mediate between market knowledge (MK) and organizational performance (OP).

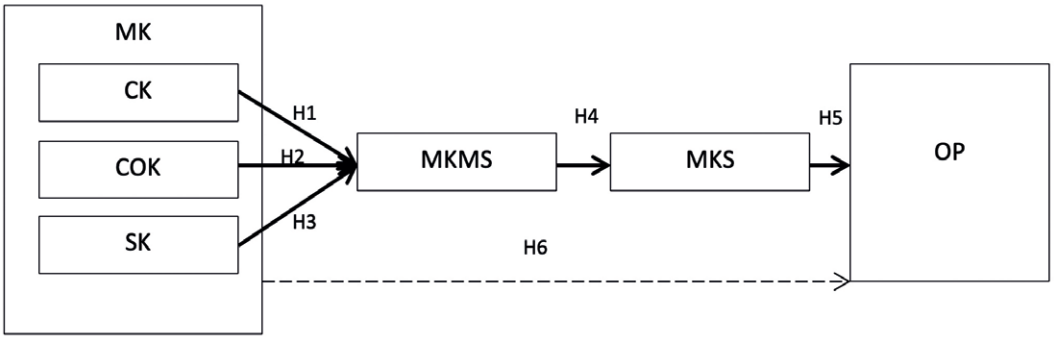

Figure 1: Research framework

3 RESEARCH METHODOLOGY

This study utilized survey research. The questionnaires were used to collect data. A corresponding 5 Likert scale was deployed (1 for "Strongly Disagree"; 2 for "Disagree"; 3 for "Neither Agree nor Disagree"; 4 for "Agree" and 5 for "Strongly Agree"). Prior to pilot testing and main data collection, the questionnaires were pre-tested with several experts in the field and also several insurance companies who could become the prospective respondents. The questionnaires were pilot tested with 30 insurance companies. Using the SmartPLS, the responses of these 30 companies were analyzed for assessing the reliability of the measurements. The recorded Cronbach Alpha for all variables employing multi-items estimated range from 0.65 – 0.88 which suggests that the questionnaires were reliable (Kline, 2011).

The populations of the study were 416 Malaysian insurance companies listed in the National Innovation Agency of Thailand (NIA). There were 215 companies responded. However, only 209 questionnaires were valid for the data analysis. The remaining 209 were analyzed using Partial Least Square (SmartPLS version 3). This study will first develop and assess the measurement model and followed by the development and assessment of the structural model.

Previous studies have indicated a sample threshold of as little as 100 samples for PLS-SEM (Reinartz, Haenlein & Henseler 2009). Alternatively, one can revert to the more restrictive minimum sample size recommended based on statistical power (Hair, Hult, Ringle & Sarstedt, 2014). We used G*Power to calculate the sample size based on statistical power (Faul, Erdfelder, Buchner & Lang, 2009), suggesting that we needed a sample size of 138 for a statistical power of 0.95 for model testing. Since, our sample size exceeded 138, the power value in this study also exceeded 0.95. Moreover, the minimum power required in social and behavioural science research is typically 0.8. Therefore, in both cases, we can conclude that our sample size was acceptable for the purposes of this study.

4 DISCUSSION

The respondents of the study were 209 Thai SMEs, the categories of companies consisted of 44.50% was eco-industry, 34.45% was design & solution and 21.05% was bio-technology. Most of the respondents were from central zone which was 74.16% followed from the south 8.61% and 7.18% was from the northeast and the north (6.70%). Most of the respondents (58.85%) were small companies which have less than 50 employees.

4.1 COMMON METHOD VARIANCE (CMV)

Due to the self-reported nature of the data, there was a potential for common method variance (CMV), and so the Harman one-factor test was conducted to determine the extent of this. According to Podsakoff and Organ (1986), common method bias is problematic if a single latent factor would account for the majority of the explained variance. The un-rotated factor analysis showed that the first factor accounted for only 26% of the total 74% variance, and thus the common method bias was not a serious threat in the study.

4.2 MEASUREMENT MODEL

To examine the research model Partial Least Square (PLS) analysis technique was employed by using the SmartPLS 3 software version 3.2.8 (Ringle, Wende & Becker, 2015). In an effort to refine all structural equation models two stage analytical procedure was employed, where researchers tested the measurement model and structural model recommended by Hair, Sarstedt, Hopkins & Kuppelwieser (2014). Prior to structural modelling, the study has to assess the measurement model of latent construct for their dimensionality, validity, and reliability. Cronbach's (α) and composite reliability were also tested as recommended by Henseler, Ringle & Sarstedt (2015).

The measurement model used in this study included five constructs: customer knowledge (CK), competitor knowledge (CoK), supplier knowledge (SK), market knowledge management system (MKMS), market knowledge sharing (MKS) and organizational performance (OP). In assessing a model's reliability, the loading of each indicator on its associated latent variable must be calculated and compared to a threshold. Generally, the loading should be higher than 0.7 for indicator reliability to be considered acceptable (Hair, Hult, Ringle & Sarstedt, 2014). A loading lower than 0.4 indicates that an item should be considered for removal, and items with a loading of 0.4–0.7 should be considered for removal if they increase the composite reliability (CR) and Average Variance Extracted (AVE) above the threshold (Hair, Hult, Ringle & Sarstedt, 2014). Table 1 indicates that most of the indicator loadings on their corresponding latent variables for the respondents were higher than 0.7.

4.3 VALIDITY ASSESSMENT

Validity was assessed in terms of convergent validity and discriminant validity. Convergent validity is the extent to which the scale correlates positively with other measures of the same constructs (Malhotra, 2002). Convergent validity of measurement model is usually ascertained by examining the factor loading, average variance extracted (AVE) and compost reliability (CR) (Hair, Black, Babin, Anderson & Tatham, 2010). All the values were above 0.6, shows the convergent validity of the model. Convergent validity can be evaluated by examining the loading (≥ 0.6), AVE ≥ 0.5, and CR ≥ 0.7 (Kim, 2010). Each item's coefficients on its underlying construct were observed. A test of each item's coefficient was used to assess convergent validity. All values fulfil the required standard, indicating high convergence validity. Table 1 shows the results of factor loadings threshold level of 0.7 as recommended by Hair et al. (2010).

Table 1: Factor loading, C.R. and AVE

Constructs	Loading	Beta	C.R.	AVE
SK	0.807	0.807	0.872	0.631
OP	0.819	0.819	0.871	0.576
MKMS	0.838	0.838	0.889	0.666
MKS	0.878	0.878	0.924	0.803
COK	0.866	0.866	0.902	0.650
CK	0.799	0.799	0.882	0.713

Besides assessing the convergent validity, the study also evaluated the discriminant validity. Discriminant validity can be evaluated by examining Fornell-Larcker Criterion (Fornell & Larcker, 1981) and Heterotrait-Monotrait Ratio (HTMT) (Henseler, Ringle & Sarstedt, 2015). Fornell and Larcker (1981) have suggested examining whether the square root of the AVE for each construct is greater than the correlation between the constructs. There are two ways of using HTMT to assess discriminant validity: (1) as a criterion or (2) as a statistical test. First, using HTMT as a criterion involves comparing it to a predefined threshold. If the value of HTMT is higher than this threshold, one can conclude that there is a lack of discriminant validity. Some authors suggest a threshold of 0.85 (Kline, 2011), whereas others propose a value of 0.90 (Gold, Malhotra & Segars, 2011). Table 2 and table 3 show the results of the discriminant validity assessment of the measurement model using the Fornell–Larcker criterion and HTMT ratio and indicate that the models possess acceptable discriminant validity.

Table 2: Fornell and Larcker

Constructs	CK	COK	MKS	MKMS	OP	SK
CK	**0.845**					
COK	0.503	**0.806**				
MKS	0.184	0.287	**0.896**			
MKMS	0.448	0.415	0.247	**0.816**		
OP	0.221	0.278	0.589	0.158	**0.759**	
SK	0.602	0.450	0.205	0.435	0.220	**0.794**

Table 3: Heterotrait-Monotrait Ratio (HTMT)

	CK	COK	KS	MKMS	OP	SK
CK						
COK	0.596					
KS	0.206	0.317				
MKMS	0.508	0.453	0.263			
OP	0.267	0.337	0.652	0.186		
SK	0.735	0.534	0.258	0.492	0.268	

4.4 STRUCTURAL MODEL

We performed bootstraping involved 5000 samples whilst our actual sample stood at 209. The SEM results are presented in Table 4 and Table 5. It can be observed that R^2 values for MKMS is 0.276, suggesting that 27.6% of the variance in MKMS is explained by the customer knowledge (CK), competitor knowledge (CoK), and supplier knoweldge (SK). The MKMS construct in turn contributes to 6.1% of the variance in market knoweldge sharing (MKS) based on the R^2 values of 0.061. Meanwhile MKS contributes to 34.7% of the variance in organizational performance (OP). Table 4 shows that all beta path coefficients were positive and in the expected direction and were statistically significant. To elaborate the significant effect of customer knowledge (CK) ($\beta = 0.214$, $p < 0.05$), competitor knowledge (CoK) ($\beta = 0.211$, $p < 0.05$), supplier knoweldge (SK) ($\beta = 0.213$, $p < 0.05$), market knowledge management system (MKMS) ($\beta = 0.274$, $p < 0.05$) and market knowledge sharing (MKS) ($\beta = 0.589$, $p < 0.05$). Thus H1, H2, H3, H4 and H5 are supported but H2 is not supported. The result also reveals that market knoweldge sharing (MKS) has a high impact, 34.7%, on organizational performance.

Table 4: Path coefficient and hypotheses testing (Direct Effect)

Hypotheses	R^2	Beta	S.D.	T Value	Decision	VIF	Q^2
H1:CK → MKMS	0.276	0.214	0.113	1.901	supported	1.756	0.037
H2:COK → MKMS		0.211	0.116	1.842	supported	1.402	
H3:SK → MKMS		0.213	0.105	2.015	supported	1.644	
H4:MKMS → MKS	0.061	0.247	0.104	2.372	supported	1.000	0.147
H5:MKS → OP	0.347	0.589	0.063	9.320	supported	1.000	0.171

Table 5: Indirect Effect

Path	Beta	S.D.	T Values	Decision
CK → MKMS → MKS	0.053	0.037	1.442	Not supported
COK → MKMS → MKS	0.053	0.040	1.313	Not supported
SK → MKMS → MKS	0.052	0.035	1.485	Not supported
CK → MKMS → KS → OP	0.031	0.022	1.397	Not supported
COK → MKMS → KS → OP	0.031	0.024	1.276	Not supported
SK → MKMS → KS → OP	0.031	0.022	1.381	Not supported
MKMS → MKS → OP	0.146	0.069	2.113	Supported

To test indirect effect, we employed Preacher and Hayes (2008) bootstrapping method. First we tested the indirect effect of CK, CoK and SK on MKS. The bootstrapping analysis revealed that the indirect effect of β=0.053 with *t* values of 1.442, β=0.053 with *t* values of 1.313 and β=0.052 with *t* values of 1.485 respectively (Table 5). We found that there is not a mediating effect of MKMS between market knowledge and market knowledge sharing (MKS) given that the indirect effects with *t* values less than 1.645. Based on the above result we can conclude that the mediation effect of MKMS and MKS on the relationship between market knowledge (MK) and OP is statistically insignificant. Thus, H5 is unsupported. However, market knowledge sharing has a mediating effect between market knowledge management system (MKMS) and organizational performance (OP).

We evaluated for multicollinearity among the variables in our model, and did not find any cause for concern using the criteria of variance inflation factor (VIF), which were (Table 4) all below the suggested value of 5.00 (Hair et al., 2014). Finally, we also assessed the predictive relevance of the model through the blindfolding procedure (Table 4) as suggested by Hair et al. (2014). The Q^2 values for market knowledge sharing (MKS) (Q^2 = 0.037), market knowledge management system (MKMS) (Q^2 = 0.147) and organizational performance (OP) (Q^2 = 0.171) are > 0, suggesting that the model has sufficient predictive relevance.

5 CONCLUSION

The study found that market knowledge sharing becomes an important factor to organizational performance. Knowledge sharing practices are extremely important in keeping and enhancing gained valuable intellectual capital and therefore organizational success. Hence, the identification of influencing factors and the outcomes of these practices is necessary. Information technology is an important factor for establishing a knowledge sharing platform. Supportive technical environment increases the collaboration among the people (O'Dell & Hubert, 2011). Knowledge Management Systems (KMS) (a type of information systems) are supportive technologic knowledge sharing instruments. A flexible corporate infrastructure is necessary for enterprise based knowledge management systems for instant, ad hoc and intensive collaborations (Liu et al., 2005). Furthermore, KMS is recommended as an enabler for KMS use in increasing knowledge sharing.

The result from the Importance-Performance Matrix Analysis (IPMA) shows that market knowledge sharing has high importance and high performance compared to market knowledge management system and market knowledge. The finding of this study is supported by the research conducted by Wang and Noe (2010) in which knowledge sharing is suggested as a fundamental knowledge centered activity through which employees can mutually exchange their knowledge and contribute to knowledge application and ultimately the competitive advantage of the organization.

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FOREIGN OWNERSHIP AND PERFORMANCE: THE CASE OF PORTUGUESE INDUSTRIAL FIRMS

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An earlier version of this article has been published as a conference paper: Pacheco, L. (2019) 'Foreign Ownership and Performance: The Case of Portuguese Industrial Firms', in Tomé, E. and Kragulj, F. (eds.) Proceedings of the International Conference on Theory and Applications in the Knowledge Economy TAKE 2019. Vienna, Austria. pp. 116–133.

ABSTRACT

The objective of this paper is to empirically examine the relationship between the firms' ownership and control structure, in particular the presence of foreign capital, and its financial performance. The literature about performance determinants is abundant, however, the relation between performance and ownership and control structure is much less studied. The performance of the Portuguese economy is still highly dependent of foreign investment inflows directed to the industrial sector, a sector mainly comprised of SMEs that are responsible for the majority of job creation, innovation and exports. This paper uses a balanced panel data of 5.722 firms for the period from 2010 to 2017, researching if the presence of foreign capital influences financial and economical performance, and controlling the effects of other variables such as size, age, exports, indebtedness and sector of activity. Finally, possible non-linear effects or moderating and interaction roles between variables are also tested. Our results evidence that, despite foreign firms higher levels of profitability, the degree of foreign ownership and institutional difference generally showed a non-significant relation with performance. Nevertheless, there seems to exist a non-linear relation between the development level of the country of origin of the share capital and profitability, with the results indicating that firms with share capital originated from more advanced countries attain a higher performance.

Keywords: Ownership structure; Financial performance; Foreign investment; SMEs; Industrial sector

KEY FINDING(S)

- Compared to domestic firms, foreign-owned firms present significantly better performance measures, are larger, export-oriented and display lower levels of indebtedness
- Nevertheless, the estimation results evidence that the degree of foreign ownership and institutional difference generally shows a weak relationship with performance, meaning that the origin of the capital does not seem to exert any influence of the different firms' profitability levels.

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- Albeit the small coefficients obtained, there seems to exist a non-linear relationship between the development level of the country of origin of the share capital and profitability, with the results indicating that firms with share capital coming from more institutionally diverse countries attain higher performance levels.

- Regarding differences between industries, the results evidence that foreign capital seems to exert a slightly negative effect on performance, particularly in those sectors with a larger proportion of small firms and lower internationalization and foreign ownership levels, possibly due to the fact of being highly competitive sectors, with mature firms with well defined markets and networks.

- Firm's age seems to have a negative impact on performance. Possibly, older firms are more likely to be in the maturity phase, with lower levels of growth opportunities and, consequently, lower financial performance levels. Smaller firms present a better financial performance as a result of their flexibility and operational efficiency, contrary to large firms, which face increased monitoring costs and bureaucratisation. Additionally, export-oriented firms tend to present higher levels of profitability and more indebted firms are less profitable, independently of the maturity of the debt.

IMPLICATION(S) FOR THE PRACTICE OF SMEs

Management theories should not consider firms just as a value maximizing entity regardless of its owners. Different owners and managers have different risk attitudes, face different incentives and bring to the firm different resources, so similar firms could present different degrees of performance.

The performance of the Portuguese economy is still highly dependent of foreign investment inflows directed to the industrial sector, a sector mainly comprised of SMEs that are responsible for the majority of job creation, innovation and exports. Joint-ventures (JVs) and wholly foreign-owned firms coexist in Portugal, rendering particularly relevant an analysis of the influence of different degrees of foreign ownership on firm performance.

Differences in performance between firms can be related to differences in firm-specific advantages, as well as differences in industry's characteristics where firms operate. Foreign-owned subsidiaries potentially possess a set of firm-specific advantages that aren't available to domestic firms, such as access to technological, financial and human resources or the ability to exploit economies of scale, that enhance their performance and results.

The quadratic nature of the relationship between institutional and development differences and performance calls for major attention to these effects by policymakers, who should focus their energies in attracting FDI from significantly more developed countries, enhancing the performance results of those firms and their spillover effects to the economy. Capital coming from less developed countries also seems to have a positive effect, possibly due to some sort of positive "cultural" promoting and complementing effects. Globally, these results mean that when capital comes from countries similar to Portugal in terms of institutional/cultural development levels, the impacts on performance are lower.

Given the importance of the performance-promoting channel of FDI, particularly when assuming the form of JVs, our findings may be of use in the optimization of investment promotion policies. In particular, our results imply that policymakers should develop efforts to attract foreign capital, potentially under the form of JVs, promoting the establishment of international partnerships between domestic firms and firms located in countries with higher levels of institutional development.

1 INTRODUCTION

The increase in international capital flows over the last decades motivated the research about the potential impacts of those flows on firm performance (Gomes & Ramaswamy, 1999; Kotabe et al., 2002). Due to the significance of Foreign Direct Investment (FDI) among the other sources of international flows, this paper follows that micro perspective focusing on Small and Medium Enterprises (SMEs), rather than the usual macro perspective adopted when studying the impacts of FDI on economic growth.

Joint-ventures (JVs) and wholly foreign-owned firms coexist in Portugal, rendering particularly relevant an analysis of the influence of different degrees of foreign ownership on firm performance. Wholly-owned firms are subsidiaries of a parent firm from another nation, which has full ownership and sole responsibility for the management of the operation. On the other hand, JVs involve a local and or a foreign partner that share the ownership, management, risks and rewards of the newly formed entity. According to INE (2018), there are 6.455 foreign subsidiaries operating in Portugal (1,6% of all non-financial firms), a number reflecting the country's peripheral nature. The majority of firms are owned by intra-EU firms, are classified as SMEs, have a non-exporting profile, attain productivity levels above average, pay higher wages and are concentrated on the following sectors: commerce, construction and industry.

This paper fulfills a gap in the literature since: i) distinguishes not only between domestic and foreign-owned firms, but also between wholly and partly foreign-owned firms; ii) examines the possible non-linearity of the ownership-performance relation; and iii) uses a set of control variables and tests the presence of moderating and interaction roles between variables. To the best of our knowledge, with the exception of the paper from Barbosa and Louri (2005), this is the first empirical paper examining the relationship between ownership and control levels of foreign subsidiaries with firm performance in Portugal. The choice of a national data set allows us to compare our results with similar studies in other countries (e.g., Dimelis & Louri, 2002; Barbosa & Louri, 2005; Azzam et al., 2013; Gelübcke, 2013). From this comparison we expect to gain some insights into country-specific factors influencing the performance of SMEs, which are frequently rooted in the domestic environment (Narayanan, 2015; Stouraitis et al., 2017) and at the same time understand the importance of the performance-promoting channel of FDI, particular when assuming the form of JVs.

The rest of the paper is structured as follows. The next section reviews the literature on the relation between foreign ownership and firm performance. The section also presents the other determinants of performance and the hypotheses to be tested in the paper. Section three presents the variables, the data and the methodology to be used. The following section presents and discusses the empirical results with the final section presenting some concluding remarks.

2 LITERATURE REVIEW

The present paper is focused on the determinants of firm performance assessing if performance is influenced by the presence and magnitude of foreign capital. Firm performance is a multidimensional construct heavily researched in the literature (e.g., Venkatraman & Ramanujam, 1986), but here we are interested on the association of performance with the firm's ownership and control structure, in particular the effects of foreign ownership. Modes of entry and equity ownership are key variables in international business research (e.g., Li & Guisinger, 1991; Nitsch et al., 1996) and the impact of corporate governance on firms' strategic decision-making and performance has been well documented in the literature (e.g., Shleifer & Vishny, 1986; Demsetz & Villalonga, 2001), mostly for large and listed firms, but the idiosyncrasies of SMEs and the presence of foreign capital associated with different firms' performance has been less studied.

2.1 THE CHARACTERISTICS OF FOREIGN-OWNED FIRMS AND THEIR IMPACTS ON PERFORMANCE

A group of authors suggested that foreign-owned subsidiaries possess a set of firm-specific advantages that aren't available to domestic firms, such as access to technological, financial and human resources or the ability to exploit economies of scale, that enhance their performance and results (Harris, 2002; Harris & Robinson, 2003; Yudaeva et al., 2003; Caves, 2007; Girma & Görg, 2007; Temouri et al., 2008; Halkos & Tzeremes, 2010).

Despite the generally accepted hypothesis that foreign-owned firms outperform domestic firms, at least in developing or emerging countries, several authors found evidence of little or no superior performance (e.g. Globerman et al., 1994; Griffith, 1999; Konings, 2001; Barbosa & Louri, 2005; Benfratello & Sembenelli, 2006; Huang & Shiu, 2009; Azzam et al., 2013). Domestic firms may possess a better knowledge of the local environment or have the necessary connections with political and local authorities. Other authors argued that the divergent results between countries were due to country-specific factors (e.g., Barbosa & Louri, 2005; Gelübcke, 2013).

A large number of papers present the limitation of adopting a simple view, using a dummy variable to distinguish firms between foreign-owned and domestic-owned, not properly analysing the situations in-between, for instance the presence of JVs, with varying degrees of foreign ownership. For instance, when studying different countries and time periods, some authors generally evidenced that firms characterized by different degrees of foreign ownership may perform differently (Blomström & Sjöholm, 1999; Dimelis & Louri, 2002; Greenaway et al., 2014).

Blomström and Sjöholm (1999) showed that foreign ownership is associated with higher labour productivity but that doesn't depend whether firms are majority or minority owned by foreigners and Dimelis and Louri (2002) evidenced that foreign ownership entails a productivity advantage, which is more important in fully or majority foreign-owned firms. More recently, using several measures of performance, Greenaway et al. (2014) found that JVs perform better than wholly foreign-owned and purely domestic firms. Although productivity and profitability initially rise with foreign ownership, they start declining once ownership exceeds about 60%. This interesting non linear relation, also found by Hintosova and Kubikova (2016), suggests that some domestic ownership is necessary to ensure optimal performance.

Differences in performance between firms can be related to differences in firm-specific advantages, as well as differences in industry's characteristics where firms operate. Theoretically, in the context of competitive markets it is expected that within the same industry firms converge to similar levels of performance (Cubbin & Geroski, 1986). Hansen and Wernerfelt (1989) and Rumelt (1991) evidence that industry effects played a modest role in explaining the variability in performance. Thus, it is relevant to study if there are significant differences between foreign-owned and domestic firms within particular industries, where the specificities of both type of firms could exert some influence.

Another interesting topic, grounded in the institutional economics literature, are the issues of development differences and institutional distances, that is the question if performance could be affected by the country of origin of share capital and its development/institutional distance towards the host country (e.g. Chari & Shaikh, 2017). The recent paper from Trapczynski and Banalieva (2016) presents a complete literature review on this issue but, albeit the "paradox of distance", most of the literature points that a larger institutional distance reduces firm performance due to higher uncertainty and transaction costs (Zaheer, 1995; Zaheer & Hernandez, 2011).

As a result of this literature review, we can now state a first set of hypotheses to be tested:

H1: The degree of foreign ownership is positively related with firm performance
- **H1a:** Foreign ownership has a positive effect on profitability
- **H1b:** That effect is non-monotonic
- **H1c:** That effect differs between sectors of activity

H2: Firms with foreign share capital coming from more institutionally developed countries present higher levels of profitability

2.2 ADDITIONAL DETERMINANTS OF PERFORMANCE

Even though our paper is focused on the relation between foreign presence in firms' equity and performance, following previous authors (e.g. Grenaway et al., 2014; Trapczynski & Banalieva, 2016), it is included a set of control variables in order to rule out alternative determinants of the sampled firms' performance. Besides their direct impact on performance, we intend to explore the moderating role of some organizational characteristics in influencing the foreign ownership-performance relationship. These variables are traditionally used in studies about performance determinants: firm age, size, internationalisation and debt.

Theoretically, older firms should possess a greater stock of knowledge and experience, which could have a positive impact on performance. Older firms have enjoyed the benefits of learning, are not prone to the liabilities of newness and can, therefore, enjoy superior performance. For example, brand, reputation and legitimacy are some strategic resources that firms build with time. Older firms could also be better equipped to learn from their experiences in the past and would possess more skills to implement their learning in new undertakings (Singla & George, 2013). Yet, as firms age they tend to become more conservative and prone to inertia, having difficulties in dealing with changes in their competitive environment (Hannan & Freeman, 1984; Aggarwal & Gort, 1996).

Albeit the impact of age on performance is ultimately an empirical question, our expectation is that age negatively moderates the effect of foreign ownership on performance since foreign firms have to face a learning process when operating in a new and unfamiliar environment.

Regarding the impact of size on performance, the literature points to the fact that size can be a source of competitive advantage because larger firms have at their disposal greater technical and commercial opportunities, allowing them access to economies of scale, greater bargaining power and the capability to raise barriers to deter potential competitors or have an easier access to capital markets (Dhanaraj & Beamish, 2003; Thomas & Eden, 2004). Nevertheless, fixed costs, increased monitoring needs and organizational inefficiencies associated with larger size could outweigh the benefits of increased market power, with the larger flexibility of smaller firms being a competitive advantage (Chen & Hambrick, 1995) or size could only influence performance in certain industries, given specific differences in terms of the degree of competition or the existence of economies of scale (Bamiatzi et al., 2016). According to the agency theory, it is expected a negative relationship between size and profitability, since the separation of ownership and control creates a conflict between managers and shareholders, which in turn could shift the objective from maximizing benefits for others towards management, such as survival or growth. In sum, the literature is ambiguous about the existence of competitive advantages positively related to size, so that the sign of that relation remains an empirical issue.

The discussion of the effects of internationalization on performance has mainly covered large firms, with the literature generally finding a positive relation between internationalization and performance (Lu & Beamish, 2004; Hsu et al., 2013). Lu and Beamish (2006) argue that exporting has been extensively employed by firms as an internationalization strategy. Empirical studies on samples of SMEs have revealed the existence of a "liability of foreignness" at the beginning of the internationalization process via FDI, and a positive relationship between exports and profitability. Empirical results of prior studies have been inconclusive with some studies finding a positive impact of the degree of internationalization (e.g. Kim et al., 1989; Qian, 2002; Tsao & Chen, 2012; Hsu et al., 2013), others finding no effect (e.g. Hoskisson & Hitt, 1990; Morck & Yeung, 1991; Vithessonthi, 2016) and still others finding a negative effect (e.g. Singla & George, 2013; Xiao et al., 2013; Vithessonthi & Racela, 2016).

Regarding leverage, some studies show that SMEs prefer going into debt before increasing capital to finance their investments, thus avoiding the entry of external shareholders (Anderson et al., 2003). However, other studies show that SMEs prefer to be more prudent, not going into debt in order to avoid losing their independence to creditors (López-Garcia & Aybar-Arias, 2000). Given that SMEs could have specific concerns in terms of privacy, control and generational transition, they tend to prefer internal financing policies, favouring the reinvestment of their own funds to capital increases or long-term debt (Gallo et al., 2004), nevertheless, their attitude towards debt could change as generations, managers and the business as a whole evolves (Lussier & Sonfield, 2009). Debt ratios are included because a firm's ownership may influence its capital structure (Demsetz & Lehn, 1985; Randøy & Goel, 2003) and, in line with the agency and pecking order theories we expect a negative relationship between SMEs indebtedness and its financial performance.

So, regarding the control variables, we state the following set of hypotheses:

H3: The relation between foreign ownership and performance differs between younger and older firms, the latter being more profitable.
H4: The relation between foreign ownership and performance differs between larger and smaller firms, the former being more profitable.
H5: The relation between foreign ownership and performance differs between export oriented and domestic oriented firms, the former being more profitable.
H6: The relation between foreign ownership and performance differs between more or less indebted firms, the latter being more profitable.

3 MATERIALS AND METHODS

3.1 DEPENDENT AND INDEPENDENT VARIABLES

Prior studies have used a broad range of performance measures ranging from outcomes achieved in the product markets (such as sales growth: Siddharthan & Lall, 1982; Grant, 1987), to accounting measures (such as ROA, ROS and ROE: Riahi-Belkaoui, 1998; Lu & Beamish, 2001) as well as market-based measures (such as Beta and risk-adjusted returns: Michel & Shaked, 1986; Goerzen & Beamish, 2003). A key problem with narrow measures is that they may not be representative of firm performance, which may differ from traditional profitability ratios (Pangarkar, 2008). Firm performance measures tend to be related, as firms with greater productivity are more likely to have greater profitability and to experience higher rates of growth. Nevertheless, they can display low levels of correlation (Thomsen & Pedersen, 2000). For instance, many SMEs in the early stages of their evolution might place a strong emphasis on sales growth.

Due to data availability, and in line with the Industrial Organization paradigm, it is assumed that all firms are profit-maximizing and, accordingly, their performance will be measured by profitability variables. The use of ROA is widely supported by the literature and has been used in several studies analyzing the relationship between internationalization and firm performance (e.g., Barbosa & Louri, 2005; Grenaway et al., 2014; Trapczynski & Banalieva, 2016), being generally considered to be a key performance indicator and superior to alternative measures such as ROE which is sensitive to the firm's capital structure (Miller et al., 2016). Additionally, ROA and related profitability measures can be easily computed from financial statements and compared in cross-country surveys.

ROA is computed as net income scaled by the book value of total assets. In order to check robustness, we also proxy financial performance by the ratio between EBITDA and total assets (REBITDA) and by the ratio between EBIT and total assets (REBIT). The variable return on sales (ROS) is also tested as a profitability measure being computed as net income divided by total sales.

The independent variable foreign ownership (FO) is computed as the percentage of the firm's capital that is foreign-owned, being expected a positive relation with profitability. This is a common way to measure foreign

ownership, and was for example used by Halkos and Tzeremes (2010), Greenaway et al. (2014), Konings (2001) and Hintosova and Kubikova (2016) among others.

We assume that when the foreign share capital comes from a country that is more institutionally developed than the host-country that should be beneficial for the firm, benefiting from the experience and cost-efficient methods brought by foreign capital. So, the variable institutional difference (INST) between the host-country and the country of origin of the share capital is measured using Holmes et al. (2008) *Heritage Index of Economic Freedom* (INST = Portugal's yearly index – parent country yearly index). This index ranges from 0 to 100, with higher values indicating greater economic development. More positive (negative) values for INST indicate that the host-country is more (less) institutionally developed than the parent-country, being expected a negative (positive) relation.

3.2 CONTROL VARIABLES

Even though our paper is focused on the relation between the degree of foreign ownership and performance, we include the following set of control variables in order to rule out alternative determinants of the sampled firms' performance: firm age, size, internationalization and debt. For kurtosis reasons, variables age (AGE) and size (SIZ) are measured, respectively, as the log of the number of years since the firm's inception and the log of total assets. Concerning the variable "internationalization" (EXP), we will use that traditional variable of exports' intensity (ratio of foreign sales to total sales) and the debt level of the firm is measured by short-term (STD) and long-term debt (LTD), respectively, Current liabilities/ Total assets and Non-current liabilities/ Total assets.

3.3 DATA AND METHODOLOGY

This paper analyses a sample of SMEs from the industrial sectors (codes 10 to 32, from the *European Classification of Economic Activities* – NACE – Rev. 2) obtained from SABI *(Sistema de Análise de Balanços Ibéricos)*, a financial database powered by Bureau van Dijk (with the exception of the variable measuring "institutional difference"). Applying the criteria for SMEs definition (Commission Recommendation 2003/361/EC), thus excluding a large number of micro firms (which employ fewer than 10 persons and whose annual turnover and/or annual balance sheet does not exceed 2M€), considering only firms already existing in 2010 and presenting complete data from 2010 to 2017, excluding firms with negative debt ratios or equity and liabilities greater than assets and winsorizing the observations below (and above) the 1st (and 99th) percentile, in order to eliminate spurious outliers, we obtained a balanced panel data of 5.722 SMEs distributed by all industrial sectors.

Table 1 presents a detailed description of our sample. The sample is composed of mature SMEs, with an average age of 30 years, accounting for 229.708 employees, a turnover near 23.000 M€, total assets of 23.930 M€ and an average ROA of 2,9% in 2017. The sample has 76,4% of small firms (4.372) and 23,6% of medium firms (1.350) and all relevant sectors are represented. The average percentage of foreign ownership is around 4%, with 269 firms with partial or total foreign ownership, with share capital coming from 28 different countries. In those 269 firms there are 198 wholly foreign-owned firms and 71 JVs, respectively with average ROAs of 4,2% and 3,0%. Foreign ownership is more relevant in highly capital intensive sectors, such as sectors 19/20/21, 27, 29 and 30.

Before estimating the different models we present in Table 2 some descriptive statistics and the correlation matrix of the variables. The sample's mean values for the different variables, differentiating between the two kinds of firms are presented, together with the results of a test for differences in mean values between the two sub-samples. Notice that foreign firms present better performance measures, are larger, export-oriented and display lower levels of indebtedness. The t-tests for equality of means show that there are considerable differences between domestic and foreign-owned firms with regard to profitability. Also, we find a preference for foreign firms for larger size and less debt, which may contribute to the positive differential in profitability.

Regarding the correlation coefficients, they are generally low, with foreign ownership negatively correlated with institutional difference, meaning that foreign share capital comes mainly from more developed countries.

Table 1: Distribution of the sample by industry classifications

Industry Classification (NACE)	Number of Firms	Small firms (%)	Aver. number of empl.	Average sales (th€)	Exports (%)	Average EBITDA	Foreign ownership
Food products (10)	821	78,6%	36,2	5.049,0	7,6%	351,1	2,4%
Beverages and tobacco (11/12)	129	88,4%	26,5	4.702,1	27,7%	741,1	7,0%
Textiles (13)	327	71,2%	47,8	4.756,4	32,0%	496,4	3,2%
Wearing apparel (14)	457	66,1%	52,0	3.795,2	61,5%	265,4	1,4%
Leather and related products (15)	394	58,9%	53,7	3.869,3	49,2%	281,9	2,0%
Wood and of products of wood and cork (16)	323	86,4%	30,8	3.584,6	26,3%	335,4	2,0%
Paper and paper products (17)	108	68,5%	51,4	7.452,4	15,3%	724,9	10,1%
Printing and reproduction of recorded media (18)	199	86,4%	29,6	2.161,4	5,2%	306,7	0,5%
Refined petroleum, chemicals, man-made fibers and pharmaceutical products (19/20/21)	161	73,9%	44,5	7.431,9	19,0%	753,9	16,7%
Rubber and plastic products (22)	306	73,2%	44,0	5.512,5	23,7%	692,6	6,9%
Other non-metallic mineral products (23)	443	81,0%	34,8	3.008,8	30,7%	426,2	4,0%
Basic metals (24)	55	61,8%	52,8	7.503,2	34,6%	824,3	4,6%
Fabricated metal products (25)	995	80,7%	35,7	3.153,1	27,2%	404,1	3,6%
Computer, communication and electronic equip. (26)	27	66,7%	61,4	7.037,7	36,5%	618,7	11,1%
Electrical equipment (27)	111	77,5%	40,5	4.260,5	30,0%	437,5	9,7%
Machinery and equipment (28)	285	76,5%	40,3	3.916,3	32,7%	482,6	5,5%
Motor vehicles, trailers and parts (29)	86	62,8%	53,0	4.874,2	40,5%	521,2	12,8%
Other transport equipment (30)	22	54,6%	58,7	6.106,5	45,2%	625,9	18,2%
Furniture (31)	341	82,1%	32,0	1.947,8	32,7%	218,1	0,9%
Other manufacturing activities (32)	132	84,9%	31,3	2.073,0	19,3%	193,7	6,1%
	5.722	**76,4%**	**40,1**	**4.019,0**	**28,6%**	**411,9**	**4,0%**

Note: Small firms are firms with less than 50 employees. Sectors 11/12 and 19/20/21 are aggregated since the sample only comprises a very small number of firms in sectors 12, 19 and 21.

The relation between performance and foreign ownership is addressed with a panel data methodology estimated through three different regression models: Pooled Ordinary Least Squares (POLS), Fixed-Effects Model (FEM) and Random-Effects Model (REM). Applying the Breusch-Pagan and Hausman tests to choose the most appropriate regression technique, the Breusch-Pagan test leads to the rejection of the null hypothesis, indicating that REM is more appropriate than POLS whereas the Hausman test leads to the non-rejection of the null hypothesis that REM is preferable to FEM.

Table 2: Descriptive statistics and correlation matrix between independent variables

	Domestic firms (n= 5453)	Foreign firms (n= 269)	Mean differ. (t-test)	FO	INST	AGE	SIZ	EXP	STD	LTD
ROA	2,9%	3,9%	5,62 (***)	0,034 (***)	-0,042 (***)	-0,091 (***)	0,049 (***)	0,085 (***)	-0,123 (***)	-0,170 (***)
REBITDA	9,4%	10,2%	3,94 (***)	0,021 (***)	-0,038 (***)	-0,164 (***)	-0,011 (**)	0,042 (***)	-0,097 (***)	-0,092 (***)
REBIT	4,9%	6,0%	5,34 (***)	0,032 (***)	-0,042 (***)	-0,109 (***)	0,045 (***)	0,088 (***)	-0,091 (***)	-0,145 (***)
ROS	2,2%	2,5%	1,17	0,003	-0,013 (***)	-0,015 (***)	0,031 (***)	-0,027 (***)	-0,053 (***)	-0,071 (***)
FO	...	85,7%	...	1	-0,535 (***)	0,007	0,222 (***)	0,164 (***)	-0,015 (***)	-0,050 (***)
INST	...	- 4,6	...		1	-0,003	-0,148 (***)	-0,117 (***)	0,025 (***)	0,030 (***)
AGE	3,1	3,1	0,69			1	0,285 (***)	0,038 (***)	-0,217 (***)	-0,111 (***)
SIZ	7,4	8,7	56,96 (***)				1	0,277 (***)	-0,086 (***)	0,007
EXP	26,3%	52,5%	32,13 (***)					1	0,073 (***)	-0,048 (***)
STD	41,1%	39,0%	-4,46 (***)						1	-0,289 (***)
LTD	16,4%	13,0%	-9,66 (***)							1

*Note: * p < 0,10; ** p < 0,05; *** p < 0,01*

"Domestic firms" are firms with fully national share capital; "Foreign firms" are firms with partial or total foreign ownership; ROA = return on assets; REBITDA = EBITDA/total assets; REBIT = EBIT/total assets; ROS = return on sales; FO = percentage of foreign share capital; INST = $HIEC_{Portugal} - HIEC_{parent\ country}$; AGE = logarithm of firm age, in years; SIZ = firm size, measured by the logarithm of total assets; EXP = total exports as a percentage of total sales; STD = current liabilities/total assets; LTD = non-current liabilities/total assets.

4 RESULTS AND DISCUSSION

4.1 EMPIRICAL RESULTS

The regression results for the random-effects model are presented in Table 3, where the three alternative dependent variables (ROA, REBITDA and REBIT) are run on the variables "foreign ownership" (FO) and "institutional difference" (INST) and the control variables AGE, SIZ, EXP and debt (STD and LTD). The results with ROS as the dependent variable are not presented since are very similar to the others. Variables with the suffix FO are interaction variables with a foreign ownership dummy, in order to see if the effects of those variables are statistically different between 100% domestic firms and partial or totally foreign owned firms, thus testing our hypotheses. Table 4 presents the separate results for the domestic and foreign firms' sub-samples, considering ROA as the dependent variable, albeit the results for REBITDA, REBIT and ROS are very similar. With the full specifications the random-effects model results present a goodness of fit near 10%.

Table 3: Random-effects model results

		ROA	REBITDA	REBIT	ROA	REBITDA	REBIT	ROA
C	0,029*** (0,000)	0,029*** (0,001)	0,094*** (0,001)	0,049*** (0,001)	0,103*** (0,004)	0,239*** (0,005)	0,133*** (0,005)	0,105*** (0,004)
FO	0,000** (0,000)		0,000 (0,000)	0,000** (0,000)	-0,000*** (0,000)	-0,000*** (0,000)	-0,000*** (0,000)	-0,001*** (0,000)
INST		-0,001*** (0,000)	-0,001*** (0,000)	-0,001** (0,000)	-0,000 (0,000)	-0,001 (0,000)	-0,000 (0,000)	-0,000 (0,000)
Controls								
AGE					-0,021*** (0,001)	-0,036*** (0,001)	-0,024*** (0,001)	-0,021*** (0,001)
SIZ					0,007*** (0,000)	0,005*** (0,001)	0,007*** (0,001)	0,006*** (0,000)
EXP					0,017*** (0,001)	0,018*** (0,002)	0,020*** (0,002)	0,017*** (0,001)
STD					-0,103*** (0,002)	-0,121*** (0,003)	-0,107*** (0,002)	-0,103*** (0,002)
LTD					-0,119*** (0,002)	-0,134*** (0,003)	-0,126*** (0,003)	-0,117*** (0,002)
AGE_FO								0,000 (0,000)
SIZ_FO								0,000** (0,000)
EXP_FO								-0,000 (0,000)
STD_FO								0,000 (0,000)
LTD_FO								-0,001*** (0,000)
Overall R^2	0,01	0,01	0,01	0,01	0,10	0,07	0,08	0,10

*Notes: Standard-deviations presented in brackets. * p < 0,10; ** p < 0,05; *** p < 0,01.*

Table 4: Random-effects model results: "domestic firms" and "foreign wholly or partial owned firms" (ROA as dependent variable)

	Domestic firms (n= 5453)	Foreign firms (n= 269)	
C	0,106*** (0,004)	0,033 (0,027)	0,037 (0,028)
FO			-0,000 (0,000)
INST			-0,000 (0,000)
AGE	-0,021*** (0,001)	-0,013*** (0,005)	-0,012** (0,006)
SIZ	0,006*** (0,000)	0,012*** (0,003)	0,012*** (0,004)
EXP	0,017*** (0,001)	0,014** (0,007)	0,014 (0,012)
STD	-0,103*** (0,002)	-0,107*** (0,011)	-0,107*** (0,017)
LTD	-0,116*** (0,002)	-0,177*** (0,014)	-0,177*** (0,028)
Overall R^2	0,10	0,10	0,10

*Notes: Standard-deviations presented in brackets. * p < 0,10; ** p < 0,05; *** p < 0,01.*

Since one of the objectives of this paper is to test the presence of non-linear effects of foreign ownership in performance, we alternatively test the variables FO and INST and their squares as independent variables, for the sub-sample of "foreign firms" (Table 5). Notice that, only the most significant results are presented.

Table 5: Random-effects model results: Testing the presence of non-linearities

	ROA	ROA	ROA	REBITDA	REBIT
C	0,051** (0,023)	0,055** (0,023)	0,033*** (0,004)	0,094*** (0,005)	0,053*** (0,005)
FO	-0,001 (0,001)	-0,001 (0,001)			
FO^2	0,000 (0,000)	0,000 (0,000)			
INST	0,001 (0,000)		-0,001* (0,000)	-0,001* (0,001)	-0,001 (0,001)
$INST^2$	0,000** (0,000)		0,000* (0,000)	0,000* (0,000)	0,000* (0,000)
Overall R^2	0,02	0,01	0,02	0,02	0,02

*Notes: Standard-deviations presented in brackets. * p < 0,10; ** p < 0,05; *** p < 0,01.*

Finally, testing the presence of differences between industries, Table 6 presents the results for the different sectors of activity.

4.2 DISCUSSION

We now analyse the results at the light of the different hypotheses. The first rows in Table 3 evidence that "foreign ownership" seems to have only a slightly negative impact on performance thus not confirming H1a and the results from Hintosova and Kubikova (2016). This lack of evidence that foreign-owned firms perform better than domestic firms is in line with the results reported by Konings (2000) and Barbosa and Louri (2005), meaning that the knowledge of the domestic market may be a important factor for profitability. Well established relationships among domestic firms, their owners and their managers, provide some advantages to domestically-owned firms that cannot be attained by foreign-owned firms. Additionally, for the full sample, institutional difference seems unimportant to explain performance differences between firms.

Table 6: Random-effects model for different manufacturing sectors. ROA as dependent variable

	CAE 10	11/12	13	14	15	16	17	18	19/20/21	22
C	0,093*** (0,012)	0,033 (0,034)	0,092*** (0,021)	0,118*** (0,020)	0,163*** (0,017)	0,115*** (0,026)	0,103*** (0,029)	0,119*** (0,030)	-0,005 (0,035)	0,122*** (0,020)
FO	-0,000* (0,000)	-0,001*** (0,000)	-0,000 (0,000)	0,006 (0,001)	-0,000 (0,000)	-0,000** (0,000)	-0,000 (0,000)	0,000 (0,000)	0,000 (0,000)	-0,000* (0,000)
INST	-0,001 0,000	-0,002 (0,001)	-0,002 (0,003)	-0,002 (0,002)	-0,000 (0,002)	-0,001 (0,001)	0,002 (0,003)	-0,001 (0,001)	-0,000 (0,001)	-0,001 (0,001)
AGE	-0,014*** (0,003)	-0,009* (0,005)	-0,019*** (0,005)	-0,040*** (0,005)	-0,033*** (0,004)	-0,019*** (0,004)	-0,016*** (0,006)	-0,017*** (0,004)	-0,021** (0,009)	-0,016*** (0,004)
SIZ	0,005*** (0,001)	0,007* (0,004)	0,009*** (0,002)	0,016*** (0,003)	0,009*** (0,002)	0,003 (0,002)	0,007** (0,003)	0,003 (0,003)	0,017*** (0,004)	0,005** (0,002)
EXP	0,014** (0,007)	-0,005 (0,009)	0,005 (0,007)	0,011* (0,006)	0,009* (0,005)	0,026*** (0,005)	0,018 (0,016)	0,051*** (0,016)	0,035 (0,024)	0,015* (0,008)
STD	-0,108*** (0,008)	-0,076*** (0,018)	-0,114*** (0,012)	-0,135*** (0,013)	-0,126*** (0,011)	-0,099*** (0,014)	-0,114*** (0,018)	-0,108*** (0,018)	-0,069** (0,028)	-0,133*** (0,012)
LTD	-0,118*** (0,001)	-0,082*** (0,017)	-0,138*** (0,014)	-0,169*** (0,017)	-0,177*** (0,016)	-0,111*** (0,013)	-0,137*** (0,020)	-0,112*** (0,016)	-0,016 (0,021)	-0,145*** (0,013)
Overall R^2	0,06	0,14	0,11	0,13	0,18	0,10	0,15	0,08	0,09	0,17
	23	24	25	26	27	28	29	30	31	32
C	0,074*** (0,023)	0,030 (0,064)	0,122*** (0,011)	0,189* (0,108)	0,058* (0,035)	0,122*** (0,025)	0,126*** (0,035)	0,096 (0,098)	0,149*** (0,025)	0,201*** (0,033)
FO	0,000 (0,000)	0,000 (0,000)	-0,000* (0,000)	-0,001*** (0,000)	-0,000 (0,000)	-0,000 (0,000)	-0,000 (0,000)	-0,001*** (0,000)	-0,000** (0,000)	0,000 (0,000)
INST	0,002 (0,002)	0,003 (0,003)	0,001 (0,001)	-0,003 (0,003)	0,005 (0,004)	0,001 (0,001)	-0,002 (0,003)	0,005 (0,005)	0,004*** (0,001)	0,002 (0,003)
AGE	-0,013*** (0,005)	-0,013 (0,010)	-0,026*** (0,002)	-0,037* (0,020)	-0,028*** (0,009)	-0,029*** (0,004)	-0,023** (0,009)	-0,071** (0,030)	-0,021*** (0,004)	-0,032*** (0,006)
SIZ	0,004* (0,002)	0,009 (0,007)	0,008*** (0,001)	-0,006 (0,008)	0,017*** (0,005)	0,008*** (0,003)	0,011*** (0,004)	0,037* (0,019)	0,000 (0,002)	0,004 (0,003)
EXP	0,020*** (0,005)	0,043 (0,040)	0,013*** (0,004)	-0,011 (0,024)	0,010 (0,011)	0,026*** (0,007)	0,007 (0,011)	-0,074 (0,051)	0,024*** (0,006)	0,003 (0,011)
STD	-0,092*** (0,013)	-0,081** (0,032)	-0,114*** (0,007)	-0,091** (0,044)	-0,093*** (0,029)	-0,096*** (0,014)	-0,180*** (0,026)	-0,117** (0,051)	-0,116*** (0,014)	-0,138*** (0,020)
LTD	-0,102*** (0,013)	-0,116*** (0,038)	-0,133*** (0,007)	-0,249*** (0,071)	-0,154*** (0,036)	-0,119*** (0,018)	-0,207*** (0,029)	-0,151*** (0,047)	-0,119*** (0,014)	-0,137*** (0,021)
Overall R^2	0,06	0,04	0,13	0,14	0,10	0,13	0,23	0,11	0,13	0,14

Notes: Standard-deviations presented in brackets. $p < 0,10$; ** $p < 0,05$; *** $p < 0,01$.*

Considering only the wholly or partial foreign-owned firms and regarding the possibility of a non-linear relationship, the results presented in Table 5 show that institutional difference displays a significant U-shaped relation with performance. Figure 1 plots this interesting result, showing that firms with foreign share capital coming from more institutionally advanced countries (lower levels for INST) display increasingly levels of profitability, whereas capital from lagging countries result on lower levels of profitability. This result, which partially confirms H2, evidences the potentially low levels of performance obtained by firms where part or whole of the capital comes from less developed countries, lacking the necessary resources, technologies and managerial and international networking skills to obtain higher levels of profitability (Huang & Shiu, 2009; Greenaway et al., 2014).

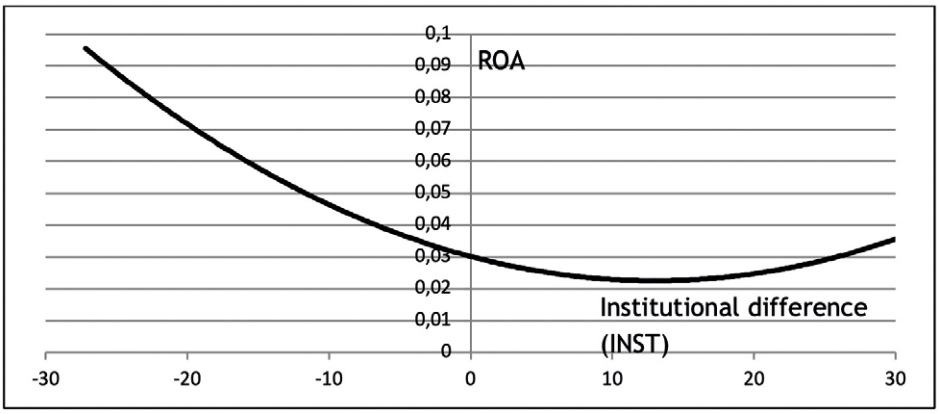

Figure 1: Effect of institutional difference on performance

The quadratic nature of the relationship between institutional difference and performance calls for major attention to these effects by policymakers, who should focus their energies in attracting FDI from significantly more developed countries, enhancing the performance results of those firms and their spillover effects to the economy.

Regarding the other hypotheses related with the control variables (Table 3), the coefficients are always significant, confirming hypotheses H4, H5 and H6 Regarding the variable AGE, and confirming the results from Barbosa and Louri (2005), firm's age seems to have a negative impact on performance, thus not confirming H3. Possibly, older firms are more likely to be in the maturity phase, with lower levels of growth opportunities and, consequently, lower financial performance levels. Larger firms present a better financial performance as a result of their competitive power and operational efficiency that compensates increased monitoring costs and bureaucratisation. This evidence that bigger firms outperform smaller ones brings an important policy-making implication. Typically, firms in Portugal are micro or small firms, so policymakers should create an adequate set of incentives to foster mergers and acquisitions, as a way to improve firms' competitiveness. Additionally, and confirming previous results (e.g. Greenaway et al., 2014), export-oriented firms tend to present higher levels of profitability and more indebted firms are less profitable, independently of the maturity of the debt. This result, which is typically found in the literature, is in line with the predictions of the agency and pecking order theories, since a

high level of leverage imposes a fixed financial commitment on the firm, reducing the free cash flows available to management (Vieira, 2017). The interaction terms in Table 3 are significant for the variables AGE and debt, giving a strong support to hypotheses H4 and H6 and showing different impacts of those two variables on performance for "domestic firms" and "foreign firms". The stronger impact of firm size and indebtedness on profitability is also evidenced in Table 4, where the respective coefficients present higher values for "foreign firms".

Regarding differences between industries, Table 6 evidences that foreign capital seems to exert a slightly negative effect on performance across sectors, particularly in sectors 10, 11/12, 16, 22, 25, 26, 30 and 31. This negative effect seems to be stronger in those sectors with a larger proportion of small firms and lower internationalization and foreign ownership levels, possibly due to the fact of being highly competitive sectors, with mature firms with well defined markets and networks. There is no evidence of positive effects deriving from foreign capital and institutional differences also seem to be irrelevant.

5 CONCLUSION

Management theories should not consider firms just as a value maximizing entity regardless of its owners. Different owners and managers have different risk attitudes, face different incentives and bring to the firm different resources, so similar firms could present different degrees of performance. Some recent studies have compared performance between foreign-owned and domestic-owned firms. While some of those studies have found that foreign-owned firms outperform their domestic counterparts, other studies evidenced the opposite. Only a limited number of papers have attempted to examine how the degree of foreign ownership in a firm influences its profitability.

This exploratory paper contributes to fill that gap studying the differences between domestic and foreign-owned firms (wholly or partially owned by foreign share capital). The degree of foreign ownership and institutional difference generally showed a broadly non-significant relationship with performance, meaning that the origin of the capital does not seem to exert any influence of the different firms' profitability levels. Nevertheless, albeit the small coefficients obtained, there seems to exist a non-linear relationship between the development level of the country of origin of the share capital and profitability, with the results indicating that firms with share capital coming from more advanced countries attain a higher performance.

Regarding the main questions addressed in this paper, we can answer that: i) compared to other firms, foreign firms are more profitable; ii) performance is positively impacted when foreign ownership originates from more advanced countries; iii) there is a significant positive relation between firm's size and degree of internationalization with performance and a significant negative impact of firms' age and level of indebtedness on performance.

This paper gives a contribution to the literature about foreign capital impact on performance, studying if there are significant differences between domestic and foreign-owned firms in terms of performance. Nevertheless, some limitations of this study should be mentioned: i) in the first place, firms' performance is affected by many variables that were not considered (e.g., managerial labour and product markets, political and economic factors

or even the personality of shareholders and managers), meaning that the results should be treated with caution. Notice that, our results evidence profitability differences between the two types of firms, but those differences are not specifically explained by the employed variables, failing to take account of the complexity of interests that are involved in an ownership structure. Possibly, considering internal factors such as knowledge transfer, R&D, product positioning and marketing, it would possible to unveil the differing impacts on firm performance; ii) secondly, profit manipulation and transfer pricing by foreign-owned firms could potentially create a bias in profitability measures. So, a multifaceted measurement could be more appropriate (Delios & Beamish, 2004); iii) third, the dataset comprises 5.722 firms, but only 269 have partial or total foreign ownership. Ideally, a larger number of observations and firms, in particular of "foreign firms", allowing a clearer differentiation between wholly foreign-owned firms and JVs, could result in more robust results (notice that, the low variance of our variables FO and INST could be responsible for the non-significant coefficients); iv) finally, a factor that can limit the generalization of the results is that the measures of performance used in the literature differ widely, leaving us with the question whether our results are dependent on the measures used and on the specific context of the Portuguese economy.

Given the importance of the performance-promoting channel of FDI, particularly when assuming the form of JVs, our findings may be of use in the optimization of investment promotion policies. In particular, our results imply that policymakers should develop efforts to attract foreign capital, potentially under the form of JVs, promoting the establishment of international partnerships between domestic firms and firms located in countries with higher levels of institutional development.

ACKNOWLEDGEMENT

This work is supported by FEDER funds from COMPETE 2020 and Portuguese funds - PORTUGAL 2020. Project IEcPBI - Interactive Ecosystem for Portuguese Business Internationalization - POCI-01-0145-FEDER-032139.

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QUALITY OF MUTUAL HUMAN-MACHINE LEARNING PROCESSES IN SMART FACTORIES

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An earlier version of this article has been published as a conference paper: Seghatoleslami, T. (2019) 'Quality of Mutual Human-Machine Learning Processes in Smart Factories', in Tomé, E. and Kragulj, F. (eds.) Proceedings of the International Conference on Theory and Applications in the Knowledge Economy TAKE 2019. Vienna, Austria. pp. 205–218.

ABSTRACT

Smart factories emerged as a result of industrial revolution and/or evolution in the context of Industry 4.0. These have brought about revolution in manufacturing, which is called intelligent manufacturing. In intelligent production systems human and machine not only successfully interact with each other, but also they learn from each other using the cognitive skills of both actors. Mutual human-machine learning enables enhancement of human and machines and can enable fundamental potentials within systems. In order to assess the outcome of mutual learning process the term "quality of mutual learning" and its determinants are defined. Summary of findings indicate that machines can deliver remarkable performance examined distinctively and relatively to humans, except that human can lead machine in undertaking complex and diverse tasks.

Keywords: Quality Assessment, Human-machine interaction, Reciprocal learning, Machine learning process, Smart factory

KEY FINDING(S)

- Key characteristics of quality in process of mutual learning between human and machine actors in smart factory are identified and operationalized,
- Human and machine learning patterns are compared and contrasted according to their human competencies and machine autonomy level,
- Reciprocal learning procedure is presented as a means for human and machine enhancement,
- Opportunities and Obstacles for information- and data-transfer as well as for learning due to characteristics of human and machine are identified,
- An assessment to measure the quality of mutual human-machine learning process in learning and/or smart factory is developed,

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- Resulted model for optimal task allocation between human and machine assisted by exploiting respective strengths of resources (human and machine) is applied.

IMPLICATION(S) FOR THE PRACTICE OF SMEs

Industry 4.0 provides new standards for industrial management of SMEs and the foundation for learning and/or smart factories in production sector, as in these factories the main exchanged packet is knowledge between human and machine actors. These actors create knowledge with provided information and consequently implement the data-transfer. The development of information and communication technology brings about potentials within manufacturing companies. Both human and machine actors confront alterations in their job description and so there is a requirement to adapt their possessed abilities. Therefore, this environment enables them to learn mutually. An Outcome of the reciprocal learning is not only advantageous for the production sector, but also for enhancement of each individual actor.

In order to conceptualize the mentioned advancements from a conventional to knowledgeable and smart factory, various kinds of enterprises will come into consideration. SMEs consider themselves towards new technologies and their implementation ill-equipped. Nevertheless, it is discussed that this framework will assist them with regard to their performance objectives. Papers (e.g. Moeuf et al., The industrial management of SMEs in the era of Industry 4.0. International Journal of Production Research, 56 (2018) 3, 1118–1136.), which are discussing SMEs in context of Industry 4.0 concluded that due to mentioned considered shortage these enterprises do not exploit every available opportunity of the industrial evolution/revolution and isolate themselves to basic application of this framework; e.g. technologies to monitor industrial processes. Thus, it is crucial to adopt measurement towards digitalization within planning, human-machine mutual learning and etc. in SMEs, since there are still gaps concerning these matters. The key barrier for SMEs are cost-driven issues and know-how shortage, which could be overcome with further collaboration with public and private institutions e.g. universities, external financial aids and know-how transfer e.g. through consultancy.

1 INTRODUCTION

In the new era of evolution, development and innovation in industrial automation technology, which is assisted on the one hand by Internet and on the other hand by human-machine interaction known as Industry 4.0, industries and production sectors face challenges and complexities in market due to structural changes caused by global trends (Bartodziej, 2016; Bauernhansl et al., 2014). Thus, it is demanded that these new modern technologies bring about and implement potentials in processes and procedures within manufacturing sectors (Bartodziej, 2016). Internet aids industrial sector by Internet of Things (IoT), which is bringing Internet to the things that leads to creation of services to be utilized by humans and machines (Shaoshuai et al., 2011). It is discussable that the future belongs not only to humans or machines but only to human and machine together (Ganschar et al., 2013).

Industry 4.0 comprises a shift from simply automated to an intelligent manufacturing concept and indicates the growth of physical and virtual worlds together (Klocke et al., 2011). In other words, it is the transformation of industry towards full digitalization and intelligentization particularly in manufacturing processes. The concepts such as IoT, smart manufacturing, and other technological developments function as a backbone of Industry 4.0 to integrate human and machine agents, production and processes (Erol et al., 2016). Industry 4.0 underlies the main research question in this paper, which concerns learning process by human and machines and evaluates its quality.

Machine learning capabilities indicated huge development in the computing era, whereas it is required to build a new generation and application of computers, which learn from structured and unstructured data, capture and analyze vital correlations, and propose measurements to achieve better outcomes (Kelly & Hamm, 2013). As a matter of this fact, Ansari et al. (2018a) discussed the assistance of human resource by devices, likewise human and machine interaction and information exchange with intelligent machines enforce changes to work division between human and machine as a matter of Industry 4.0. Intelligent collaboration of humans and machines, in which the behavioural characteristics of humans affect algorithms adopted by machines and vice versa can deliver better results, as the strengths of both agents are extracted (Vempaty et al., 2018).

1.1 RESEARCH OBJECTIVE

To aforementioned challenges, intense and coordinated research will be promoted aimed at developing technological and methodological solutions. The main aim of the research is to assess and facilitate the human-machine reciprocal learning in the recently mentioned industrial evolution and/or revolution and to bring about anticipated outcomes for manufacturing sectors with assistance of a quality assessment of the whole process. Due to the mentioned industrial evolution and/or revolution new roles and tasks will be appointed within Human-centered CPPS; these will lead to more complexed problem-solving processes to be mastered.

As a result of the industrial evolution and/or revolution, there are the cognitive skills of machines to be discussed. As mentioned above, to implement a concept for quality assessment of the mutual learning interaction, skills of humans and machines will be investigated and identified. Furthermore, the collaboration of these elements will be a basis for the concept, respective various quality aspects that are defined and quantified. An important factor is to understand, how humans and machines assist each other and accordingly, respectively better solution and outcomes will be brought about.

Two types of learners will be distinguished as follows: human or intelligent machine. The collaboration of these two actors in the process of learning introduce the process of mutual human-machine learning. The outcome of this process and its effects on each actor of the process (human or machine) will be discussed. It is significant to find the relations of key attributes to learning process. Therefore, attributes will be designated to this process; at final stage can be amalgamated as a whole.

Beyond the human-machine mutual learning as the main objectives of the proposed research the central aim is to assess the quality of the process, explicitly to construct the mentioned model to be utilized further in industrial production sectors and applicable to smart factories. This model will aid the actors within the CPPS to identify the most applicable approach to learn from each other. The model will lead to better understanding of task allocation in the process of production and to reach more comprehensive outcomes within the system. Due to this reason, this assessment model is centered as the fundamental aim of the proposed research.

1.2 METHODOLOGY AND OUTLINE OF PAPER

As the main methodology for the proposed research, a comprehensive literature review will be conducted to generate the state-of-art of the mutual human-machine learning in context of Industry 4.0 and smart factory. The methodology consists of respective literature that are found employing database search using keywords. Section 2 provides detailed state-of-art literature review methodology used in this study. Based on the comprehensive literature review and summarizing the findings of the review, it is intended to apply the outcomes and construct respective quantitative and/or qualitative models in section 3. The outcome will be evaluating the learning process depending on defined attributes, enhancing labour division between human and machine, setting a basis to improve the mutual learning process. Section 4 contains findings, conclusion and future outlook.

2 LITERATURE REVIEW

Smart Factory is one of the aforementioned potentials that is constructed by connected and flexible integrated production infrastructure and has as its core Cyber-Physical Systems (CPS) (Geisberger & Broy, 2012; Bauernhansl et al., 2014). It is future of production intended by Industry 4.0 as node of bigger network that is connected in order to ease the process of fulfilling of certain customer demands (Erol et al., 2016). It can organize itself with aid of CPS in real-time because of real-time data, to which it has access and with these data it can adjoin virtual and real world in order to find real-time solutions (Bauernhansl et al., 2014). The goal is to create a technology platform to be adapted in various industries (before any in medicine sector) and practical tool to change (Kelly & Hamm, 2013).

Lee (2008) defined CPS as "integrations of computation and physical processes. Embedded computers and networks monitor and control the physical processes, usually with feedback loops where physical processes affect computations and vice versa." Cognitive computing enable machines and systems to resemble the ability of human learning to reproduce human skills assisted by methods of machine learning (Ansari et al., 2018a). The more humans interact with and train these machines, the smarter they will get and train back and as a feedback this loop continues and cause reciprocal learning (Kelly & Hamm, 2013). These interconnected systems emerged by exponential growth of computing and dynamic progression of information and communication technology (Bartodziej, 2016).

Although Humans play vital role in these systems, CPS can construct digitalized networks and optimise themselves and they can autonomously solve problems with human cooperation (Bauernhansl et al., 2014). Machines are once designed, programmed and trained by humans, further on they can reprogram themselves as well as they

interact and learn (Kelly & Hamm, 2013). CPPS (Cyber-Physical Production Systems) are subdivisions for CPS that are mainly in direct connection with production systems in order to increase the productivity and flexibility in manufacturing (Reinhart et al., 2013). Despite discussions on human substitutability, Ansari and Seidenberg (2016) emphasize of complementarity of strengths and weaknesses of CPPS and human regarding of knowledge exchange and reciprocal learning.

An attempt to identify strategies to execute an ideal state of smart factory distinguishes various approaches to construct collaboration of highly autonomous CPPS and qualified humans (Ansari & Seidenberg, 2016). The goal is having machines that are more capable of learning and interacting with humans, which leads to a state that humans think and work differently, since machines can give helpful insights aided by weighing and assessing evidence and drawing relevant conclusions (Kelly & Hamm, 2013).

Machines approach an initial query first to ask for additional information to comprehend the problem accurately and to gain understanding of what it is asked. Scenario based learning and learning from data is the approach of machines for acquiring knowledge. Scenario based learning "uses scenarios, structured descriptions of real-world problems and related instructions, to support active learning" (Erol et al., 2016). According to this machines learning competence has following stages: generating hypothesis form evidence, ranking the acquired hypothesis and generating a question from it, and acquiring an answer depending on the earlier learned data. These data are once captured through its interaction with humans and the system will improve itself with time. Furthermore, it is able to digest not only textual information but also statistical data (Kelly & Hamm, 2013). In Figure 1 Khobreh et al. (2016) exhibit Meta-Model of the Job-Know ontology. In other words, it consists three components and two relations as following: there is a task that requires competence that enables fulfilment of the task; knowledge, skills and abilities (KSA) qualify the competence that it also requires KSA.

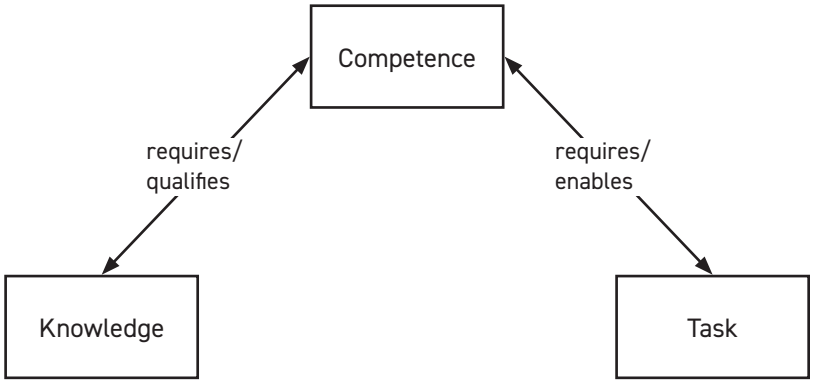


Figure 1: Meta-model of Job-Know ontology

Problem-solving as one of main proposed processes within manufacturing systems, is to identify optimal solution among other solution paths, in which they lead from an initial state to their (desired or undesired) goal state. To such it is required to determine and evaluate strategies of alternative paths (Vempaty et al., 2018). There are two agents to conduct this task: either human or machine, or a cooperative action (Ansari & Seidenberg, 2016). Therefore, the rationality and bounded rationality of humans is questioned, as if rational decision-makers like machines have stronger/larger memory to store and computational competencies to make evidence-based decisions (Kelly & Hamm, 2013; Vempaty et al., 2018).

Ansari et al. (2018a) evidenced, that there is a lack on exploring co-occurrence of human-machine learning, but their learning would be examined distinctively because of the tendency to differentiate the learning approaches both human and machine. To this reason mutual learning is defined in context of Industry 4.0, as "a bidirectional process involving reciprocal exchange, dependence, action or influence within human and machine collaboration, which results in creating new meaning or concept, enriching the existing ones or improving skills and abilities in association with each group of learners" (Ansari et al., 2018a).

A thorough study of learning curves in production and operations management stressed the performance improvements of workers as a result of task repetitions or experience; although there were only few discussions about forgetting (Glock et al., 2018). In this regard Kelly and Hamm (2013) state that providing learning systems first with information and rules, which they require to perform a well-defined task and second training them to utilize this information; this is combination of interaction and sophisticated algorithms that can rival the performance of a top human expert in a specific domain. It is assumed that something more than our comprehension from human-machine interaction will be practiced. Learning curves can predict, monitor and therefore improve the performance of individuals and are applicable to different sectors specifically production management as most popular area of research on learning curves. They emphasized on repetition as the ability to improve performance (Glock et al., 2018; Jaber & Glock, 2013).

Dreyfus (2004) offers a 5 stage model of adult skill acquisition, in which after recognizing elements of task environment and accordingly following rules it is emphasized on gaining experience as a route to competence and learning. As said, at first stage individuals act like a heuristically programmed computer, giving them time, they act as a complex task seems normally solved. Interesting is the point, which computers do not have any sense of success or failure to identify, which stage to stop. In smart factory as a leaning environment, performing tasks is consisted of exchange, action or influences with certain level of dependency, that leads to mutual learning. Mutual learning has elements such as knowledge acquisition by human and machine and participation of both actors in doing shared task (Ansari et al., 2018a). As follows in Figure 2, Ansari et al. (2018a), depicted the elements of smart factory as a hybrid learning environment and indicated that knowledge and skill acquisition is only achieved with participation of both actors of human workers and intelligent machines.

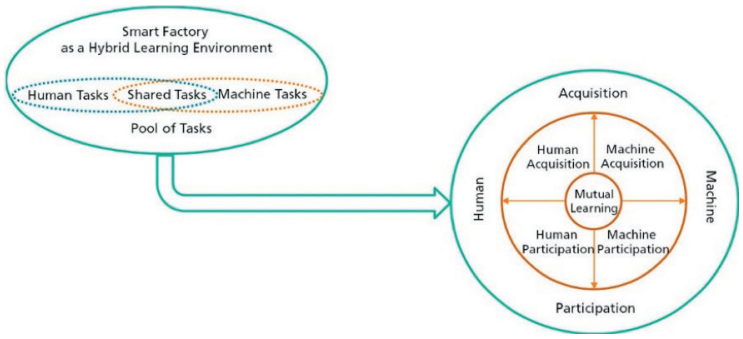


Figure 2: Mutual learning in relation to human-machine collaboration

Jaber and Glock (2013) assume there is a portion of time to perform any task, which is dedicated to process information, acquire and build-up knowledge. Learning occurs in the latter action and is called cognitive learning. So it is said, on worker level of Industry 4.0 there is an increase of automation through routine tasks and due to this, strong analytical competencies and generating practicable solutions are key features of future (Erol et al., 2016). Furthermore, domain knowledge of methods and languages are required for conducting a task or job both as main competencies of humans and machines (Erol et al., 2016; Kelly & Hamm, 2013).

On factors cost and quality need to be focused, while the crucial factor time is formerly studied (Ganschar et al., 2013). The connecting systems aided by CPS enable speed and quality of experience transfer, which leads to ability of discovering problems faster and so to optimize production lines. Dreyfus (2004) highlight experience as main feature to build a route to gathering skills and learn; accordingly, Ansari et al. (2018a) consider quality and performance variation of a task implementation are leading indicators to identify the competency of human and machine to perform the assigned task.

3 MODEL TO ASSESS THE QUALITY OF HUMAN-MACHINE MUTUAL LEARNING

Models become not only prediction tools for studying a problem (Bondavalli et al., 2009), but also can contribute to description and explanation of a problem. They are capable of capturing key elements of system, type of correlation and their magnitude. To construct a model in order to evaluate the quality of reciprocal human-machine learning process successfully, it is required to characterize behaviour of human and machine (Vempaty et al., 2018), define crucial features and parameters to represent quality in this process, while disregarding irrelevant factors (Klein & Scholl, 2012). This model will be a mean toward desired system. To the reason that this concept has not been discussed before the author has assumed parameters, which were supposed to be relevant in order to assess the process of mutual learning.

3.1 QUANTIFYING THE QUALITATIVE ASPECTS

In order to build qualitative and quantitative models to evaluate quality, procedures are demanded, which can allow comparison based on qualitative and quantitative aspects. That can be undertaken with Evaluation techniques, while assisted by these methods, the subjective estimation is extremely considered. In this regard, a) criteria to reach parameters are operationalized, b) goals are set, and c) target conflicts are dissolved. These are called multi-criteria evaluation procedures (Klein & Scholl, 2012), which are understood as Multiattribute Decision Making (MADM).

Applicable to the methodology and features of quality definition there are two major methods investigated: one possibility is to integrate qualitative aspects aided by Benefit analysis, or second Analytic Hierarchy Process (AHP). Their assignment includes firstly determination of functions for the high-preferred parameters and secondly ascertaining weighting factor for each parameter in the function (Klein & Scholl, 2012). Both of methods belong to multi-criteria evaluation models with a difference on the one hand in theory basics and on the other hand, how they assist the model-constructer in the assignment of the model. In Utilizing benefit analysis, the results will be directly assigned to the parameter scales, while in AHP a comparison between alternatives can be undertaken supporting the goal. In this comparison one alternative will be preferred to the other and therefore will be chosen.

MADM methods require congestion of information, which is prone to subjective decisions that are made by model-constructor, e. g. operationalization of the parameters, which can lead to over- or undercompensating of the goal. This can be a negative aspect of MADM models (Klein & Scholl, 2012). There are few methods for allocating values and so giving the weighting factors to the parameters. Applicable to MADM models are two techniques following: 1) assigning ordinal or metric scaled values to any given goal or restricting the values of the goals to predefined ordered classes. Having many classes in latter technique it tends to transform to former, 2) assessing comparatively two goal pairs as determining, which one better is or assigning ratio scale to values (primarily used by AHP modeling).

An approach to set the parameters and gaining sufficient knowledge to make it applicable is realized by model-constructor. This research is conducted principally with dummy data, while the access to real data is first of all restricted, as there are not many smart factories running and data are sensitive to acquire. Second researchers can familiarize themselves with real world before they get access to real data. Therefore, before any aroused complexity, researchers can assess the results of their operation. Positive point is that these data does not contain any data from specific person. Hence, the security is guaranteed because no anonymous data is used.

As stated, there are influential parameters for human-machine mutual learning systems, which will be analysed and given a weighting factor. This paper will examine and outline a MADM model. It should be considered during the process of modeling not to confuse the qualitative and quantitative models because of their similar characteristics. As the margin between quantitative and qualitative can be unclear and so one is misinterpreted as the other (Klein & Scholl, 2012).

When the elements are defined as parameters and appear in form of equation and inequation, they reckon as mathematical or quantitative models; whereas constructing qualitative models is based on description and qualitative information, of which the former can be and the latter are usually influenced by subjective aspects. As a result, it is relevant to quantify qualitative data for formal evaluation of the qualitative models. That is due to the reason, that a quantitative model emphasizes first on precisely structuring problem, concentrates on relevant facts and can deal with the subjective aspects of individuals (Klein & Scholl, 2012).

3.2 EVALUATION OF QUALITY

3.2.1 CONCEPTUALISATION THE MODEL AND ITS CHARACTERISTICS

According to section 3.1, it is necessary to define essential characteristics and features of, which will form the concept and interpretation of quality of mutual human-machine learning. It is important to measure and recognize the attributes of model and not to measure models (Churchill, 1979). Ansari et al. (2018a) mention aspects and research gap that are beyond state of the art in the context of Industry 4.0 in the field of mutual human-machine learning; one is ascertained as measuring mutual learning outcome. To assess the effects of Industry 4.0 on decision-making tasks and examine the transferability of these tasks between human and CPPS (with emphasize on complementarity of human and machine instead of substitutability), three characteristics are offered, which are also elaborately considered by author. These are: handling/operation time, human error probability, and learning time (Ansari et al., 2018b).

To this, due to having lack of literature that discuss topic of human-machine learning or even assessing quality of a process considering some features, which create the definition of quality, the author intends to define, operationalise and summarize these characteristics in a model in order to provide better understanding of what is thoroughly discussed in literature review regarding learning skills through human, machine and human-machine. Quality is the extent of the fulfilment between expectation and performance (Parasuraman et al., 1985) and according to this definition after fixing the determinants of mutual human-machine quality, it is a stage to assess the difference and gap between expected and accomplished outcomes. This occurs for both actors including human and machine. Subsequently, these form a weighting factor that this determinant of whole quality component can accomplish, which will be applied to the value function.

Again to highlight the complementarity of human and machine and to capture an aspect to define the quality of mutual learning, human competence level and CPPS autonomy degree is underlined (Ansari et al., 2018b; Ansari et al., 2018c). As cited before Dreyfus (2004) and Khobreh et al. (2016), the competence level subdivides to levels of experience, skills and ability. Ansari et al. (2018b) counterpose the competence level of human resources to autonomy degree of production systems; demonstrated that human developments are as: novice, competent, proficiency, expert and mastery (Dreyfus, 2004), and machine developments as: notification, assistance, partial autonomy, conditional autonomy and full autonomy. The collaboration of human and CPPS occurs by mentioned human and machine levels of qualification. The term "qualification" (Ansari & Seidenberg, 2016) instead of competence level (Ansari et al., 2018b; Ansari et al., 2018c) indicate the optimal collaboration of human and CPPS. Therefore, these both terms underpin qualification level of humans to fulfil a task.

3.2.2 CONSTRUCTING MODEL OF MUTUAL HUMAN-MACHINE LEARNING QUALITY

Kilibarda et al. (2012) propose a figure to demonstrate a model of quality of logistics service measurement. Figure 3 (Kilibarda et al., 2012) in the proposed research is elaborated by author, finding resemblances in both research.

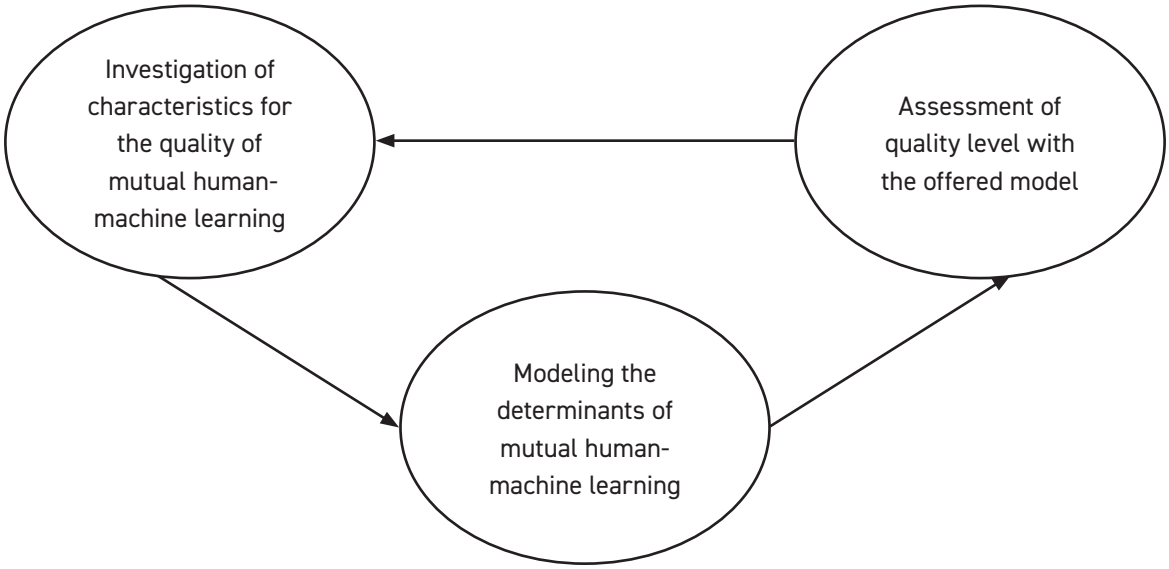


Figure 3: Model for assessing the quality of mutual human-machine learning

The model of mutual human-machine learning quality is based on following assumptions:

1. These definitions and subsequently values are summarized in Table 1 and Table 2 (author elaboration on the basis of section 2) are relevant for each actor.
2. A task is defined, which can be undertaken in fixed time scale.
3. The to be assessed learning process is fulfilled by human and machine as a process of exchange of information.
4. Dependent variables are the determinant of quality, which are defined by author to an independent variable of time.
5. In Table 2, "H" stands for human and "M" stands for machine.
6. Weighting factors are those that depends on, how a determinant (parameter, attribute) influence the whole function or equation of quality.
7. Expected value is, what is required to be fulfilled to declare that human and machine have gained expected knowledge in the period of time and are capable of implementing a defined task.
8. Sustainability demonstrate, how long can the learnt material be retrieval. This learning can be sustainable, when e. g. captured knowledge be retrieved again after 3 weeks of break.

Table 1: Definition of Determinants of mutual human-machine learning process quality and their expected value

Determinants of quality		
Determinant	**Definition**	**Expected value**
Pace of task fulfilment (PoTF)	The measurement of task accomplishment in a fixed time scale	
Sustainability of learning (SoL)	Sustainable learning occurs when human and machine do not forget, what they have learnt and can start again, where they in past they left a task in past	
Capability to deal with complexity/diversity of task (CoT)	Depending on complexity/diversity of a task human and machine create different outcomes due to their level of cognitive competency	
Required competence level/ autonomy degree (degree of qualification (DoQ))	Competence level/autonomy degree highlights the level of acquisition skills/autonomy with respect to status of formal learning processes (depending on learning curves of both learners)	

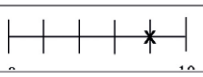
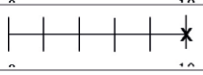
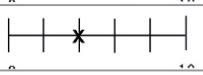
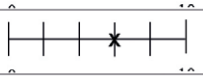
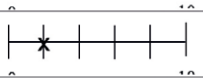
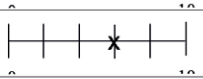
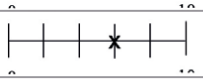
Determinants are PoTF (a_1), SoL (a_2), CoT (a_3), and DoQ (a_4), which determine Quality of mutual human-machine learning (QohmL) as main component of this research. These can range between 0-10 as expected rate, which means how critical and influential is this determinant.

Depending on this expected value, the fulfilment rate can be calculated in which:

$$Fulfilment\ rate\ (FR) = \frac{resulted\ value}{expected\ value}$$

$$Weighted\ Fulfilmate\ Rate\ (WFR_k) = w_k * FR_k$$

Table 2: Comparison of expected values and resulted values of quality component determinant

Comparison of values					
Determinant	Weighting factor (w)	Resulted Value		Fulfilment-rate	Weighted FR (WFR)
PoTF	0,3	H		0,8	0,24
		M		1	0,30
SoL	0,4	H		0,5	0,20
		M		1,2	0,48
CoT	0,15	H		1	0,15
		M		0,33	0,05
DoQ	0,15	H		0,6	0,09
		M		0,6	0,09

Weighting factors are given to emphasize on criteria, which can be essential for production sector. For example, it can defer from a smart factory to another. Some factories need more qualified resource and for some speed of implementation is important. It varies from each other and therefore it can be as an independent factor and set by production sector itself.

After defining the attributes and setting the expected value of learning from human or machine, a benefit analysis result (outcome value analysis) can be built:

$$Overall\ Fulfilment\ Rate\ for\ human\ OFR_H = \sum_{k=1}^{n} (WFR_k)_H$$

$$Overall\ fulfilment\ Rate\ for\ machine\ OFR_M = \sum_{k=1}^{n} (WFR_k)_M$$

$$for\ n = 4,\ H: human,\ M: machine$$

Conducting these set of formulas to calculate and therefore compare overall fulfilment rate for human and machine, following the differences will be calculated:

$$OFR_H = \sum_{k=1}^{n} (WFR_k)_H = 0{,}24 + 0{,}20 + 0{,}15 + 0{,}09 = 0{,}68$$

$$OFR_M = \sum_{k=1}^{n} (WFR_k)_M = 0{,}30 + 0{,}48 + 0{,}05 + 0{,}09 = 0{,}92$$

These values assist to draw a conclusion while comparing the achievement of human and machine in the process of mutual learning. In section 3.2.3 it will be discussed.

3.2.3 INTERPRETATION AND ANALYSIS OF OUTCOMES OF THE MODEL

As it is said by Ansari et al. (2018a) potential of learning for human workers and intelligent machines depends on capabilities of both learners. Constructed model aims to demonstrate that the capability of actors in process of mutual learning impact directly the quality of human-machine mutual learning. Having adapted constructed data, the author attempts to ascertain the determinants representing quality of mutual learning and the classify importance of these adapting weighted factors. The outcome is weighted fulfilment rate, which express capability of each learner dependant on defined determinants.

These WFRs of different addressed determinants are amalgamated respective each learner distinctively to identify the differences and suggest recommendations for mutual learning approach. In order to compare and contrast what is the outcome of constructed model, figure 4 depicts WRF for each quality indicators (a_n). With help of both these methods it can analyse and interpret the outcomes of model.

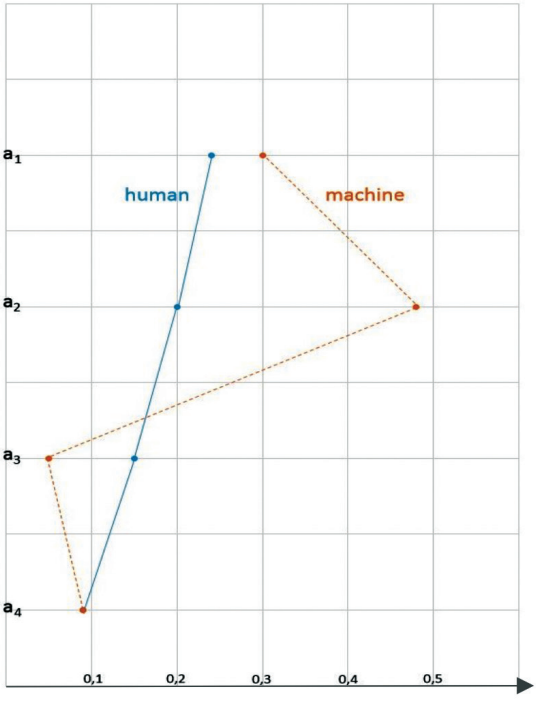


Figure 4: Comparison model of mutual learning fulfilment qualities between human and machine

Interpreting the calculations of OFR for both human and machines can be understood that considering the constructed data produced by author, machines will function far better than humans after the process of mutual learning. Having set pace of task fulfilment, sustainability of learning, capability to deal with complexity/diversity of task and required competence level/autonomy degree as defined determinants of model, respective overall study, machines indicated better learning outcomes.

The all factor inclusivity of benefit analysis should not be disregarded. This model realizes the attributes as a whole and it is not concrete which influences more on the result. Discussable is also the subjective aspect of model, which is caused by author and his understanding of theme. For this purpose, author decided to build another tool to compare the results in order to examine precisely each determinant with its WFR.

According to the figure 4 human does not have fluctuating rates in mutual learning. This can demonstrate that the competencies of human after mutual learning result relatively similar outcomes; whereas considering machines they have different approaches to different determinants; e. g. with regard to sustainability of learning, the waste of machine resources is seen. That means, machines learn so sustainable and do not forget anything that for simple tasks they can be waste of resource. Having FR of more than one is discussable and accordingly operations should be against that undertaken.

Degree of qualification indicates the required competence level/autonomy degree. Here the respective calculation of section 3.2.2 and figure 4 have resulted same values, which manifest the competence level of human and autonomy degree of machine run in same level while mutual learning process. Expressed the ideas in 3.2.1 competence level and autonomy degree will be enhanced in few stages and steps. Declaring the addressed ideas both human and machine can gain simultaneously KSA on the route to competent human and autonomous machine.

Regarding pace of task fulfilment both learners indicate approximately similar outcomes in the exemplar model in section 3, to which machine can have agile task fulfilment due to its computing skills. Capability to deal with a complex or diverse task is the only determinant that human can lead the skills of machine. The interpretation of this is directly linked to the special skills and objectives that human can only have and deliver, e. g. soft skills and the objectives delivered through soft skills. To this reason, it is hard for machine to overcome a complex or diverse task, thus, human can be a leading role.

Assisted by model and figure 4 produced from the value information in model, the characteristics of mutual human-machine learning is discussed and summarized. These model can be applicable to real data in order to achieve more concrete understanding form the process and the competencies of its learners. The amalgamation of weighted fulfilment provided an overview to quality of mutual human-machine learning.

4 FINDINGS, CONCLUSION AND OUTLOOK

Findings of the conducted research paper and resulted information in section 3 will be summed up to outline this section. Identifying the key characteristics of quality in process of mutual learning is the main discussion of the paper. In this paper, it is attempted to identify these attributes while reviewing the literature and conducting state of the art. For this purpose, having said it is appropriate to find gaps of knowledge in the literature that have respectively resemble topics and to extract relevant aspects from these literature.

Intelligent manufacturing has features that require to be discussed. Mutual learning occurs within intelligent manufacturing systems or smart factories which are equipped with machines that are connected and can transfer data and information in real time.

In addressed smart factories machines have the ability to learn and to teach; this is the basis of mutual human-machine learning. They are accessed to a huge amount of data, with which they can learn and can enhance their performance and autonomy. On the other hand, human can develop their skills and competencies with learning. This learning can not only be independently, but also the emphasize of this research is to implement, ease, demonstrate and review the mutual learning process. This is the foundation for the discussed model.

In the model literature-based relevant characteristics of mutual human-machine learning are defined and operationalized. The definitions attributed to the determinants have been concluded from the literature review. Having had expected value and fulfilment value to assess the quality, which is the ratio of these two, the fulfilment rate is built. Weighted fulfilment rate is created by underlining it with weighted factor. Finally, the amalgamation of WFR corresponding defined determinants is calculated. With this method the quality of human and machine separately learning process is assessed. Desiring more precise interpretation and analysis a figure is constructed to depict details.

Section 3.2.3 can be summarized by acknowledging machines manifested higher overall fulfilment rate; although it should be mentioned, that the method of benefit analysis has inclusive perspective of all determinants, which impedes the decision-maker of the model to have detailed overview of influential characteristics. To facilitate to compare and contrast figure 4 has contributed to draw detailed conclusions. It is emphasized on skills of human and machine that are enhanced through the process of mutual learning.

After conducting state-of-art and reviewing literature the lack of theories to apply to practice and smart factories is disclosed. Quality as a feature of a process is scarcely discussed. To this, there are opportunities in this regard to define other quality aspects of mutual human-machine learning and apply it to this model.

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EMBEDDING ECOLOGICAL REQUIREMENTS INTO NEW PRODUCTS

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An earlier version of this article has been published as a conference paper: Rohatyński, R. (2019) 'Embedding Ecological Requirements Into New Products', in Tomé, E. and Kragulj, F. (eds.) Proceedings of the International Conference on Theory and Applications in the Knowledge Economy TAKE 2019. Vienna, Austria. pp. 429–444.

ABSTRACT

This paper reviews the recently emerged field of design for environment. It is based on the author's long-term interest of the subject. Objectives and problems of design products with consideration of ecology are discussed in details. Need of taking into account full life cycle of the product is emphasized. Basic concepts of the product life cycle and their transposition to engineering design are outlined. Recommendations for avoiding pollution during the product utilization are described. After utilization, during the product end of life a number technologies exist, which should be considered as early as possible during the product development process. They are named at the end of the paper. Particular responsibility designers for development ecological products is the general premise of the paper.

Keywords: Product design, product life cycle, ecological products, design for environment.

KEY FINDING(S)

- In his paper the author emphasizes that designers are responsible for development ecological products. As new product with its features is created in the process of design and manufacturing, so it is rational to consider all 'ecological' features of the product during design.
- Two of the most important designers' responsibilities are: (i) Environmental friendly, yet economical, material processing during all product life cycle, and (ii) Avoiding environmental pollution during the product use. In this context a variety of technologies applied for end-of-life products have been enumerated.
- It was shown that environmental issues should be considered at each of five stages of the product realization process. If this is done then expected overall result is likely.
- Requirements for products and processes relevant to any phase of the product life have been specified. It has been emphasized that product materials should be kept as much as possible in a closed loop while the reminders should conform to the natural biological cycle.

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- A number of advices and recommendations for designers how to minimize detrimental impact on the environment during the entire life of the product are put forward.
- An operational definition of 'ecomaterial' has been proposed. According to this definition seven properties of the ecomaterials have been identified.
- It was noted that low level of designers' knowledge about environmental issues is a limiting factor for taking into account environmental issues into design. To develop a product friendly to environment designers have to complement their knowledge.

IMPLICATION(S) FOR THE PRACTICE OF SMEs

According to estimations provided in the literature SMEs account for 60-70% of industrial pollution in Europe, but only up to 24% are actively engaged in action reducing their environmental impact. Thus, there is in SMEs the great potential to reduce harmful effects on environment by controlling air and water pollution, solid waste, radiation and noise, and reduction of energy demand.

In addition to the *Design for Ecology* guidelines contained in this paper there are also some particular suggestions for SMEs in it, for example:

- Implement requirements for modern environment-friendly technologies,
- Invest in clean technologies,
- Use *ecomaterials*,
- Produce and/or implement parts easy to recycle,
- To obey checklists of environmental features in all product life cycle.

1 INTRODUCTION

Ecology generally pertains to the study of relationships between various organisms and their environment. This includes consideration of plant, animal, and human populations in terms of rate of population growth, food habits, reproductive habits, and ultimate death. Growth of the world population, combined with the technological changes associated with our living standards, has created a greater consumption of our resources, resulting in potential shortages. The amount of wastes has increased significantly. The net effects of this have caused alterations to the basic biological process, and to some extent these alterations have been harmful. Those problems are of particular concern:

- Air pollution and control
- Water pollution and control

- Noise pollution and control
- Radiation
- Solid waste.

There is a growing need to design new products so that avoid or at least minimize harmful impacts for environment. This approach needs to take into consideration all processes involved in product production, use, and after using it, i.e. the product life cycle. As new product with its features is created in process of design and manufacturing, so it is rational to consider all 'ecological' features of the product during design (Graedel & Allenby, 2010; Hundal, ed., 2002).

Many of the challenges related to worn out products are consequences of how the products were designed (Rohatyński, 2016a; Rohatyński, 2016b; Rohatyński, 2009). In order to support the company's product development process, several eco-design methods and tools have been developed, which consider product end-of-life issues (Hundal, 2002). Literature of the subject is quite rich but disperse, hence an attempt to make an overview here.

2 PRODUCT LIFE CYCLE

The product life cycle shown on Figure 1 starts from the market needs identification compared with technological capabilities of the company. For each instance the detailed specification of user needs and technological requirements must be performed. The crucial decision is to choose whether one type of product or the family of similar products (product platform), which would satisfy a wider range of consumers, will be manufactured (Blanchard & Fabrycky, 2014).

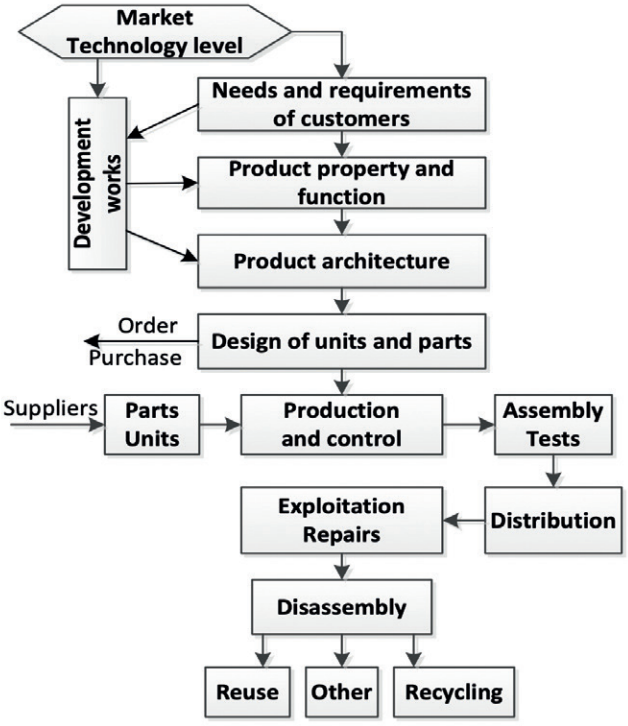

Figure 1: The life cycle of a product from identification of needs to end of use

For the products family their architecture and the range of their function have to be determined prior to the production start. The product architecture is created top-down, from assemblies to parts and allowing for manufacturing processes. The essential problem to solve is how to incorporate technological and functional qualities into the product.

When the product architecture has been set up engineers can begin design of units and parts of each member of the product family. One of the strategic decisions is then to make choice of cooperating suppliers because internal manufacturing costs often exceed costs of outsourcing. Reconciliation of quality demands with the costs of manufacturing is also a critical challenge.

In this paper the particular attention is drawn to the post-operating period, when disassembly of the used product should get together with the decision about further processing of constructional materials.

The general diagram of the material cycle in industrial economy is shown in Fig. 2. It consists of four sectors: material procurement, production, users, and reverse (feedback).

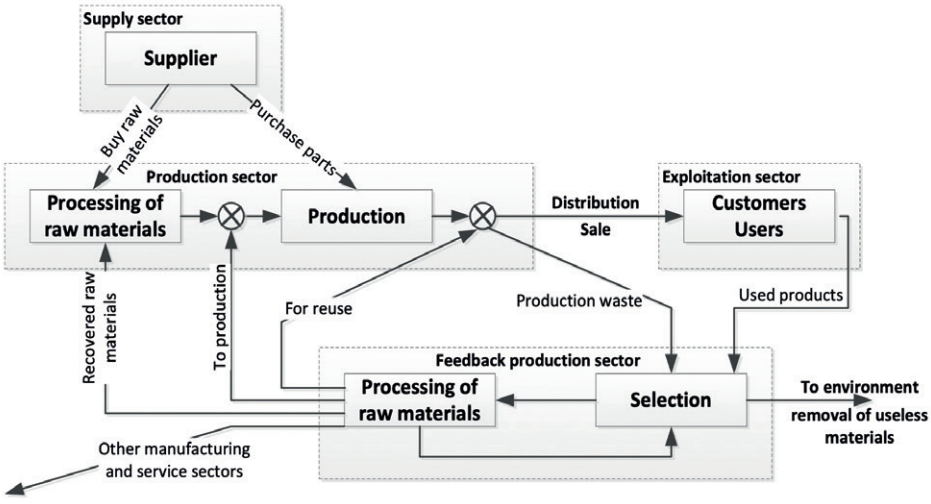

Figure 2: Block diagram of the production system with the material feedback (Whitney, 2003)

The production sector besides off the shelf products generates also some defected ones, which are subjected to repair, recycling or retrieval. Useless residues are disposed. The reverse production sector collects used products from users. These products after dismantling and selection and further processing return to the production sector or are removed to the environment.

There are two types of feedback in the material cycle: internal of the production sector (not shown in Figure 2) and external one. These feedback types close the material products cycle, not completely however, because a part of the materials returns to the environment and may have impact on ecological equilibrium.

Designing a new product in modern technology is daunted challenge. It is not satisfactory to design a product that does what it is supposed to do. Tasks for the designer include the following after (Graedel & Allenby, 2010: Ch. 9):

- Surveying customers to receive ideas for product characteristics ("products should not merely satisfy the customer, they should delight the customer")
- Addressing competitive products. New designs must meet or exceed those of the competition, or they will be unsuccessful
- Complying with regulations. Product safety, labelling requirements and many of other legally binding constraints must be considered
- Protecting the environment. Design considerations that have environmental implications are increasingly a topic of interest to customers, regulators, and industrial managers
- Producing designs that are attractive, easy to manufacture, delivered on time and competitively priced. In today's business world, immediate customer acceptance, efficient manufacturing, and timeliness are crucial.

Simultaneously considering in the design all phases of the product life, including production, consumption, maintenance, and the end-of-life, is called *Design for Life Cycle.* This implies that, even in the conceptual phase of a product, the design of appropriate production systems and dismantling operations should be considered. However, to apply such approach in practice a lot of information is necessary which is not available at the beginning of design. Moreover, solutions that are preferably from the environmental point of view are not necessarily of the value for clients. For example, the client may not prefer the cover of a car engine made from environmental friendly plastic. Thus, satisfying ecological requirements is not only important but also difficult task for producers.

3 DESIGN FOR THE LIFE CYCLE IN GENERAL

Direct subject of engineering design is product realization process. In general, it consists of five stages. At each stage relevant information about the product life cycle should be considered. If that information is taken into account in subsequent stages, a better overall result is likely.

'Design for Life Cycle' methodology considers all life of the product – from raw materials through their conversion, manufacturing and use to the after-use (reverse) period. Consideration of requirements for products and processes relevant to any phase of the product life is obligatory for engineers, particularly for designers (Figure 3). Products should be easy to repair and disassembly (possibly without destroying of elements), reuse and recycling. Product design should regard ecology in all product life – as in exploitation phase as after it. It means: use materials that meet ecological requirements, apply environment friendly technologies, avoid generation of harmful scraps and other toxic substances, minimize energy and water consumption, utilize renewable

resources and so on (Beitz, 1990; VDI Richtlinien 2243, 2002). Materials should be kept as much as possible in a closed loop while the reminders should conform to the natural biological cycle.

In general, product realization process consists of five stages. At each stage relevant environmental information can be considered. If that information is taken into account in subsequent stages, a better overall result is likely. (Graedel & Allenby, 2010: 145-146)

Stage 1: From concept to preliminary design. The appropriate environmental tool at this stage is a list of product or process attributes that will be not permitted, for example: radioactive substances.
Information known: Principal materials, critical electrical characteristics, critical mechanical characteristics, size. Key manufacturing processes (with technology and chemicals).

Stage 2: From preliminary design to mature design. The availability of a reasonable complete design at this stage allows use of additional environmentally related tools and approaches. Hence, the activity at stage 2 is a review of environmental aspects of product and process design approaches, together with other associated guidance provided.
Information known: Major components, preliminary electrical design, preliminary mechanical design, preliminary visual appearance. Principal manufacturing processes (with technology and chemicals).

Stage 3: From mature design to Development. Environmental information at this stage can be derived from detailed guidelines and checklists. The review should evaluate the degree in which a product design incorporates recommended product attributes. It allows for corrections of environmentally unfavourable attributes before the product design is finalized.
Information known: All components, final electrical design, final mechanical design, final visual appearance, mould designs. All manufacturing processes (with technology and chemicals). Process energy consumption.

Stage 4: From development to Manufacture. Most items of environmental concern are identified at this stage but product delivery implications can be addressed in detail for the first time, and the overall results can be made quantitative to the degree desired.
Information known: Final materials list (constituents and quantities), recyclability, packaging. All by-product streams. All residue streams. Outside supplier interactions.

Stage 5: From manufacture to sales and use. It should be checked whether environmental issues have been properly reviewed at previous stages, whether the product delivery and marketing activities will meet environmental goals, and whether provisions need to be met for end-of-life activities such as product takeback or battery recycling. As soon as the manufacturing process begins, even in the pilot plant stage, audits for energy, water, and waste can begin.
Information known: Marketing and shipping.

Although described above sequence of stages is recommended, the way in which an individual corporation proceeds may be a function of the details of its environmental management plan. The important factor is a way that guarantee the use of environmental information at stage reviews.

Very important consideration is the amount of environmental impact produced by products when and after they are used. The use and maintenance of products after it passes to the consumer is largely constraint only by the product design. This circumstance places special responsibilities on the designer to envision aspects of design that minimize impacts during the entire useful life of the product.

Simultaneously considering in the design all phases of the product life, including production, consumption, maintenance, and the end-of-life, is called design for life cycle. This implies that, even in the conceptual phase of a product, the design of appropriate production systems and dismantling systems should be considered, because these systems depend strongly on the design of product itself and vice versa. Yet to apply such approach in practice a lot of information is necessary which is not available at the beginning of design (Navin-Chandra, 1994).

Designers of products and processes should be aware of long-term consequences of their particular decision. For example, the use of some solvents can be very harmful when millions of doses are applied.

Designers should be concerned with adaptation of the product to these requirements. They have to predict the product behavior in the utilization period. Duration of the product and its parts life should be estimated as well as its influence on maintenance, service, and repairs. Information resulting from this consideration is the basis for further product development.

To accomplish these tasks designers may use a number of tools developed over many years e. g. (Pahl & Beitz, 2005; Booker et al., 2001; Boothroyd et al., 1994; Das, 2002; Das et al., 2008), but many of these had been developed before environment became as important as it is now. There are many methods and tools that aid product realization processes, e.g. The Pugh's selection matrix, QFD, FMEA, and other methods of generation and evaluation of design problem solution e.g. (Otto & Wood, 2001; Eder & Hosnedl, 2008).

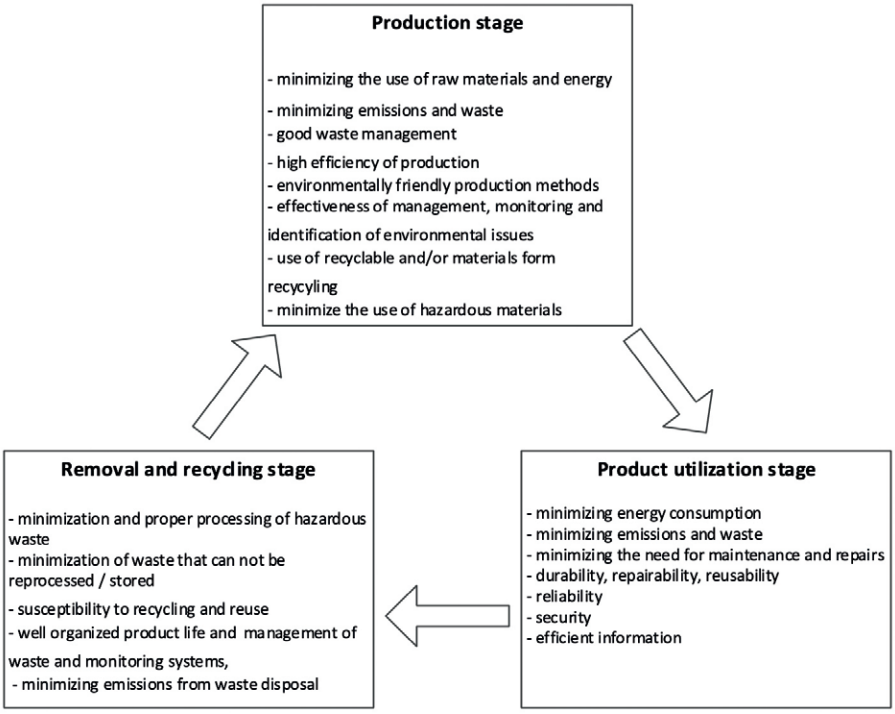

Figure 3: Requirements for product design related to ecology

The toolkits that aid the design for environment can be categorized in four groups (Graedel & Allenby, 2010, Part III):

- Lists of component and materials that can violate environment
- Design guidance handbooks
- Life-cycle assessment
- End of life processes.

For environment friendly design the best approach is taking into account all product life cycle, or more exactly – all lifecycle of materials used to its manufacture and to the involved processes (Chen, 2001). This approach is entirely considered in Design for X (DfX) methodology (Dixon, 1991; Kuo et al., 2001). Here 'X' may be any of a number of design attributes, such as: Assembly, Compliance, Disassembly, Environment, Logistics, Manufacturability, Material and component applicability, Reliability, Safety and liability prevention, Serviceability, Testability, and so on.

The scope of Design for Environment extends far beyond the factory walls. The focus on all the topics raised by DfX requires that product and process design be performed by product design teams made up of individuals from a wide range of specialties. In addition to the appropriate mix of engineering specialists, such teams often includes environmental experts, packaging engineers, manufacturing engineers, marketing specialists, business

planners, and perhaps financial and purchasing experts. The practice of using diversified teams for product design considerably complicates the process in its initial stages. The benefits, however, arise from the early consideration of the variety of attributes that will ultimately determine the success or failure of the product. Most features of a product are effectively set early in the design process. Participation of an industrial ecology expert on every design team effectively improves the environmental responsibility of the modern products.

Demands for reusing parts and materials result in formulation of a number of new sets of requirements for the modern products. They complement traditional set of the conventional design requirements. The general guidelines are listed in order:

1. Design of products adapted to remote repair or modification.
2. Comprehensive use of reliability information.
3. Design for predetermined life time.
4. Modular constructional structures for easy exchange of wear out parts.
5. Avoiding of noxious, difficult to disposal materials.
6. Design of products for which the manufacturer holds ownership for all their life cycle.

Product properties important for disassembly, recycling and other recovery processes show up in post operation phase only. Including these properties concurrently into design process is not an easy task. It is estimated that at least 80% product attributes have been decided during development process primarily at conceptualization. Consequently, design teams are responsible for taking into regard problems of the product reverse part life cycle including disassembly for remanufacturing (Ostlin et al., 2008). Designers are recommended to consider subsequently each phase of life cycle and note the pertinent requirements (Table 1).

Table 1: Matrix of requirements in product life

Product life phases	Types of requirements					
	Engineering	Economics	Ergonomics	Law	Environment	More?
Planning						
Design						
Production						
Market						
Utilization						
Removal						
Recovery						

This can result in a base for benchmarking in order to rank a new product on market. After exchange of views and discussion among designers and experts from other disciplines, for example, enterprise managers, economists and ecologists it is possible to answer for five cardinal questions.

First question is about the product structure, its material and function including physical processes. Its composition, size, appearance, etc. If it will consists of elements of different usefulness to recovery after end of life easy process of segregation during disassembly should be considered.

In second question assessment of disassembled elements value for the producer is considered. Recurrent use of some elements can be economically profitable, e.g. electric engines, joints and other. A preliminary list of required materials should be created not forgetting of principles of value analysis.

Potential threats to the environment is subject of the third question. A list of parts that need special treatment when not used again should be prepared. A look into problems in ecology that may arise in distant future is necessary:

What will be treatment of retired products – who and how is going to make assembling and sorting: Producer, user or a professional firm? How many stages will the process consists of? What will be final result? This information will help formulate product design requirements. It is the content of the fourths question.

Finally, intention of the fifth question is searching for possible improvement of the product present concept. Is it possible to amend some ecological indicators by means of some parts exchange? How would it impact on the product long life? Duration of the product life and its parts should be estimated as well as its influence on maintenance, service, and repairs. Information resulting from these analyses is the basis for further product development.

Above questions complement the traditional approach to design by taking into regard product end of life processes.

During product conception, it is important to take into account strategies for updating the product due to rapid changes in technology as well as clients' needs. In this case, too, design for environment can give companies a significant market advantage (Kelle & Silver, 1989; Klausner et al., 1999).

4 DESIGN TO AVOID ENVIRONMENTAL POLLUTION DURING THE PRODUCT UTILIZATION

Designers should be sensitive that small-scale decisions can make enormous impact on environment, as, for example, is the effect of the use of almost environmentally harmless solvents for pharmaceutical products when millions of doses are being manufactured.

The use and maintenance of products by the consumers is largely constraint by the design. This fact sets exceptional responsibilities down the designer in order to envision these aspects of the design that minimize

detrimental impacts during the entire useful life of the product. Sometimes solutions that are preferably from the environmental point of view, are not necessarily of the best value for users. For example, a client may not prefer the cover of engine made from environment friendly plastic. Thus, satisfying ecological requirements although important may be a controversial task for a producer.

A short discussion of the environmental pollutions caused by a product residues is put below. (Allen, 1994; Graedel & Allenby, 2003: Ch. 13).

Solid residues. The design of consumable goods for reuse or efficient recycling is generally recommended. There are two principal approaches to such design. One is a design that permits ready recycling once the consumable item has been returned. Another one is design of a product for a specific infrastructure for it recycling. An example of the latter is the approach used by a number of corporations to recycle the cartridges from laser printers. Users are encouraged by clear instructions to return the cartridges for regeneration and reuse. Not only is this approach beneficial for environment but companies realize that cartridge reuse is much more profitable to them than using a new cartridge every time.

Liquid residues. The best are the designs that encourage the consumer to use all consumable fluid at once or minimize the quantity of fluids thrown away or use only fluids with a modest environmental impact. Extensive efforts should be made to recycle fluids.

Gaseous residues. Products whose use involves such processes as the venting of compressed gas or the combustion of fossil fuels require the industrial ecologist to explore design modifications to minimize or eliminate these emissions. The automobile's internal combustion engine is perhaps the most common example of such a product, and one whose cumulative emissions are very substantial, but anything that emits an odour during use is, by definition, generating gaseous residues, e.g. polymer stabilizers from plastics or vaporized fluids from dry cleaners. Replacements for the volatile chemical constituents will often be available if the designers look for them.

Dissipative products. Many products are design to be dissipative in use, that is eventually to be lost in some form to the environment with little or no hope of recovery. Examples include surface coatings such as paints or chromate treatments, lubricants, pesticides, personal care products, and cleaning compounds. Attempts are being made to minimize both the packaging volume and the product volume as, for example, in case of superconcentrated detergents. Alternatively, some liquid products that are dissipated when used can be designed to degrade in environmentally benign ways, e.g. some pesticides and herbicides or fertilizer for crops, where any excess spread on fields is dissipated to local and regional ground and surface waters.

5 DESIGN FOR PRODUCT END OF LIFE

A limiting factor for putting design for environment into practice is the low level of knowledge of product designers concerning about end-of-life strategies. This is due to the fact that a product's conception is usually centred on its functionality and costs, in detriment to environmental issues. It should also be noted that to perform design

for environment, product designers require specific expertise to develop the product with a view to its efficient treatment after utilization.

The part verification procedure depicted on Figure 4 may be implemented in the design in order to ensure that the product is suitable for post-operating period. Before an element is accepted the designers should consider its suitability to reuse, protection of environment, and cost. Can this part be used as it is somewhere else? If not, is it possible to design it for easy decomposition that at least some of its elements can be reused? If not directly then perhaps after a modification or recycling? Are these processes not too expensive? In case no reuse is possible then the material disposal should not detrimentally influence the environment.

The efficiency with which cyclization occurs is highly dependent on the design of products and processes; therefore designing for recycling (DfR) is one of the most important aspects of industrial ecology (Beitz, 1990).

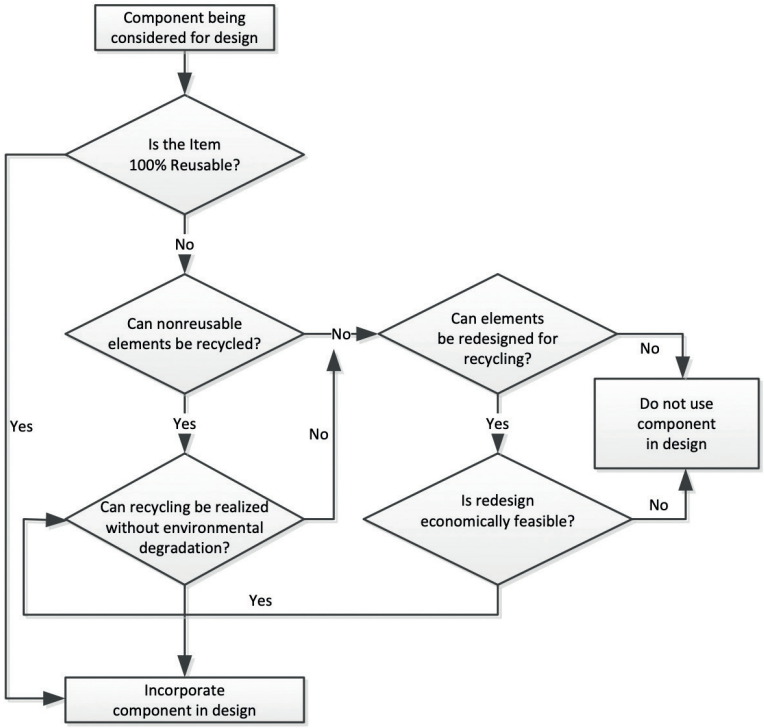

Figure 4: Evaluation of an element for its after-use processing after (Blanchard & Fabrycky, 2014)

Demands for reusing parts and materials result in formulation of a number of new sets of requirements for the modern products. They complement traditional set of the conventional design requirements. The general guidelines are listed in order:

1. Design of products adapted to remote repair or modification.
2. Comprehensive use of reliability information.
3. Design for predetermined life time.
4. Modular constructional structures for easy exchange of wear out parts.
5. Avoiding of noxious, difficult to disposal materials.
6. Design of products for which the manufacturer holds ownership for all their life cycle.

Above questions complement the traditional approach by taking into regard product end of life processes. A number of environmental features checklists have been prepared to offer general Design for Ecology guidance to product designers (Kaldijan, 1992).

- Make it durable
- Make it easy to repair
- Design it so that it can be remanufactured
- Design it so that it can be reused
- Use recycled materials to make it
- Use commonly recyclable materials
- Make it simple to separate the recyclable components of a product from the non-recyclable components
- Eliminate the toxic and problematic components of a product or make them easy to replace or remove before disposal
- Make products more energy and resource efficient
- Make products manufacturable using environmentally superior processes
- Work toward designing source reduction-induction products (i.e. products that eliminate the need for subsequent waste)
- Adjust product design to reduce packaging.

5.1 MATERIALS SELECTION PROBLEMS

It is obvious that materials should have the desired physical properties (strength, conductivity, index of refraction, etc.), desired chemical properties (solubility, photosensitivity, reactivity, etc.), and reasonable cost. However, to take into account ecological requirements, a number of additional properties is also to consider. The environmental and safety hazard, high energy embodied in the material, potential supply constraints, availability of a recycled supply of the material, the material substitutability, and so on.

The designers should select materials suitable to be reused, and will not cause any toxicity problems, and can be decomposed without adding to the solid waste dumps that unfortunately still exist. Care must also be taken to ensure that a product do not need for transportation containers or packaging that will cause environmental problems.

Detailed lists of improper material characteristics and hazardous materials have been prepared by European Union and governmental bodies. These lists are subjected to modifications in effect of progress of knowledge and when new materials appear. For example, in recent years extensive efforts have been made o determine what properties might make some materials more environmentally friendly than others, that is, to define the characteristics of "ecomaterials". An operational definition of an ecomaterial is: 'An ecomaterial is one whose acquisition and use cause minimal environmental impacts, minimal resource depletion, and minimal regulatory constraints to use'. According to this definition seven properties of ecomaterials can be enumerated:

- An abundant supply of the material exists
- A recycled supply of the material can be utilized
- The material requires low energy consumption in extraction, processing, and manufacturing
- The material has little or no associated environmental impact
- The material has no existing or anticipated legal restrictions
- The material can be used over extended time periods
- The material can be renewed and/or recycled.

To illustrate eco-material evaluation one can compare aluminium and a plastic composite for use in an automobile in the tropics. Aluminium is easy to supply (it is abundant), has little impact on environment, it is recyclability and has legal status. It is difficult for recycling supply (virgin aluminium is used in automobiles), and its processing requires substantial amounts of energy. Also, aluminium corrodes in salt air. The plastic composite is easy on supply, good in environmental impact, and energy consumption, but poor in the use of recycled material and in recyclability. In this example neither material is clearly environmentally superior, but on balance the aluminium appears slightly preferable.

Generally, Al, C, Fe, Mn, Si, and Ti, are easy to supply and cause no significant toxicity problems, and they potential for recycling is good. Conversely, As, Au, Be, Cd, Cs, Ge, Hg, In, Pb, Re, Tc, Tl, and Zn are in short supply and/or cause significant toxicity problems should be avoided or limited in use. Radioactive elements should be avoided with the possible exception of nuclear power applications.

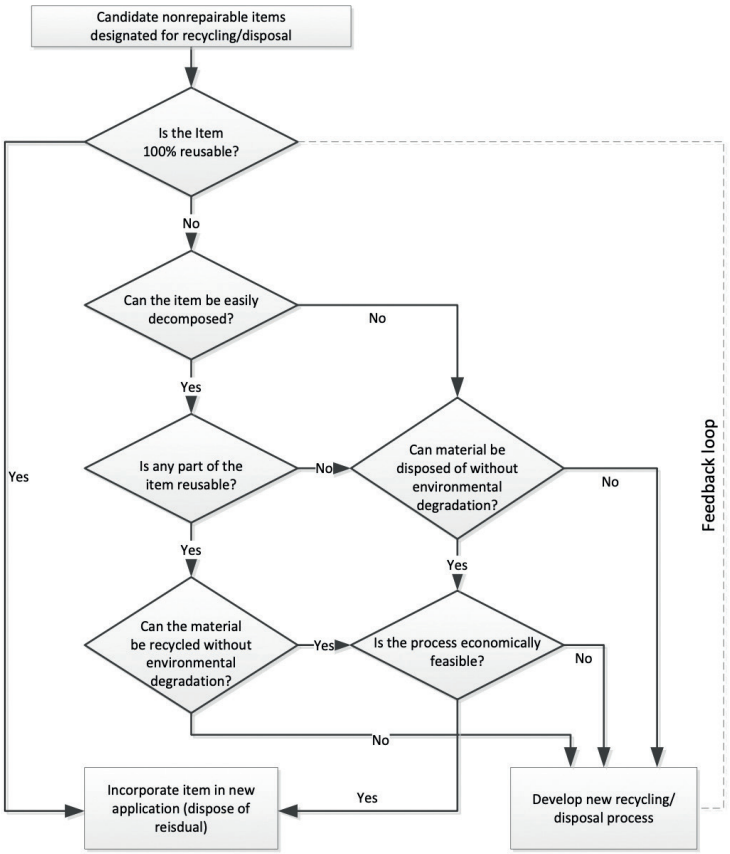

Figure 5: Evaluation of a part recyclability with allowance for ecology (Blanchard & Fabrycky, 2014)

The materials selection process can be summarized in four recommendations:

- The needed materials should originate from recycling streams rather than through raw materials extraction.
- Abundant, nontoxic, nonregulated materials should be preferred.
- Minimum use of materials in products, in processes, and in service should be preferred.
- Longevity, refurbishment, and recycling increase the utility of materials, and enable recovery of materials when the use ceases.

No matter what materials are chosen for a product, the amount that is used can generally be minimized by careful designing involving stress analysis. The suggested rules are:

- Avoid sharp corners
- Use a greater number of smaller supporting ribs rather than a few large ribs
- Where sheets of metal or plastic are used, achieve strengths by providing support by bosses (protruding studs included for reinforcing holes or mounting subassemblies) and ribs, not by using thick sheets
- Gussets (supporting members that provided added strength to the edge of a part) can aid in designing thin-walled housings
- Metal inserts should be avoided in non-metal assemblies. If that cannot be accomplished, install them on break-off bosses.

Order of the particular steps in the procedure of evaluation an element in dependence of its material is shown in Fig. 5. A particular technological operation (repair or recycling or renovation or crush, and so on) depends mainly of the element material.

If a part cannot be qualified to reuse then next proceedings follow as shown in Figure 4. These sequence of decisions takes directly into account requirements of ecology and protection of the environment.

5.2 BASIC END OF LIFE TECHNOLOGIES

Technological processes related to post-using phase are numerous and extremely complex. The ones that are frequently applied in industry are listed below.

Cannibalization of machine parts, in maintenance of mechanical or electronic systems with interchangeable parts, refers to the practice of removing parts or subsystems necessary for repair from another similar device, rather than from inventory, usually when resources become limited. The source system is usually crippled as a result, if only temporarily, in order to allow the recipient device to function properly again.
Core, used product, subjected to further treatment (renovation, repair, etc.)
Dismantling/disassembly, separation of components and materials for their recovery.
Recycling, the product does not work and cannot be repaired. In this case, the product will be recycled. It is the process of taking a component material and processing it to make the same material or useful degraded material.
Reemploy, the product has reached the end of his first life (e.g. the owner wants to discard it) but it is in working order and may be reemployed.
Refurbish/Recondition, are processes of restoring components to a functional and/or satisfactory state to the original specification. In recondition used elements are recovered to the state they had before use. This process is applied in manufacture.
Remanufacture, It is a form of a product recovery process that differs from other recovery processes in its completeness: a remanufactured machine should match the same customer expectation as new machines.
Renovation, to restore to good condition; make new or as if new again; repair.

Repair, the process of bringing damaged components back to a functional condition After repair, the product can be reused.
Reprocessing, conversion a product or material for other properties
Reuse, product no longer works, but it can be repaired. After repair, the product can be reused.
Reuse 'as is', implies that items are used by a second customer without prior repair operations or as originally designed.
Revalorization, any process for recovering original values of removed product or material
Upgrade/Restore, any process improving product functionality.

There is a variety ways to deal with used products. The best is to use the product again as it is or after slight modifications. Containers and boxes of multiple application are of good example. The next in the hierarchy is remanufacturing. Recycling follows in order. This technology processes materials of used products to other purposes thus preserving them in reverse life cycle. Accumulation of not processed products is in the end of the order. Yet they can still be utilize to produce biogas, fuel for power and the like. If even that is not feasible they should be located in safe, isolated from environment stores.

6 SUMMARY

The paper presents an overview of issue on design for products conform to ecology. First, phases of the material product cycle have been addressed and concept of design for life cycle has been explained. Next, the design process and its stages has been discussed. Particular emphasis was put on these product requirements which are related to ecology. The designers should focus attention for resolving these complex demands by taking into account various points of view. This is possible in team work only. Two the most important designers' responsibilities discussed detailed in the paper are related with avoid the environmental pollution during the product use, and environment friendly, yet economical, material processing during all life cycle. Finally, different technologies applied for end of life products are enumerated.

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WILL ROBOTS HAVE THE CAPACITY TO REPLACE HUMANKIND? EMPIRICAL ANALYSIS FROM PORTUGAL

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An earlier version of this article has been published as a conference paper: Rombão, M. and Tomé, E, (2019) 'Will Robots Have the Capacity to Replace Humankind? Empirical Analysis From Portugal', in Tomé, E. and Kragulj, F. (eds.) Proceedings of the International Conference on Theory and Applications in the Knowledge Economy TAKE 2019. Vienna, Austria. pp. 416–428.

ABSTRACT

This work aims to study the application of skills and integration of Artificial Intelligence (AI) in Human Resource Management (HRM)and acceptance that this change may have among humans/employees looking to know how they will process this adaptation to this technological change and how can it will come to influence the development of enterprises and society as a whole. It was necessary to use a questionnaire, composed of 30 questions, on the topic under study, which could be answered with 5 levels. In developing this work, a lot of information was collected consisting of studies on the development of artificial intelligence, all of which took for granted, that today, that artificial intelligence is part of our daily lives, finding robots in multiple industries, which help in the development of new scientific knowledge and opportunities in areas such as health, construction of automobiles and no doubt, HR, which will benefit from the introduction of this new technology. There are many ethical and moral issues which must be respected, for instance, you must create boundaries to this technological development, which is AI, and which today no longer receives great resistance from broad sectors of society, and some believe the introduction of AI into companies and other organizations of society will be a factor of development that will create more job opportunities than those that it will inevitably destroy, allowing to bring new knowledge to Man.

Keywords: Artificial Intelligence, Human Resources, Emotions, Technological Advances

KEY FINDING(S)

- First, using an exploratory factor analysis we defined five constructs for which there was convergence, namely, 1. Impact on increased knowledge; 2. Effects of robotization on society; 3. Impact of introducing robots into Human Resources; 4. Impact on human work; 5. Effect of interaction between man and robots. For all the factors, the coefficient of variation was small, and for the last four the average was high, so people agree on the impact of robots in the mentioned four situations.

- Second, regarding the five group of questions about the initial propositions as initially defined, all the groups received strong support with the exception of society and all the groups had fair variation with the exception of human resource management (big diversity) and society (small diversity). Also, analyzing answers to

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question 27 we found people do not believe that machines will ever have feelings or emotions. This is a very interesting finding because it diminishes the importance of robots in all the plausible future scenarios, and it reinforces the dominance of humans of planet Earth. People seriously believe that robots may be faster and stronger in same aspects, but they will never have souls, they will never know they will die, and therefore, they will always be inferior to mankind. This alone, considerably limits and defines the answer to the research questions included in the title of this paper, and also undermines and limits some thoughts massively included in the media about the future importance of robots in History.

IMPLICATION(S) FOR THE PRACTICE OF SMEs

SMEs may feel harder than other companies the problem of automation because they will fell more the pressure of competition. And the respondents believe that organizations will change a lot due to the implimentation of IA. The interesting question is that the respondents do not believe in a fully automated world or that robots will take over, and this means that ultimately it will be Humans who will still manage SMEs. This in turn calls for much need for human leadership and for much talent of management, in order to maintain the competitiveness and social value of SMEs. Therefore, as a major thought robots will compell humans to become more skilled and more competent, and to crafts to be more complex, particularly in SMEs.

1 INTRODUCTION

In today's society some very basic questions are posed over the introduction of robots, such as the following: Will robots ever replace humans? Can robots have the ability to produce more and better than humankind? Do robots have the artificial intelligence to develop themselves and be better than humankind? Will HR have the capacity to integrate and adapt the capabilities of the robots together with the collaborators? How much and how fast will robots change societies and organizations?

Accordingly, in this paper we present an empirical study in which we attempted to analyze the perceptions of citizens over these questions, and most of all to this one – May robots replace humankind? In order to address that question, the paper is composed of four parts: literature review, methods and data collection, results and finally, conclusions.

2 LITERATURE REVIEW

In this section we present ideas found in the literature about five questions on the relation between robots and humans, namely: robots and HR, robots and HRM, robots and HR development, robots and organizations and robots and society at large. The five analysis will be presented in succession, from 2.1 to 2.5. In the end (2.6) detailed research proposals will be defined, clarifying the initial research question.

2.1 ARTIFICIAL INTELLIGENCE (AI) IN HUMAN RESOURCES (HR)

When talking about the use of AI in HR, it is seen as data that are processed by algorithms, allowing them to be able to make decisions. If we embrace such automation, it is possible to change the day to day processes as well as the way in which Management and Human Resources is done. Robots can also be used in the strategy of making important decisions and in the organization of workers, to study existing labor policies, to make changes that improve the quality of work and to automate some tasks that were exclusive to a worker. With AI, the HR strategy can be modified, and the decisions taken are made with more assertive meaning and better adapted to the qualities of each professional, having a great impact both on the work of the employee and on the results obtained. The more extensive the information is about individual skills and competences, the greater and more realistic the track record of each individual within his/her life in the company will be.

With the use of AI in companies, the manager can quickly have access to valuable information, such as communications, skills, technical work, billing and others, that facilitate the work of those who run the trajectory of a company. According to Crews, in the paper written by Nagele-Piazza (2018), by introducing robots into companies, it is possible to improve wage policies by more easily controlling the various wage levels and professional categories, applying the laws in force in company agreements and eliminating possible errors that exist on the pay grids. According to Parker, it is also possible, as in the Nagele-Piazza (2018) article, to create within the company, Chatbots that allow employees better access to all relevant information in labor relations, facilitating communication between the various departments. The exchange of and use of these technological means must always be accompanied by some prudence, as the use of robots may not be well accepted by employees and may have impacts that cause major changes at all levels within the company.

2.2 ARTIFICIAL INTELLIGENCE (AI) IN HUMAN RESOURCE MANAGEMENT (HRM)

Ever since the study of intelligence and human reasoning was a concern of scientists and philosophers, there have been advances made to get to know about this subject which is important to compare and to help in what is now a civilizational advancement with the introduction of AI in the various sectors of activity and in particular in Human Resource Management (HRM). Entrepreneurs are the first stakeholders to promote the introduction of AI in HRM, which will promote major changes in various areas such as recruitment, assessment, training, management and integration.

There is a general consensus that appropriate HRM must involve effective policies and practices that guarantee a good contribution of all the employees in the fulfillment of a company's strategic objectives (Baird, 1988). The performance of the company depends on a set of initiatives and policies implemented by Human Resources, empirical evidences that justify this basic assertion (Harker, 2000). Paradoxically, the studies that established the relationship between Human Resources Management policies and the achievement of company objectives, gave little importance to the difference between the policies and practices that originate in more traditional or technical knowledge and those that originate from specific policies of strategic management of Human Resources.

In recent years, compensation systems have been involved in conjunction with Human Resources Management policies. It allows identifying factors such as flexible working, improving the quality of work, training and others. Utilization of the companies AI allows adjustments, not only of working hours, but also for employees to have a better lifestyle. Human capital, along with the robots, of a company can be a decisive factor in gaining a competitive advantage (Williams, Ashill & Naumann, 2015).

2.3 ARTIFICIAL INTELLIGENCE IN THE DEVELOPMENT OF HUMAN RESOURCES

Can AI come to steal our jobs? It is a question that is posed today and that puts us on the alert regarding all developments in this matter. According to the historian Yuval Harari (2017), we must devote more of our time to studying and monitoring all the technological advances that AI is having, so that for some years we will not be surprised by the state of integration and interaction between the machines with AI and Humans, which can go beyond the limits of what is ethical and acceptable in society. Only effective early regulation by humans can prevent machines from regenerating themselves and jeopardizing the development of Humanized societies.

Scientist Stephen Hawking (2018) went further and thought that AI will determine the end of the human race. It seems unlikely that this will happen, but this AI technology, is increasingly present in companies and our daily lives, by integrating this intelligence into robots, Iphone, Windows, Facebook and many other tools we use in our daily activities. There are many fully automated call centers, and we will soon see other sectors of activity go the same way toward partial or even total automation. Human Resources is one of the sectors where AI will bring about major changes and its integration will perform the small routine tasks that will allow employees to perform other tasks with greater added value.

Nowadays we already think of complex equipment for companies, with certain cognitive abilities, doing tasks faster than man, and even being able to do more accurate analysis (Moniz, 2018). It is thought that the simplest tasks will be the first to be extinguished. It is believed that with the study done on the future of work, there are some professions that are at risk of disappearing such as; marketing operators, cash operators, cooks, waiters and accountants. (Frey & Osborne, 2017)

The fact that there is an increase in productivity by the machines can lead to greater salary differences among employees, since it is increasingly necessary for specialized individuals with specific skills in one area to monitor several individuals in their respective areas.

2.4 ARTIFICIAL INTELLIGENCE SEEN IN THE ORGANIZATION

AI has evolved to such an extent that today it is widely used in many industries such as robotics being an essential tool in automobile assembly lines and other production sectors, as well as in service-related sectors. There has been a constant evolution of robots, companies believe in the added value of introducing machines with AI, robots, which will be a source of development and adding value to all sectors of activity.

AI can be associated with activities that contribute to achieving the goals of companies. Organizations are made up of individuals who have the ability to learn and have a relevant role in the company, who, with the introduction of AI, have their work redirected towards solving more specific and complex problems while robots handle simpler tasks that can be easily solved with the automation of robots. The emergence of AI has allowed us to develop new tools than can identify inappropriate work behavior.

To create technology with AI, which can perceive and correct human behaviors that are less ethical and morally unacceptable, is undoubtedly a great technological advance that can influence and change this type of behavior that is unacceptable in the workplace, specifically sexual harassment. This technological tool, with AI, can be fundamental, in conjunction with HR employees, to eliminate condemnable behaviors that undermine industrial relations in companies.

Humans have limited capabilities to understand and track all developments in the activity of virtual organizations, AI gives virtual organizations the ability to mitigate the limitations of human beings, being able to monitor and control much of the available resources without loss of costly human time. Virtual organizations are the first industrial application of AI, used in the knowledge and development of robotics.

2.5 ARTIFICIAL INTELLIGENCE SEEN IN SOCIETY

The use of AI can help in various human activities, which are now part of our daily lives. There is an extraordinary volume data produced and available on computers. AI can provide great aid in the treatment and processing of these data, and this interaction may have benefits for both Human kind and machines.

AI can impact the many daily activities of humans, such as health, environment, space, and many other areas where it is possible to work with AI. There are great potentialities of intervention between Human kind and robots, which together can open space for major investigations, which may in the future solve many of the problems of Human kind. It is possible to think that in the future there is a probability that a doctor will have access to information on cases and treatments of a particular disease, from other patients around the world with similar diseases, to assist in the diagnosis and cure of the disease.

AI is evolving at a speed that Human kind did not anticipate. It is as if a smart, calculating brain, having infinite ability to find patterns and anticipate scenarios that will help fight serious illnesses, have smart cities, and increase the production of many factories. AI will become a virtual company, a voice that goes with us everywhere, this is what happens in countless Gots and virtual assistants, who are coming with countless apps and devices. The great fear that torments man is that AI will become the best friend of many people, which may further increase the existing socialization problems of people today.

Nowadays AI already exists in the houses, cars and many other things that are part of our life. There is an infinite innovative cycle in some popular scientific areas. The use of AI is not, and will never reach a total consensus of being a positive thing, but also there are those who reasonably raise some doubts, particularly related to issues

of ethics and morality (Bostrom, 2017). There is a concern with the existence of dangerous intelligent systems, in which anxiety increases with some of the various studies and discussions that are made on this topic.

2.6 RESEARCH QUESTIONS

There are several questions that this study seeks to answer.

Research Question 1: Will AI influence man's way of working, allowing robots to collaborate with human resources without ever replacing them? (Bostrom, 2017)
Research Question 2: Will the interconnection between AI and HRM bring more skills and knowledge, in order to require the best technicians for the organizations? (Luger, Artificial Intelligence, 2004)
Research Question 3: With the introduction of robots in the development of HR, will it be possible for them to develop the simplest tasks, and can man do the most complex tasks? (Hamlin & Stewart, 1998)
Research Question 4: Do organizations see robots as machines that can develop organizations, bring new technologies and that can evolve, also bringing new knowledge and techniques to man? (Wakka, 2018)
Research Question 5: Is AI a positive thing for the evolution of society, supporting what is the development of companies, man and technology? (Oliveira, 2018)

3 METHODOLOGIES

3.1 QUESTIONNAIRE

A questionnaire (see Annex 1) was created, composed of 30 items, six for each one of the research questions defined below (see Table 4). Each item was analyzed with a 5-point Likert scale from Do not agree (1) to Totally agree (5), in which the respondents expressed their level of disagreement or agreement respectively with the problems raised in the survey.

3.2 DATA COLLECTION

The questionnaire was put in Google, and disseminated with Facebook and LinkedIn, and we obtained about 120 answers: the questions were distributed to another 30 people by mail and 30 more on paper, and thus we obtained a sample of 180 respondents, obtaining concrete answers on this theme.

4 RESULTS

4.1 SAMPLE CHARACTERISTICS

The 180 persons for which we obtained results were mainly women (60 percent), with a bachelor's degree (40 percent) or secondary studies (30 percent). The average age was 46 years, with the extreme ages being between 18 and 88 years old.

4.2 EXPLORATORY FACTOR ANALYSIS

Given that the scales we used were new, and untested, we decided to make an exploratory analysis of the information collected.

In consequence some items were eliminated, namely items 1, 4, 10, 14, 18, 19, 21, 22, 23 and 30, because they presented a low factorial weight (<0.50) or because there was saturation in items by more than one factor.

We obtained a new and final structure of factors, composed by 5 factors. After analysis of the items of each factor, the following designations were attributed:

a) Factor 1 is called Impact on the increase of knowledge, being composed by the items:

11. Artificial Intelligence is capable of making important scientific discoveries, and even if we are not able to understand the process, this is considered science.
27. Robots, like man, may have emotions and affections that may be important in more complex situations.
28. Robots will have capabilities that allow you to solve more complex problems, creative ability, critical sense and a lot of individual initiative.
29. The Artificial Intelligence allows one to know the constant needs of the clients, being that such needs are in constant change.

b) Factor 2 is called Effects of robotization in society, resulting from the following items:

5. Robots will be a source of business development and added value to all sectors of business activity and may be of added value to companies.
15. Considers it important, the insertion of Artificial Intelligence, for the labour industry, in the next 10 years.
20. Societies can be intelligent and autonomous enough, taking advantage of what Artificial Intelligence is.
25. Artificial intelligence is increasingly present in companies and in everything man uses.
26. Robotics allows Human Resources Management to be transformed into each company, and there may be a need to have Artificial Intelligence in the company.

c) Factor 3 is considered the impact of the introduction of robots in Human Resources, with the following items:

2. The introduction of Artificial Intelligence will influence how you will manage the Human Resources of a company.
3. Artificial Intelligence can be used in the strategy of making important decisions and organizing workers.
6. If Artificial Intelligence thinks faster than man and can predict which questions are to be answered, it will be able to answer the questions posed.
7. This introduction will modify the various tasks to be performed by Human Resources, being automated by robotics.
8. With automation in Human Resources there are changes in the way of working and areas that can be more developed.

d) The penultimate factor is the Impact on human work, with the following items:

13. Can Artificial Intelligence challenge existing jobs?
24. It is possible for men to feel insecure and threatened by cybernetic risks.

e) Finally factor 5 is called Effect of the interaction between man and robots, the related items being:

9. Humans are always necessary to be able to regulate the presence of the Artificial Intelligence in the company.
12. Bringing companies together with Artificial Intelligence allows you to adjust not only working hours but also allows employees to have a better lifestyle.
16. The integration of Artificial Intelligence may create more jobs than it will destroy, arguing that its use is an opportunity to automate "repetitive and low value added tasks".
17. There must be collaboration between humans and the robots so that together they can achieve the objectives of the company.

4.3 INTERNAL CONSISTENCY

The final values for Cronbach's alpha for each item are shown in the following Table. The numbers in bold indicate the factor to which each item belongs. Each item had at least an alpha value of 0.5.

Table 1: Factorial Weight of the remaining items

Perg. = Question	Factor				
	1	2	3	4	5
Perg._28	**,835**	,296	,195	,133	,076
Perg._27	**,649**	,394	,228	,084	,148
Perg._29	**,644**	,513	,467	,055	,260
Perg._11	**,593**	,359	,371	,068	,151
Perg._26	,496	**,754**	,540	,193	,249
Perg._15	,348	**,702**	,459	-,041	,449
Perg._25	,343	**,693**	,417	,536	,351
Perg._20	,322	**,662**	,339	,251	,415
Perg._5	,261	**,613**	,430	,006	,445
Perg._7	,265	,478	**,805**	,219	,260
Perg._2	,279	,399	**,648**	,169	,261
Perg._8	,208	,551	**,621**	,155	,359
Perg._3	,399	,598	**,600**	,005	,219
Perg._6	,488	,444	**,530**	,117	,181
Perg._24	,151	,229	,207	**,763**	,117
Perg._13	,148	,209	,233	**,712**	,065
Perg._17	,243	,454	,364	,157	**,674**
Perg._16	,293	,373	,265	-,264	**,563**
Perg._9	-,101	,198	,105	,208	**,546**
Perg._12	,349	,495	,331	-,024	**,538**

As shown in Table 2 below, the internal consistency for each of the 5 factors revealed a Cronbach's alpha within the limits of acceptability, with values higher than 0.7.

Table 2: Cronbach Alfa values for the 5 factors defined by the analysis

	Cronbach alfa
Impact on increased knowledge	0,754
Effects of robotization on society	0,807
Impact of introducing robots into Human Resources	0,769
Impact on human work	0,724
Effect of interaction between man and robots	0,648

4.4 STATISTICAL ANALYSIS OF FACTORS

In order to verify if there is an association between the several factors under study, the respective correlation coefficients were analyzed (see Table 3, below). Based on the consistency levels of the Cronbach alpha, it is possible to verify that among the several items there is a strong correlation.

Table 3: Main statistical data on the 5 factors

	Average	Standard deviation	1	2	3	4	5
Impact on increased knowledge	2,69	0,89	α = 0,754				
Effects of robotization on society	3,53	0,74	0,458**	α = 0,807			
Impact of introducing robots into Human Resources	3,56	0,71	0,471**	0,619**	α = 0,769		
Impact on human work	4,13	0,93	0,196**	0,277**	0,266**	α = 0,724	
Effect of interaction between man and robots	3,59	0,74	0,295**	0,523**	0,381**	0,085	α = 0,648

In the table presented, we identify several important values for this study, such as the average, the standard deviation, the Cronbach's alpha and the correlations between the various items.

Regarding the average values, we find that the affirmations about the impact on the increase of knowledge have an average of 3 (2.69). Therefore, it seems that the individuals who answered were undecided about whether the Increased knowledge for both people and robots could be important for their development and business.

Regarding the other factors, the average of the answers was 4, which indicates that respondents believe that robots can be inserted in society, and can interact with humans, that their introduction in companies can be impacting, and may influence the work environment in the way humans work, being able to help in the accomplishment of tasks, getting humankind and the robots to interact with each other.

With the values presented for the standard deviation, one can perceive the existence of possible values that are out of what is the pattern of given answers, given low values for these factors, it is indicative that AI can have a positive impact, both in the life of humans, and also in the companies, influencing what types of work in the organization and the forms of interaction of the robots, to make the introduction of the robots a reality.

Regarding the existing correlations, although the correlations between the variables will decrease, it is possible to infer a variable based on the knowledge of another variable, the correlations will be strong and significant between the various items, approaching the maximum positive value (1). However, factor 5 when relating to factor 4 presents a value that is not significant, that is, the relation between these two values does not exist. There is a non-linear correlation here, where the various points tend to be concentrated around a curve.

Finally, the alpha of Cronbach is presented, in which each factor has a perfect correlation when correlating with its own factor, being presented the value of this alpha. The fact that all factors present a value higher than 0.7 indicates that the questions presented are valid for the study that is being carried out. The present issues with the associated items will thus be valid for possible future studies.

4.5 ANALYSIS OF THE ANSWERS TO THE VARIOUS QUESTIONS

The answers obtained in the questionnaire regarding the five research questions are summarized in Table 4, below.

Table 4: Answers to the questionnaire, summary

Factors Under study	Minimum	Maximum	Average	Mode	Median	Standard Deviation	associated answers
Human Resources	1	5	3,83	4	4	0,75	3,8,13,18,23 e 28
Human Resource Management	1	5	3,5	4	4	1,22	2,7,12,17,22 e 27
Development of human resources	1	5	4	4	4	0,89	4,8,14,19,24 e 29
Companies	1	5	3,83	4	4	0,75	5,10,15,20,25 e 30
Organizations	1	5	3,2	3	3	0,41	1,6,11,16,21 e 26

With the presentation of this table, it is verified that there are some differences in the average and the standard deviation between the several existing initial factors, and that also happens a little in the mode and median.

With the results presented, we know that the introduction of AI in the society obtained, in the given answers, an average of acceptance of level 3, which indicates that the respondents do not have an informed opinion on the theme of insertion of AI.

Therefore, it is clear that there are doubts about the benefits of having robots in the daily life of humankind. The answers given for the remaining items, obtained an average degree of acceptance of level 4, which indicates the introduction of AI in organizations and HR, can be beneficial in the future, since it can help humankind in the performance of routine tasks, leaving the collaborators freer to perform other tasks within the development of various areas, making possible the synergistic collaboration between robots and human kind.

Analyzing the set of answers obtained, it is verified that the great majority of the answers were placed at level 4 of the scale, from which it can be concluded that there is a high degree of acceptance in relation to the introduction of AI in companies, the management of human resources, valuing not only the company, but the work of man. In the item Median, the value that divides the data set in two subsets with the same size is calculated, it is noticed that the value that appears in the majority of the answers is of level 4, that is, here also the value indicates and confirms the full acceptance of AI among the respondents.

Finally, on the standard deviation, which indicates how much a data set is uniform, identifies that the introduction of AI in society, having the lowest value of standard deviation, indicates that it is the most regular and that the introduction of AI in management of human resources having a higher standard deviation indicates that a it is less regular.

The fact that the introduction of AI in society has on average, its fashion and even median in response 3, makes it a slightly different variable from the others, did not obtain concrete answers about this variable, the doubt is present on whether the introduction of robots into society can be beneficial, and there may be individuals who can accept this introduction, but there may also be individuals who may be reluctant to do so.

With the accomplishment and distribution of the questionnaire, answers were obtained to all the questions asked, being possible to draw conclusions according to these same answers. The majority of the answers focused on values 3 and 4, and there were answers in value 5.

However, the answers to question 27, which asked if robots can have emotions, most of the answers were 1, that is, people do not agree that robots can ever have emotions. It is thus questionable whether it is possible for robots to develop to be equal to humans that allows them the capability to have the capacity to self-develop, thus being able to express emotions.

The average of the answers given for each hypothesis was level 4, where the respondents in organizations and in the management and development of Human Resources, but with regard to their integration into society in general, there is some doubt there, and indecision before the possibility of interception with humans.

Any of the hypotheses are admitted and seen as something that can happen yet humans need to control all the advances that have been known, so that the robots do not surpass us, only develop like something that helps humans in the realization of the various tasks to be carried out day by day in the companies.

5 DISCUSSION

The computers have several levels of creativity, at the lowest level, the computers paint and in the case of the "Lamus" system, created in Spain in 2012, it created a song without any human intervention. When the creativity of intelligent systems reaches higher levels, it will be a true revolution, the solutions that can be found will make a great contribution to the solution of the greater problems of humanity, providing great scientific advances in many areas where even today science experiences difficulties.

The main purpose of the implementation of AI is to create intelligent systems that approximate the intelligence capacity of human. With the evolution of these intelligent systems, it is possible that AI can exceed the capacity of intelligence of the human, and then, if it ever happens, there will surely be a need to create limits, to control and regulate AI, because no one wants a world controlled by robots.

Are there risks to Humanity that with this technological advance that is expected to happen with the evolution of Intelligent Systems based on AI? The answer is not conclusive, but many find that it is not and that the implementation of AI in many sectors of activity will create new challenges and opportunities that will be very good for the development of humanity.

With the introduction of robots in companies, man is available to perform more complex tasks, develop skills, and even acquire new scientific knowledge, speeding up other tasks, opening new horizons and getting the most out of the interaction between humans and robots.

The introduction of AI through robots can bring benefits to companies, and can work together with humans, performing more routine and simple tasks, making room for humans to become more available for other more complex tasks, on the whole, bring benefits to institutions. (Guarino, 2018). On the part of the human resources technicians, there must be confidence in these new technologies and in the integration in order to work together.

Robotization, over time, will have an evolution, which will transform the robots of today which are used in various tasks, and AI may turn out to be similar to human intelligence in some aspects. There are already well-developed robots in our society that help to perform surgeries, to work in call centers, and can reach a stage of development in which robots can evolve on their own (Moura, 2018).

When AI reaches very high levels that approach or can exceed the capabilities of human intelligence, the so-called "Superintelligence", then the scientists will have to assume the responsibility of creating ways to control this advance and give tranquility to humanity by creating mechanisms that ensure the use of intelligent systems with components and principles of ethics and morality that defend humanity.

6 CONCLUSION

It is considered that the introduction of AI may jeopardize some existing jobs, which may cease to exist, being the tasks performed by the robots, and there is no need for human labor.

Increasingly humans can be influenced and threatened by various cybernetic risks, and AI can do more and better than humans, stealing jobs and having more cognitive abilities and having more knowledge than man himself, being able to auto-transform -develop and evolve on their own.

According to the responses of several people to which the questionnaire was distributed, they considered that the robots will never have emotions and affections, being able to commit themselves when they are in more complex situations, forcing the humans to always be present, to solve problems in situations that require their participation.

It is also possible to affirm that some respondents consider that HR will never be replaced in its entirety by robots, being that the human is needed for the development of the company and to regulate the development of AI in the company.

Generally speaking, from the answers obtained in this questionnaire, it is understood that people accept the co-existence with AI in the work place, although they express a feeling of fear and a lot of expectations about what they could represent in their lives and in society in general, as this technological evolution will inevitably bring great changes to people's lives.

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ANNEXE 1 – QUESTIONNAIRE

1. Artificial Intelligence will be compatible with the irrationalities of man.
2. The introduction of Artificial Intelligence will influence how you will manage the Human Resources of a company.
3. Artificial Intelligence can be used in the strategy of making important decisions and organizing workers.
4. There may be integration and interaction between the machines with Artificial Intelligence and the Humans, and should not exceed ethical factors.
5. Robots will be a source of development and add value to all sectors of activity, and may be of added value to companies.
6. If Artificial Intelligence thinks faster than man and can predict which questions are to be answered, it will be able to answer the questions posed.
7. This introduction will modify the various tasks to be performed by Human Resources, being automated by robotics.
8. With automation in Human Resources there are changes in the way of working and areas that can be more developed.
9. The man is always necessary to be able to regulate what is the presence of the Artificial Intelligence in the company.
10. With the introduction of Artificial Intelligence, man will be left with more complex tasks.
11. Artificial Intelligence is capable of making important scientific discoveries, and if we are not able to understand the process, this is considered science.
12. Bringing companies together with Artificial Intelligence allows you to adjust not only working hours but also allows employees to have a better lifestyle.
13. Can Artificial Intelligence jeopardize existing jobs?
14. The creation of technology with artificial intelligence allows us to perceive and correct human behavior that is less ethical and morally unacceptable.
15. Considers it important, the insertion of Artificial Intelligence, for the labor industry, in the next 10 years.
16. The integration of Artificial Intelligence may create more jobs than it will destroy, arguing that its use is an opportunity to automate "repetitive tasks and low value added".
17. There must be collaboration between the man and the robots so that together they can achieve the objectives of the company.
18. Increasingly robots will be able to be closer to man, where the distinction between the two can be difficult in some tasks.
19. Artificial intelligence can produce false and implausible results for companies.
20. Societies can be intelligent and autonomous enough, taking advantage of what Artificial Intelligence is.
21. Robotics can be used to conduct interviews, obtain answers in real time and have a realistic selection, being decisive for the choice of true talents.
22. Artificial Intelligence can make mistakes in the various Human Resources processes.
23. Increasingly, robots will have cognitive skills that allow them to be faster in developing tasks, developing them faster and better than men.
24. It is possible for men to feel insecure and threatened by cybernetic risks.
25. Artificial intelligence is increasingly present in companies and in everything man uses.
26. Robotics allows Human Resources Management to be transformed into each company, and there may be a need to have Artificial Intelligence in the company.
27. Robots, like man, may have emotions and affections that may be important in more complex situations.
28. Robots will have capabilities that allow you to solve more complex problems, creative ability, critical sense and a lot of individual initiative.
29. The Artificial Intelligence allows to know the constant needs of the clients, being these in constant change.
30. Human Resources can never be replaced by robots in their entirety.

THE VALUE OF KNOWLEDGE CAFES TO SMALL AND MEDIUM SIZED ENTERPRISES (SMEs)

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An earlier version of this article has been published as a conference paper: Sharp, P. (2019) 'Why Knowledge Cafes can be Valuable to Organisations', in Tomé, E. and Kragulj, F. (eds.) Proceedings of the International Conference on Theory and Applications in the Knowledge Economy TAKE 2019. Vienna, Austria. pp. 631–644.

ABSTRACT

This paper discusses research in to the knowledge café technique conducted over the last 10 years. The paper summarises knowledge sharing techniques similar to knowledge cafes and assesses some of the advantages and disadvantages of these techniques. The research builds on some early literature that identifies some of the advantages of the knowledge café approach. Respondents' feedback in this research confirm that the respondents who participated in the knowledge cafes with this researcher valued their experiences for a wide variety of reasons. This paper identifies and categorises these reasons using **key verbs (in order of frequency of mention) as *sharing, creating/solving, enjoying, identifying, interest, connecting, learning* and *changing.*** These findings are then discussed considering the implications for the practice of SMEs.

KEY FINDING(S)

The most frequently valued aspect of knowledge cafes is the sharing aspect and finding the experience *'interesting'.* However, the other categories of value *(changing, connecting, creating/solving, identifying, learning* and *enjoying)* should not be underestimated. With these findings in mind, there are a number of areas in business/organisations where knowledge cafes could be useful, and this set of categories and reasons could be used by an organisation/individuals to justify using the knowledge café technique in different situations.

IMPLICATION(S) FOR THE PRACTICE OF SMEs

There are many implications of this research for SMEs seeking to be innovative and creative in a world that is rapidly changing with artificial intelligence and internet-based technologies (Durst, 2019; Sharp, 2019b). SMEs represent 99% of all businesses in the European Union but they need to be adaptable to change, aware of risks like skills shortages and the problems of losing and/or recruiting suitable staff and effective knowledge management techniques are needed more than ever (Durst, 2019). This is where knowledge cafes can help. This is because they are relatively easy to set up without any significant cost and they can be tailored to the needs of SMEs. Also, as knowledge cafes are so effective at helping create new ideas, identify connections, and help organisations learn and develop, this is an ideal way for SMEs to grow, be sustainable and possibly address

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skill shortages. For example, this could be done by a better identification of roles and needs. An adapted form of knowledge café was integrated in a process called 'Make Life' with an SME in the UK and the technique was found to be effective in doing this (Sharp, 2015).

1 INTRODUCTION

In answering the question 'whether knowledge cafes are useful, and if so, how?' David Gurteen who had run many knowledge cafes across the world, said: *"There are so many things and it depends what the purpose of your knowledge café is. But personally, I find that the open conversation provides people with insights and changed ways of thinking that are helpful, challenging and stimulating. Also, different people take away different things..." (Gurteen, 2010: 1, written note)*

This response, along with several others from people who had chaired or participated in knowledge cafes before, led to this research about knowledge cafes. This research was conducted by the researcher as he participated in, and chaired, knowledge cafes over more than a period of 10 years in different organisations in London. In these knowledge cafes a myriad of different themes relevant to organisations, technology, business and world affairs were discussed.

The importance of this research is manifold. One aspect of the importance of this research is the need for effective knowledge and learning in organisations (e.g. Alavi et al., 2014; Cherchione & Esposito, 2017; Dymock & McCarthy, 2006). This can, potentially, build competitive advantage through better use of knowledge, learning and psychology (e.g. Hellstrom & Sujatha, 2001) and help organisations manage well when organisational structures change. For example in recent years, each year there have been trillions of mergers in the world (Lefika & Mearns, 2015) and a good understanding of effective knowledge sharing techniques is vital in such an environment. This paper considers research about one of these techniques: the knowledge café (Sharp, 2013).

This paper considers what a knowledge café is and how the technique compares to the range of different knowledge sharing approaches that can be used; examples of different forums the researcher has used the technique in as part of a cumulative research method for this project; feedback from participants; reasons why the technique is valued by participants; wider implications of knowledge cafes and potential for different approaches/uses of knowledge cafes in the future.

2 WHAT IS A KNOWLEDGE CAFÉ?

For the purposes of this paper a knowledge café is defined as "a frank exchange of ideas or views on a specific issue in an effort to attain mutual understanding" (Gurteen, 2013: 2). Normally, a knowledge café is conducted face to face in the same building. However, with modern technology (e.g. video conferencing using Zoom technology) there are arguably different versions of knowledge café concept which no longer require participants to be in the same room/geographical space. This paper discusses research relating to knowledge cafes conducted face to face, but also considers implications of other approaches.

'Knowledge Café' in this paper refers to face-to-face conversation conducted in groups, not computer systems that have been devised with the name 'the Knowledge Café' (Gronau, 2002). The idea of a knowledge café is explained by Gurteen (2013). The process of the café is introduced and a question is posed. This should take no more than 20 minutes in total. Participants form groups of 4 or 5 to discuss the question for 30 to 60 minutes. The facilitator calls for change of groups which is normally done three times so groups have three conversations, each about 10-20 minutes long. After this, the whole group reassemble in a circle to continue the conversation until the end of the café. Participants should suspend assumptions and listen to one another (Gurteen, 2013). This approach enables participants to address issues related to the overall topic area in a non-linear way. This enables participants to address issues as they arise in conversation rather than a linear way that it is a traditional approach to addressing topics or projects (Griffiths, 2013).

Knowledge can be defined in many and various ways (Sharp, 2003). However, it is clear that there are various characteristics that most professional employees agree are important to the concept and these are that it:

- "is human-based and particularly refers to the use of skills learnt through experience;
- is bound up with its organisational context and valuable when tailored to it;
- improves the effectiveness, value and/or competitive edge of organisations;
- is particularly valued when it is applied in its organisational context and;
- is also valued when it is possible to share it." (Sharp, 2008: 495)

The knowledge café format may or may not include a discussion on the meaning of knowledge, but these aspects of the concept of knowledge inform the terminology of knowledge café, and were used as a reference point in knowledge cafes the researcher facilitated in this research.

3 DIFFERENT KNOWLEDGE SHARING APPROACHES

The knowledge café is one of many different knowledge sharing approaches. Lefika and Mearns (2015) define and classify different knowledge sharing approaches and they said in 2015:

"...the knowledge café is a fairly new technique for knowledge sharing [and] there is limited scholarly literature about the technique." (Lefika & Mearns, 2015: 26)

For a summary of knowledge sharing techniques see Table 1.

Table 1: Knowledge Sharing Techniques (adapted from Lefika & Mearns, 2015)

	Technique	Definition
1	Peer Assist	Peers get together for feedback /clarification/lessons learnt regarding a problem/issue
2	After Action Review	Review lessons learned to not repeat mistakes in the future
3	Retrospects	Gathering of a specific group at the end of a project to review events and learn
4	Intranets and Extranets	IT platforms for sharing learning internal to an organisation and internal and external to an organisation respectively
5	Knowledge Fairs	Fair to share knowledge on a particular theme using *inter alia* kiosks, presentations, panels and demonstrations.
6	Knowledge Network	Group of individuals share a common interest using formal methods (e.g. corporate policies)
5	Mentoring	Relationship between two individuals that focuses on guidance and learning
6	Coaching	Coaching focuses on developing specific skills to satisfy goals (Association of Coaching, 2011)
7	Formal Group-Based Knowledge Sharing	Approach of doing this by formal interventions; information sharing; questioning; and managing time to produce knowledge sharing, innovation and solve problems
8	Storytelling	Give accounts of incidents and events
9	Blog (or weblog)	Web pages with no external editing which provides online commentary periodically updated and presented in reverse chronological order
10	Chat Show	Informal fun Television style chat show format with one host and three or four guests and an audience of co-workers
11	Community of Practice	Process where a group of people share a common interest, problem or passion for a specific topic and get together and discuss the issue on an ongoing basis
12	Knowledge Cafes	See above and below

There is considerable overlap in some of the knowledge sharing techniques that Lefika and Mearns (2015) define. For example, there is little that differentiates techniques 2 and 3, and there is considerable overlap in techniques 5 and 6 (see Table 1). However, this classification gives a useful view of the range of techniques that an organisation may use and the knowledge café is one option it may choose. Lefika and Mearns (2015) also provide a useful classification of techniques similar to knowledge cafes based on their Delphi research (see Table 2).

Table 2: Summary of Knowledge Sharing Techniques similar to Knowledge Cafes (adapted from Lefika & Mearns, 2015)

	Technique	Definition	Differentiators
1	World Cafes	Cultivation of conversations to transfer knowledge and learn	• Hosts of tables record conversations • Topics are community related • Multiple questions • Large group intervention • Individuals are encouraged to draw/take notes
2	Technology Cafes	Discussion by group of intervention of a new technology	Technology centred topics
3	Open Space Technology	Groups get together and then break down in to smaller groups and individuals can go to other small groups if they are not contributing to the conversation	Individuals can leave a group at any time
4	Dialogue meeting	Questions are presented for a group to work towards a common understanding	One large group from beginning to end
5	Brainstorming	Encouragement of individuals to generate creative ideas through group discussion. Lefika and Mearns (2015) cite Litchfield (2008) for a four-rule guide: i) generate a lot of ideas ii) avoid criticising ideas iii) attempt to combine and improve ideas and iv) encourage 'crazy' ideas	• One individual summarises for the group • Notes taken during brainstorming • Sessions often recorded
6	Communities of Practice (CoP)	See above	• CoPs are continuous in nature and longer term (not one-off events) • There is one group from beginning to end
7	Action Learning Groups	Lefika and Mearns (2015) cite Association for Coaching (2011) to define it as people get together to analyse a work problem and develop a plan of action	The catalyst is a problem to be solved whereas knowledge cafes emphasise enquiry

There is considerable scope for overlap with these techniques too, and, one technique may be used within another. For example, brainstorming or drawing/taking notes of key ideas may be used within a knowledge café approach, unless the facilitator is very strict in how he/she imposes the knowledge café process (see Section 2.). In addition to this, there are other knowledge sharing techniques that individuals or companies may wish to use (Sharp, 2019a).

Lefika and Mearns (2015) provide guidelines for implementing knowledge cafes and various challenges in using the approach. These challenges include not asking appropriate questions and not being authentic (Prewitt, 2011). One of the challenges Lefika and Mearns (2015) comment on is 'disregarding the rules' which could lead to the knowledge café not being 'successful' (Lefika & Mearns, 2015: 30). However, one aspect of the approach is that the participants are not closed-minded and unwilling to explore different viewpoints (Gurteen, 2013; Lefika & Mearns, 2005) so a lot depends on how the facilitator wishes to implement the knowledge café. For example,

does the facilitator and/or those hosting the knowledge café want the plenary conversation at the end of the knowledge café to be recorded? And, if so, how? However, although this is the case, knowledge cafes have distinctive features, and have certain advantages over other techniques where people come together (Lefika & Mearns, 2015).

Literature suggests that knowledge cafes are useful in a wide range of organisational environments. Gurteen (2019) has shown that the technique can be used in a wide range of organisations of different sizes and type across the world. These include multi-national companies, charities, research institutes, and government organisations (Gurteen, 2019). Also, Gurteen (2019) integrates his knowledge cafes with his newsletter and website to support a Community of Practice (the Gurteen Knowledge Community). This means that the Gurteen Knowledge Community communicates by using a combination of different means including face to face, social media and Information Technology (Gurteen, 2019). Lefika and Mearns (2015) and Sharp (2013) illustrate that knowledge cafes can be used in higher education and business environments and Singh (2017) suggests that it can be used to conduct research and generate theory.

The example of the Gurteen Knowledge Community generates interesting questions relating to the interaction of knowledge cafes with Communities of Practice and the use of technology to support and complement knowledge sharing. Arguably, Communities of Practice (CoPs) are like knowledge cafés but continue longer with repeated meetings and use of technology where knowledge is shared (Wenger et al., 2002).

The World Café is like a knowledge café that connects people around the world (Brown & Isaacs, 2005). Brown and Isaacs (2005) give stories of the benefits of this approach which encourages listening and working together with people from diverse backgrounds. The World Café approach encourages practical problem solving and removal of hierarchical structures (Brown & Isaacs, 2005). There is an appeal in this book to the value of society and face to face meetings in groups that can be lost with the use of technology (Brown & Isaacs, 2005). However, technology can support the development of discussions and reinforce the connection with people. Some examples include the use of blogs (Dennen, 2014), the development of virtual CoPs (Ogbamichael & Warden, 2018), the development of Networks of Practice using technology (Primard et al., 2016), continuing CoPs online (Cheung et al., 2013), and video-conferencing (Panteli & Dawson, 2001; Maul et al., 2018). Also, whether technology is involved or not, an interesting area of discussion is the value of crossing boundaries of CoPs to innovate and create ideas (Leino et al., 2017).

Both CoPs and knowledge cafes usually entail learning about a particular theme or area of concern or interest (Lefika & Mearns, 2015; May et al., 2016), and, as discussed above, there is overlap of the two (e.g. Gurteen, 2019). This research explores further why knowledge cafes can be useful to organisations. This research was conducted without reference to Lefika and Mearns (2015) but will add to literature on the theme of the value of knowledge cafes to organisations. Lefika and Mearns (2015) specify eight advantages of knowledge cafes for organisations (see Table 3).

Table 3: Summary of Advantages of Knowledge Cafes for Organisations (adapted from Lefika & Mearns, 2015)

	Advantage	Notes
1	Connecting People	All experts part of the Delphi study saw this as one of the key advantages
2	Knowledge Sharing	Sharing happens once connections are made and this sharing can be used to train and help with mergers.
3	Leadership Training	Leaders can train through sharing experience in knowledge cafes
4	Mergers	Knowledge cafes can help merging organisations can communicate effectively with each other
5	Leaders Share Experiences	Often this is done through leaders sharing tips and tricks and stories
6	Creative Idea Generation	Knowledge cafes help generate ideas and build consensus but were less successful in solving technical problems
7	Change Management	Experts thought it may be helpful for this
8	Learning and Understanding	Knowledge cafes have helped postgraduate students grasp concepts better than in a normal classroom setting

This paper will present further research conducted separately from Lefika and Mearns (2015) and discusses the implications of this research in light of the above literature.

4 CUMULATIVE RESEARCH METHOD: DIFFERENT KNOWLEDGE CAFÉS AND FEEDBACK

The methodology for this research can be viewed as a cumulative approach where one stage of the approach built on another (see Figure 1).

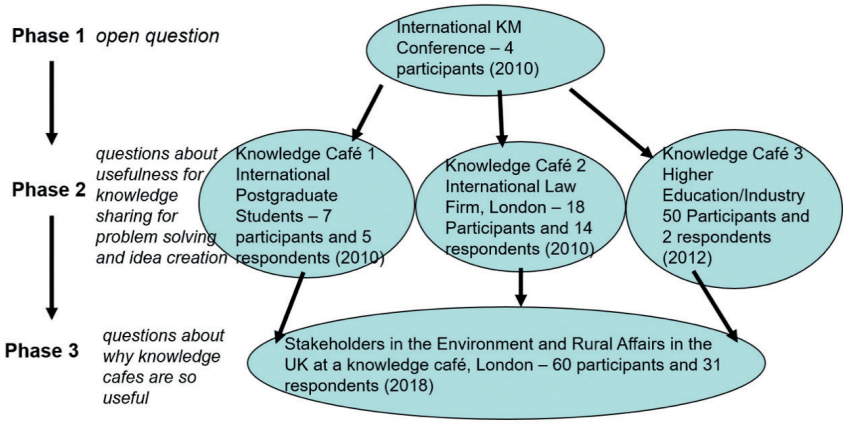

Figure 1: Cascade Methodology

Phase 1 – Interview with Four Experts

The researcher interviewed four experts at an international knowledge management conference (European Conference on Knowledge Management) in Autumn 2010. Each person was asked to give a view on their experience of knowledge cafes. Each interviewee said that they valued knowledge cafes for a variety of reasons (see Table 4).

Table 4: Phase 1: Reasons Given for Valuing Knowledge Cafes

Person	Job / Role / Responsibility	Reasons to Value Knowledge Cafes
1	Business consultant, UK (David Gurteen)	• Insights / changed ways of thinking / challenging / stimulating • Surprising benefits (see Section 1)
2	Senior Lecturer, UK University	• Synthesis of ideas • Creation of new ideas • Useful aide memoire
3	Principal Lecturer, Australian University	• Sophisticated form of brainstorming that helps build a bigger picture
4	Professor, UK University	• Opportunity for a wide variety of inputs all at once from different people

The reasons given for valuing knowledge cafes include some of the reasons given by experts in the research by Lefika and Mearns (2015) (see Table 3).

Phase 2 – Three Knowledge Cafes: International Postgraduates, Higher Education / Industry and London Law Firm

Phase 1 led to further exploration of this subject in different settings. The researcher facilitated three knowledge cafes in different environments between 2010 and 2012 and obtained feedback from some of the participants of each knowledge café, via a questionnaire. Informed consent was obtained from respondents who were asked four likert-scale questions based on feedback from Phase 1. Then, the questionnaire prompted them to give a brief statement of their overall assessment of their knowledge café experience.

The number of participants at the knowledge café always exceeded the number of people who gave feedback. Details of the organisations and numbers of participants and respondents are given above (see Figure 1 Phase 2) and a summary of feedback is given below (see Tables 5 and 6).

Table 5: Phase 2: Summary of Likert Feedback from Respondents of Three Knowledge Cafes

Organisation Context	Type of Participants/ Respondents	Helpful for Exchanging Ideas on an Issue (average likert score: scale 1-4: top score 1 = 'Strongly Agree')	Prefer IT to exchange views rather than face to face knowledge café (average likert score: scale 1-4: top score 1 = 'Strongly Agree')
Higher Education Institution, (27th Oct 2010) (Knowledge Café 1)	International Business Students	1.6	2.8
Large Law Firm London (8th Dec 2010) (Knowledge Café 2)	Knowledge administrators, lawyers and managers	1.9	3
Higher Education Institution (17th July 2012) (Knowledge Café 3)	Range of Professional workers	2.75	3

Table 6: Phase 2: Summary of Assessment of Knowledge Café Experience from Respondents of Three Knowledge Cafes Compared to Lefika and Mearns (2015) classification of Knowledge Café Advantages (see Table 3)

	Summary of Response		
Identity Number	Language Suggesting Generally Positive or Negative?	Issues of Assessment of Knowledge Café experience	Any similarities with Lefika and Mearns (2015) classification of advantages?
Knowledge Café 1			
1	Positive 'very useful'	• gives different views on same points • can help change your mind	Not really
2	Positive 'good way of getting people to communicate'	• good way of getting people to communicate and exchange ideas, questions and thoughts • therefore better understanding of topic	Yes (2 and 8)
3	Generally positive 'useful'	• could not distinguish it from a simple discussion	Not really
4	Conditional positive 'depends'	• depends on what person learns • new perspective • take something	8? Possibly
5	Positive 'fascinating'	• different opinions on topic are fascinating • learn from others	Second bullet [8]
Knowledge Café 2			
1	Positive 'Very valuable'	• Stilted conversation later flowed • Themes from it for business use • Valuable conversation with people would not normally talk to	Third bullet [3]
2	Positive. 'useful'	• People can express their issues they have not always related to the specific issue [but still useful]	2
3	Neutral	• Unexpected common themes arose • New issues • Couple of solutions to minor problems	2 and 6
4	Positive. 'enjoyed it, interesting...'	• Interesting to hear others' views • Not sure how to take forward	First bullet [2]

	Summary of Response		
Identity Number	**Language Suggesting Generally Positive or Negative?**	**Issues of Assessment of Knowledge Café experience**	**Any similarities with Lefika and Mearns (2015) classification of advantages?**
5	Very positive. 'wonderful' 'I loved this kind of forum'	• Passion for sharing needs willing participants • Motivational • Problem-solving	Third bullet involves 6
6	Neutral / positive. 'Quite interesting' 'Good to...'	• Time to discuss issues with knowledge lawyers	2
7	Positive. 'Good to ...'	• Get together without specific agenda	1 [and possibly 2]
8	Positive. 'useful...'	• Discuss in relaxed way	Arguably 1 and 2
9	Positive. 'useful...'	• Talking to people would not normally talk to • No solutions but identified problems	1 and 2
10	Positive. 'useful...'	• Good forum for sharing ideas • Uncertain about practical change	2
11	Positive	• Brought up issues and problems he/she did not think to address ready for action	2
12	Negative. 'not particularly helpful.'		
13	Positive. 'valuable...'	• Valuable to spend time as a group • Interesting potential for brainstorming	1, 2 and 6
14	Positive. 'useful...'	• Useful way of addressing an issue • Encourages through provoking discussion	First bullet [1 and 2 to some degree]
Knowledge Café 3			
1	Neither 'unable to comment'	• Presentation at beginning too vague and unstructured and too long • Dancers were great 'interlude' • Use of technical sound systems	
2	Positive 'loved the lines..'	• Feeling is that more than words needed to make café work • Use of tango and art forms helpful • Metaphors helpful • Wide mix of people excellent • Helpful when people don't think or talk like business textbooks	Fourth and fifth bullets [1, 2 and 8]

The overall picture from the feedback from respondents in Phase 2 of the research was that most respondents found the face to face knowledge café experience helpful and positive over and above what a participant could experience purely using IT-based communication. The qualitative feedback indicates that there were a lot of reasons why knowledge cafes were a positive experience for most respondents. A number of the reasons given overlap with the advantages classified by Lefika and Mearns (2015) (see Table 6). However, a number of other reasons for the positive experiences of participants in knowledge cafes were given too. These included:

9 listening to/seeing new viewpoints/perspectives on a topic;

10 helping to change a person's mind on a topic;

11 identifying themes for business use;

12 valuable conversation;
13 expressing thoughts on issues that would not be raised /heard otherwise;
14 identifying new issues;
15 improving motivation;
16 enjoying and having time to discuss things;
17 'getting together without a specific agenda';
18 encouraging people [through discussion];
19 realising new questions /issues that may not have been addressed before and;
20 enjoying new experiences together.

This research led to a final phase of research focused more on why most participants of knowledge cafes value them in the context of their work/organisation(s).

Phase 3 – Knowledge Café of stakeholders in Environment and Rural Affairs in the UK

The researcher chaired the café (see Figure 1) and gave out a questionnaire to the participants at the end of the café. An open question was posed on the experience of participants at the knowledge café. There was deliberately no 'leading question' in the questionnaire so that the feedback from the 31 respondents could be compared with previous feedback and arguably is more powerful evidence to support conclusions against the theme of this paper. For details of the feedback see Table 7 (overleaf).

Table 7: Summary of Feedback from Knowledge Café Experience of Stakeholders in Environment and Rural Affairs in the UK

Respondent	Brief Statement assessing Knowledge Café Experience	Was the experience positive?	Reason(s) for Valuing the Knowledge Café (cross reference(s))	Additional Reasons?
1	"I was a little sceptical at first, but the group discussion did provide a useful brainstorming session with useful output."	Yes	6	
2	"Very useful process. Will take the method/tool back to my organisation. Great for identifying common ground and focusing on the main issues."	Yes	12	
3	"Stimulating and enjoyable. A pleasant change from listening passively to presentation."	Yes	20	{21} Mental stimulation
4	"Positive in that sharing of different views [is] good. However, usefulness determined by implementation by [a government organisation] of views"	Yes	2	
5	"Not sure how constructive it was to repeat the question with the movement of groups, but it was generally a good discussion. With the question on the board, could have been the objective/aim of the exercise."	Yes	12	
6	"Good experience! Enjoyed it! Perhaps one more change of people"	Yes		
7	"Wondered off the point somewhat. Interesting concept will use myself...opened up conversation/other ideas etc"	Yes	6	
8	"20 minutes still seemed quick, but better than last time. Got key points across and learnings from others' views in small table discussions."	Yes	8	

Respondent	Brief Statement assessing Knowledge Café Experience	Was the experience positive?	Reason(s) for Valuing the Knowledge Café (cross reference(s))	Additional Reasons?
9	"it was a productive way of initiating discussion. It sparks my interest on this way of brainstorming and will take it forward to apply in any job."	Yes	6	
10	"I was initially sceptical, but found it more useful than I suspected, and more focused (compared to other similar events). Need to rearrange furniture lost valuable time, but otherwise valuable."	Yes		
11	"the use of more groups was good, however assembling post it notes onto board answers sometimes misses the nuances or [?] of the debate."	Yes		
12	"It was interesting to engage with people, but can't say there was any difference to a standard brainstorming session or discussion."	Yes	6	
13	"I enjoyed the experience"	Yes		
14	"Valuable + open discussion and beneficial to all involved. Good experience overall."	Yes		
15	"Very helpful unhindered and open exchange of views"	Yes	9	
16	"The process is straightforward, but the aim and value of output against any process that relied on the output was unclear."	Neutral		
17	"7 out of 10. Good!"	Yes		
18	"Potentially useful as a technique. But easy to become trapped in smaller groups with specific details."	Yes		
19	"Very interesting and gave the ability through exchange to obtain different viewpoint/output"	Yes	2 and 9	{22} Interesting
20	"Small groups encourage open discussion"	Yes	2	
21	"Interesting Small groups worked well Larger conversation was good at the end – bi"	Yes		22
22	"Very interesting experiences which I'll bear in mind in the future."	Yes		22
23	"Useful and interesting"	Yes		22
24	"In principle the café works. There are always those in [?] into [?] and steer and dominate conversation + this makes the Café style flow tough."	Yes		
25	"Valuable way of networking across the group and sharing ideas in an open transparent way."	Yes	1 and 2	
26	"Fruitful discussion. Sharing knowledge is always useful but would like to know what outcomes are used for"	Yes	2	
27	"The experience was useful and constructive."	Yes		20
28	"Good opportunity to share thoughts with stakeholders with different/ various views."	Yes	2 and 9	
29	"Enjoyed unexpected differences in points brought across @ the different tables. The big "plenary" discussion was most effective."	Yes	2 and 9	
30	"A great leveller/equaliser ensuring equal voice/participation from all present."	Yes		{23} Leveller /equaliser / takes away hierarchy
31	"Went v. well. Constructive discussions + provided a good format to hear different views."	Yes	9	

Notably 30 of the 31 respondents found the knowledge café experience a positive one. The other respondent was neutral. The reasons given for this positive experience concur with those found in the previous phases of the research. Notably, there is a particular emphasis on the value of knowledge sharing, idea generation and seeing different viewpoints (see Table 7). Also, four other reasons were given (see Table 7).

5 BRIEF DISCUSSION AND CATEGORISATION OF REASONS WHY KNOWLEDGE CAFES ARE VALUED

This research illustrates how participants generally find knowledge cafes a positive experience. Out of a total of a total of 55 respondents, 51 provided positive feedback on their experience without being prompted by the researcher. This research identifies 24 reasons why knowledge cafes were valued by participants. These reasons and the frequency of mention are categorised (by some key verbs). This is illustrated below (see Table 8).

Reason Id Number	Reason	Frequency of Mention (from Respondents)	Category	Total for the Category
3	Leadership Training		Changing	3
7	Change Management		Changing	
10	Helping to change a person's mind on a topic	1	Changing	
15	Improving motivation	1	Changing	
18	Encouraging people [through discussion]	1	Changing	
4	Mergers		Changing/Sharing	
1	Connecting People	6	Connecting	6
6	Creating new ideas	5	Creating/Solving	9
24	Problem solving/brainstorming	4	Creating/Solving	
16	Enjoying having time to discuss things	3	Enjoying	9
20	Enjoying (new) experiences together	6	Enjoying	
11	Identifying themes for business use	3	Identifying	9
14	Identifying new issues	5	Identifying	
19	Realising new questions/issues that may not have been addressed before	1	Identifying	
2	Knowledge Sharing	11	Sharing	
5	Leaders Share Experiences		Sharing	
9	Listening to/seeing new view-points/perspectives on a topic	10	Sharing	

Reason Id Number	Reason	Frequency of Mention (from Respondents)	Category	Total for the Category
12	Valuable conversation	4	Sharing	32
13	Expressing thoughts on issues that would not be raised /heard otherwise	3	Sharing	
17	Getting people together	4	Sharing	
8	Learning and Understanding	4	Learning	6
21	Mental stimulation	2	Learning	
22	Interesting	7	Other – Interest	7
23	Leveller/equaliser/breaks down hierarchy	1	Other – leveller	1

6 LIMITATIONS AND FUTURE AREAS OF RESEARCH

The total number of participants in the knowledge cafes facilitated as part of this research exceeded the number of respondents. The total number of participants was 139 and the total number of respondents was 55. At one large Knowledge Café 2 (Phase 2) (see Figure 1) I had to canvas feedback by sending out the questionnaire by e-mail because I forgot to give it out at the end of the café. In the case of the Knowledge Café with 60 participants last year (see Figure 1) some participants were still involved in their conversations and so did not give in a feedback sheet in, and although the questionnaire was short the chair of the day-long event wanted to move things on and get to lunch! This may have led to fewer responses than may have otherwise been achieved. There is always scope for more feedback from participants about why they may value knowledge cafes but the evidence from this research is conclusive that most participants do value them and for a wide range of reasons.

One future area of research is the effectiveness and comparative value of knowledge cafes conducted using Zoom technology (Gurteen, 2019). Video-conferencing/Zoom technology can bring connection bridging geographical barriers whilst retaining richness of communication (Panteli & Dawson, 2001; Maul et al., 2018). However, the dynamics of knowledge cafés conducted using Zoom technology with participants around the world are, to some extent, different, looking at lots of faces on screens and going in to virtual 'rooms' with a few participants (Gurteen, 2019). It would be interesting to find out whether participants of international knowledge cafes using Zoom technology value the experience more, less or the same as face to face and whether for the same/similar reasons or not. The implications of this for uses in organisations, CoPs and business would also be valuable areas of research to explore.

7 CONCLUSION

This paper explores why knowledge cafes can be valuable to organisations and some of the implications for SMEs. Through a cascade methodology applied over a number of years, virtually all respondents gave feedback that confirmed that they valued knowledge cafes and a wide range of reasons were provided for such a positive response. This paper categorises these reasons with key verbs and these reasons can be used to justify the use

of knowledge cafes in different settings in the future. The key verbs/nouns are (in order of frequency of mention) *sharing, creating/solving, enjoying, identifying, interest, connecting, learning,* and *changing.* All these aspects of knowledge cafes are potentially very helpful for the sustainability of SMEs in a world that increasingly needs organisations to be adaptable, creative and good at learning how to grow effectively in their environments.

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WIRTSCHAFT

ARBEIT

ETHIK

RECHT

GESELLSCHAFT

KOMMUNIKATION

TECHNIK

KUNST/DESIGN

ZUKUNFT

ENTWICKLUNG

BILDUNG

BERUF

INSTITUT FÜR
ANGEWANDTE
GEWERBE
FORSCHUNG

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