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Quality Management Evolution from the Past to Present: Challenges for Tomorrow

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Background and purpose: The quality management field has been studied for more than 100 years dating back to the early 1900s when Fredrick W. Taylor is known as the father of Scientific Management, stressed the importance of quality inspection. This paper describes how quality management field has developed and evolved to date, particularly by tracking its focus over time.
Design/Methodology/Approach: A systematic approach to literature review was adapted in this research. Identifying the gurus and the scholars in this field makes it possible for the researchers to review their works, which are, mainly, in the form of books and journal articles. Process in getting literature review that has been conducted include quality management in general, as well as 'evolution of quality management' and 'development of quality management' respectively in capturing the field of quality management and thus, illustrating how the quality management field has evolved over the time.
Results: It appears that quality management literature have evolved through time, and as they evolved, the principles, systems, tools and techniques have changed. As a result of the study, this paper also provides the synthesis of quality management literature over time according to the key focus and gives a new perspective for the further research.
Conclusions: The historical review allows the researchers to establish the pattern of quality – the 'focus, principles, systems, and tools and techniques' over time. Our observations have confirmed that as the focus has changed, the principles have also changed and as the principles have changed, the systems, tools and techniques also have changed in quality management field.

Keywords: *Quality Management; focus; principles; systems; and tools and techniques.*

1 Introduction

The quality management field has been studied for more than 100 years dating back to the early 1900s when Fredrick W. Taylor known as the father of Scientific Management, stressed the important of quality inspection (Foster, 2001, p. 44; Garvin, 1988, p. 5). According to Feigenbaum (1961), quality does not mean "best" but "best for the customer use and selling price". While Crosby (1984) deems that quality has to be defined as conformance to requirements. In turn, Juran (1988) points out that quality is "fitness for use", recognises that a product or service must be produced with the customers' need in mind.

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"Freedom from defects" and "fitness for use or purpose". Further, Drucker (1989) claims that quality in a product or service is not what the supplier put in. It is what the customer gets out and is willing to pay for. Likewise, Deming (1993) states that quality means a predictable degree of uniformity, dependability at low cost and suited to the market. As this is seconded by several literature studies which proposed the importance of a product or service must be produced with the customers' need context, such as (J. J. Dahlgaard, Kristensen, & Kanji, 2002; Foster, 2001; Price, 1990; Richardson, 1997; Slack, Chambers, Johnston, & Betts, 2006; Stamatis, 1996).

Looking from a bigger picture, quality management has been defined as "philosophy or an approach to management" made up of a "set of mutually reinforcing principles, each of which is supported by a set of practices and techniques" (Dean & Bowen, 1994). Thus, (Godfrey, Dale, Marchington, & Wilkinson, 1997) point out that quality management is about all aspects of the overall management function that determine the quality policy objectives and responsibilities, and implement them by means such as quality planning, quality control, quality assurance and quality improvement within the quality system. Consistent with this (Sousa & Voss, 2002) also highlight that quality management is a managerial philosophy or an approach made up of a set of mutually reinforcing principles, each of which is supported by a set of practices, tools and techniques for enduring effectiveness and efficiency with respect to the systems and its performance.

In general, it appears that there is agreement on the definitions of quality and quality management means although different authors use different terminology. Therefore, we would say that there seems to be no conflict or argument between the authors. It is believed that the patterns of quality management literature are influenced by the big gurus' thinking (i.e. Shewhart; Deming; Juran; Crosby, Feigenbaum and Ishikawa) which reflects the stream and direction of the quality movement as they are today. This is consistent with the works of Martinez et al. (1998) who further reinforced that the quality management movement can be tracked by looking at the Crosby, Deming, Feigenbaum, Ishikawa and Juran works', as they can be considered the most important gurus of the quality management field.

As such, a number of studies have focused on accessing the quality management approach, tools and techniques such as Total Quality Management (Belohav, 1993; Garrity, 1993; Hellsten & Klefsjo, 2000; G. K. Kanji, 1990; Kano, 1993; Macdonald, 1995; Martinez-Lorente, Dewhurst, & Dale, 1998; Milakovich, 1991; Powell, 1995; Taylor & Pearson, 1994), Six Sigma (Eckes, 2005; Kuei & Madu, 2003; Stamatis, 2003), and Lean Manufacturing (Hanna, 2007; Jayaram, Vickery, & Droge, 2008; Kremer & Fabrizio, 2005; Patty & Denton, 2010; Womack, Jones, & Roos, 1990). In recent years, the focus of these studies was to assess the integration of quality management (Pavel Castka & Balzarova, 2008; Fernie & Sparks, 2014; Mortimer & Mortimer, 2015; Muzaimi, Chew, & Hamid, 2017; Oaklan, 2014; Prajogo & Sohal, 2006; Ross, 2017; Thai & Jie, 2018; Yoon, Giirhan-Canli, & Schwarz, 2006) in the context of supply chain, risk management, corporate social responsibility and operation management. Some other studies such as (Bititci, Garengo, Dorfler, & Nudurupati, 2008; Burge, 2009; Giannakis, 2007; Hakes, 1999; G. Kanji, 2002) focused on assessing the quality management merely on the perspective of performance measurement matters. While, (Berger, 2007; Devadasan & Goshteeswaran, 2005; Gunasekaran, 1999; Jin-Hai, 2003) focused on quality management in manufacturing industry (i.e. Agile manufacturing) and others such as (Chaniotakis & Lymperopoulos, 2009; Kumar, Kee, & Charles, 2010; Tan, Hamid, & Chew, 2016; Zeithaml, Parasurarnan, & Malhotra, 2002) highlighted the quality management link to service quality.

It indicates that the majority of studies have been conducted to measure or validate quality management agenda from customers' perspectives or managers' perspectives without much attention given to examining the concept of quality from the perspective of development and evolution of quality itself. In addition, examining the evolution and development perspectives has been recommended by previous studies, for example (Chiaromonte, 2004; Cho, Jung, & Linderman, 2017; Cochran, 2007; S. M. Dahlgaard-Park, 2011; Freeman & Louca, 2001; Martinez-Lorente et al., 1998; Schroeder, Linderman, & Zhang, 2005; Wang & Kleiner, 2005).

Thus, all of the above literature suggests that there is an ample amount of literature review on quality management, the majority of studies have been conducted to measure or eliciting the view of quality management from customers' perspectives or with the attention given to examining quality practices from managers' and employees' perspectives. Consequently, based on relevant quality management review, this article contributes to the quality management literature by fulfilling the following gap:

"To the best of our knowledge, there is no study in the field of quality management that have been comprehensively conducted to review the field itself, particularly by tracking the focus of quality management evolution over time".

This paper aims to describe how quality management field has developed and evolved to date, particularly by tracking its focus over time. In the study of quality, it is vital to understand the fundamental points where quality management comes from, before predicting where this field will be in the future. The evolution of the quality development and its interconnections over time are believed to be the factors that shape the ideas of the current progress of the quality management field. Consistent with this view, Powell (1995) makes the points that the origin of quality management can be traced by time series (i.e. Historical perspective).

The rest of the paper is structured as follows: the first section provides the literature review on the origins and evolution of quality management. The second section discusses the methodology of the study. In the third section, the paper continues with the findings and discussion, along with research challenges in quality management and future research. The final section discusses the conclusion of the study.

2 Origins and Evolution of Quality Management

Authors such as (Garvin, 1988) link the era of quality management with time series; i.e., from Inspection Era to Statistical Quality Control Era, Quality Assurance Era and the latest Strategic Quality Management Era. Powell (1995) also discusses TQM relative to time. In this paper, we propose that the development and origins of quality management can also be traced to the focus of quality over the time.

Traditionally quality is used for inspection as a method of measurement to detect the errors in production manufacturing. According to Foster (2001) and Garvin (1988) the driving force of inspection activities was inspired by Frederick Taylor (the father of Scientific Management) in the early 1900s. Through the years, the interest in quality has evolved when G.S Radford published his book named The Control of Quality in Manufacturing in 1922 (Garvin, 1988, p. 5). It defined quality as a distinct management responsibility and as an independent function yet, at that time, the primary focus was inspection (Dahlgaard, et al., 2002; Garvin, 1988, p.5). Meanwhile Henry Ford developed the Model T which later became the Ford car and introduced the moving assembly line, which lead to the concept of mass production (Roth, 1996; Womack et al., 1990). The Model T was described as the first product of mass production, which was developed to produce the Model T in great quantities (Batchelor, 1994, p. 66; Roth, 1996). Moreover, Womack, et al., (1990, p. 27) note that "*the key to mass production wasn't – as many people then and now believe – the moving, continuous, assembly line. Rather, it was the complete and consistent interchangeability of parts and the simplicity of attaching them to each other. These were the manufacturing innovations that made the assembly line possible*". This interchangeability reflects the quality in the form of standardisation, which reduce the variation in the parts.

Between 1930s and 1940s, statistics became the main method of influence for the quality management discipline. In 1938, Deming published a technical book and taught courses in the use of his statistical methods (ASQ, 2002, p. 20). Deming thinking was centred to problem solving in process management, when he proposed the Deming Cycle (Plan-Do-Check-Act). This was influenced by Shewhart who at that time was concerned with the use of Statistical Quality Control (SQC) in reducing the deviation in production (ASQ, 2002).

As such Garvin (1988, p. 6) notes that in 1931, Shewhart had published Economic Control of Quality of Manufactured Product, in which he gave a precise and measurable definition of manufacturing control, developed powerful techniques for monitoring and evaluating day-to-day production, and suggested a variety of ways of improving quality. Garvin states that Shewhart's book is considered by many to be the origin of the basic principles of quality. Moreover, the book was considered by statisticians to be a landmark contribution to the effort to improve the quality of manufactured goods and he made the utmost valuable contribution to quality development with the concepts of Statistical Control or processes known today as SPC (ASQ, 2002, p. 29). Garvin adds that the development of quality management during that time was heavily influenced by statistical methods and their application. This was further developed during 1940s in the work of Bell Laboratories, which initiated and developed sampling techniques, namely Acceptable Quality Levels (AQL) and Average Outgoing Quality Limit (AOQL) (Garvin, 1988). Therefore, it is a general belief that during the period from the early 1900s to 1940s, the philosophy of quality was focused on the *product* (i.e. product focus). The process of inspection and control was aimed at detection and rejection at the point of production (i.e. *How can we ensure quality in a product?*).

The 1950s could be considered as the turning point of the quality management field. During that decade, the Japanese Industrial Revolution had rapidly begun. Earlier in 1946 the Union of Japanese Scientist and Engineers was founded, which went on to introduce the Deming Prize in 1951. At this time, the Japanese Industrial Standards Committee was established, and they have played a major role in the development of the quality movement in Japan. As such, several tools and techniques were implemented and are still being practiced across the world. These include Statistical Process Control (originated from Statistical Quality Control), Reliability Engineering, Kaizen and Genba-Kaizen, Failure Mode and Effect Analysis, Poka-Yoke (mistake proofing), Jidoka and Just-in-Time and Total Preventive Maintenance (Foster, 2001; Richardson, 1997).

Meanwhile, Juran published his first edition of the Quality Control Handbook in 1951. Its initial chapter discusses the economics of quality and proposes the famous analogy gold in the mine. He divided quality into avoidable and unavoidable causes (Costs of Quality). As such, in Statistical Quality Control, he estimates that 15% of quality problems in a company are due to special causes, which means that they may involve the workers. In his view, 85% or more are down to management dealing with the system (quality in the operation system). Therefore, he believes that problems can be solved by moulding the processes of

the system.

In 1961, Feigenbaum published his book on Total Quality Control (TQC). He argued for a systematic or a total approach to quality, requiring the involvement of all functions, not just manufacturing, in the quality process. He argued that the underlying principles of this total quality are to provide genuine effectiveness control which must start with the design of the product and end only when the product has been placed in the hands of the satisfied customer. In short, quality starts to become a must in every process. It is clear that the idea was to build in quality at an early stage rather than inspecting and controlling quality at the end of the production process.

In Japan, Ishikawa developed the Ishikawa Diagram as a management problem solving tool in 1943 (Dahlgaard, et al., 2002, p. 90; Ishikawa, 1985, p. 64). In the early 1960s, Ishikawa produced a non-technical quality analysis textbook for quality circle members. Ishikawa's quality circles where first piloted at the Nippon Telegraph and Cable Company in 1962. He published a book entitled "What Is Total Quality Control" in which seven basic tools (7 Quality Tools) were described as indispensable for quality control (Ishikawa, 1985, p. 198).

In turn, another Japanese guru in quality management progress is Taguchi. In 1951, he won the Deming Award for Literature on Quality and in 1960 he won the Deming Application Prize. Along the way, Taguchi developed the concept of the "quality loss function" and his methods are concerned with the routine optimisation of product and process prior to manufacture, rather than reliance on the achievement of quality through inspection. Concepts of quality and reliability are pushed back to the design stage. The Design of Experiments (DOE) method provides an efficient technique to design product tests prior to entering the manufacturing phase (Foster, 2001; Richardson, 1997, p. 9). This method is aligned with the concept proposed by Feigenbaum where quality is built in to every process of production. It seems that at this stage the focus of QM has moved from product to process (i.e. *How can we ensure quality in process?*).

In 1979, standards, quality accreditation and quality systems were first introduced, with British Standard (BS) 5750 since revised in 1987 (Bank, 2000; Callan, 1992; Hill, MacGregor, & Dewar, 1996), and which later became the BS EN ISO 9001:2000. Meanwhile, Womack et al., (1990, p. 159) claim that Ford started a systematic supplier grading system, called Q1, in the mid-1980s. This is a complex statistical system, which ranks suppliers by the number of defects discovered in the assembly plant, delivery performances, progress in implementing quality, improvement programs in the supplier plant, level of technology and management attitudes. The aim was to bring every supplier gradually up to higher and higher levels of performance and quality.

Following on from this, 1987 was a pivotal year for quality management when the International Standards for Organisation (ISO) and The Malcolm Baldrige National Quality Award were established. ISO developed the ISO 9000 series that set out methods by which a system can be implemented, to ensure that the specific quality requirements are fulfilled (ASQ, 2002). On the other hand, the criteria for Malcolm Baldrige Model were established by the approach that reflected a consensus of best practice, and an annual review process was put in place to ensure that the Baldrige Model continues to reflect evolving trends (Hakes, 1999).

The development of a standard European approach followed quickly on from the Baldrige experience. In September 1988, the leaders of 14 major European countries played a key role in establishing the European Foundation for Quality Management (EFQM). EFQM established its own model in 1991, named Business Excellence Model for the European Quality Award, which built upon the Deming and Malcolm Baldrige approaches (Hakes, 1999). Looking at the system as a whole, it covers all processes that are embedded within it. All of these models recognise the interdependencies between various components in the system (i.e. leadership shapes strategy, people, standardise processes, and cause and effect relationships) as all of these are interrelated. For example, Malcolm Baldridge Model consists of processes for meeting the company quality goals as these processes are measured by information management, strategic quality planning, human resource management, product and process management, and part of the customer focus and satisfaction category. While EFQM system recognises how leadership drives policy and strategy that is delivered through people, partnerships and resources, and processes. Therefore, it is suggested that all of these integrated managerial systems reflect the system focus. As it is clearly seen, the quality journey during this period from the 1960s to 1980s focused on the system (i.e. *How can we ensure quality in the system?*).

Crosby's first book "Quality Is Free" in 1979 sold over 2 million copies and has been translated into 15 languages. Much of "Quality Is Free" is devoted to the concept of zero defects, which is a way of explaining to employees the idea that everything should be done "right first time", that there should be no failures or defects in work outputs. His thinking places greater attention on the people aspects of quality management (Crosby, 1979). Meanwhile, in 1984, Crosby published his second bestseller "Quality without Tears". The 14 points that Crosby considered essential involve the following ideas: management commitment, education and training, measurements, cost of quality, quality awareness, corrective action, zero defects, goal setting and recognition (Crosby, 1984). Therefore, it is fair to say that Crosby initiates a new perspective on quality which considers it through organisational lenses.

During the 1990s, Total Quality Management (TQM) became central in the agenda of top management. According to Dahlgaard and Dahlgaard (2003) Total Quality Management (TQM) is a relatively new management

philosophy, which has evolved from the rather narrow and mechanistic approach of Statistical Quality Control (SQC) as discussed earlier, to a more holistic and humanistic approach. The concept of TQM is a logical development of the concept of Total Quality Control (TQC), as introduced by Feigenbaum in 1961. In addition, another humanistic-oriented quality standard named the Investors in People (IIP) was launched in October 1991, based on widely-accepted principles of best training and development practices to enable organisations to improve their training and enhance their performance (Mason, 1997, p. 1).

Slowly but gradually, by this time, there seems to be more attention given to people with the system (people spin), in the development of quality journey. As these can be seen with the increased focus on Investors in People (1991) for the Best Training and Development Practices, European Foundation for Quality Management (1992) for the Business Excellence Model (BEM); e.g. leadership with excellent mindset and OHSAS 18000 (1996) for Occupational Health and Safety Management System.

Following on from this, the emphasis on system focus still continues with Six Sigma and Lean Manufacturing made the headlines during the 1990s. Mikel Harry (Motorola) first published "The Nature of Six Sigma" in 1986 and commercialised Six Sigma as a vibrant quality-improvement methodology (Eckes, 2005). The technique was given global boost in 1998 by Jack Welch then CEO of General Electric (Eckes, 2005; Miles, 1999). Another philosophy emerging at this time was Lean Manufacturing which derives from the Toyota Production System (TPS) or Just in Time (JIT) manufacturing. The lean manufacturing concept was popularised in American factories in large part by the Massachusetts Institute of Technology, who studied the movement from mass production toward Lean production as described in "The Machine That Changed the World: The Story of Lean Production" (Womack et al., 1990).

Systems have further developed with the implementation of TickIT, originally set up by UK Department of Trade and Industry and administered by British Standards Institution (BSI). This standard applies to suppliers of all types of information systems that involve software development processes. Further, the International Automotive Task Force (IATF) has developed ISO/TS 16949 for automotive related products. The system enables continuous improvement, emphasizing defect prevention and reduction of variation and waste in the supply chain. ISO/TS 16949 mainly applies to design/development, production, installation and servicing of automotive related products, and is the replacement of QS 9000: 1998 - International Automotive Task Force (IATF, 2002). Therefore, this was the time when overlapping occurred within the quality movement journey with the focus on both systems and people.

Moving to the late of 2000, there seems to be an increased awareness of Corporate Social and Environmental Responsibility that obliges the business sector to play a sensible yet not solely profit-oriented role. This includes social and environmentally driven actions, where the business sector has been expected to go beyond its moneymaking and commercial activities to commit to the well-being of the community. This has led to the introduction of ISO 26000 (standards for Social Responsibility), which published in 2010 that act as a guideline for dealing with corporate social responsibility and the environment.

Castka and Balzarova (2008) insist that the new ISO 26000 should be closely aligned with ISO 14000 and requires organisations to develop their management systems around their social responsibility (i.e. people orientation) aspects and impacts. Thus, several years after the introduction of ISO 9000, global discussions was taking place related to GATT (the General Agreement on Tariffs and Trade, which was a predecessor to the World Trade Organization), aiming to remove as many obstacles as possible to international trade (P. Castka, Prajogo, Sohal, & Yeung, 2015). The ISO 9000 has been revised to the new revision, ISO 9000:2015 is based on a number of quality management principles, including a strong customer focus, the motivation and implication of top management, the process approach and continual improvement. Da Fonseca (2015) mentions that ISO 14001 is an International Standard of worldwide acceptance based on the concept that better environmental performance can be achieved when environmental aspects are systematically identified and managed giving a major contribution to sustainability, through pollution prevention, improved environmental performance and complying with applicable laws.

In turn, the emphasis on risk management is the biggest of several changes in the third version of ISO 13485 (McMenamin, 2016). New changes in ISO 13485:2016 is the requirements for a quality management system specific to the medical device industry. Another ISO quality standard evolves to the latest is the ISO 37001 standard, published on October 15, 2016, called "Anti-bribery management systems - Requirements with guidance for use" is a useful tool to tackle corruption (Valerio, 2017). Over time, it is becoming clear that the quality focus has moved from a *system focus* to a *people focus*. It is clear that the development of quality management is focused on people with an extended view towards corporate social responsibility, environment and risk management. In fact, it is also fair to say that the risk focus turn to be the main leading idea with the establishment of ISO 31000 standard and the new revision of ISO 9001 standard. In other words, from the beginning of the 1980s to the millennium the main idea is centred on understanding *how can we ensure quality in people?*.

Continuing from there, a new type of work emerges that is different from both the manual-work and knowledge-work. The organising principle is fast moving towards netocracy, with flexible, flat and ever emerging trans-organisational networks where small organisations,

and even individuals, are forming and reforming global collaborative networks to deliver innovative value propositions to global markets and customers (Hamel, 2007; Malone, 2004). Netocracy in the context of social governing reflects the idea of moving from an industrial society where social values are money driven to a humanitarian society which is knowledge driven (Bititci et al., 2008; Grant, 2008).

As such, this includes cloud manufacturing (CMfg) where it is a computing and service oriented manufacturing model developed from existing advanced manufacturing models (e.g. ASP, AM, NM, MGrid) and enterprise information technologies under the support of cloud computing, IoT, virtualization and service-oriented technologies, and advanced computing technologies (Tao, LaiLi, Xu, & Zhang, 2013). It aims to realize the full sharing and circulation, high utilization, and on-demand use of various manufacturing resources and capabilities by providing safe and reliable, high quality, cheap and on-demand used manufacturing services for the whole life cycle of manufacturing (Tao et al., 2013).

Further, in a CMfg system, various manufacturing resources and abilities can be intelligently sensed and connected into the wider internet, and automatically managed and controlled using IoT technologies e.g. radio frequency identification (RFID), wired and wireless sensor network, embedded system (Tao, Cheng, Da Xu, Zhang, & Li, 2014). Inevitably, the manufacturing resources and abilities are virtualized and encapsulated into different manufacturing cloud services (MCSs) that can be accessed, invoked, deployed, and on-demand used based on knowledge by using virtualization technologies, service-oriented technologies, and cloud computing technologies (Tao et al., 2014).

This period can be seen as the focus shifting to networks focus. It is heavily about managing/leadings networks, people with multiple networks and networks of networks. An example of this, the MCSs are classified and aggregated according to specific rules and algorithms, and different kinds of manufacturing clouds are constructed. Different users can search and invoke the qualified MCSs from a related manufacturing cloud, according to their needs, and assemble them to be a virtual manufacturing environment or solution to complete their manufacturing task involved in the whole life cycle of manufacturing processes under the support of cloud computing, service-oriented technologies, and advanced computing technologies (Tao, Zhang, Venkatesh, Luo, & Cheng, 2011). This leads to the central question of *how can we ensure quality in people in the network environment*?

Today's it has seen rapid advances in connectivity, mobility, analytics, scalability, and data, spawning what has been called the fourth industrial revolution, or Industry 4.0 (Foidl & Felderer, 2015). Aligning with the era of digitization, quality field has taken initiative to bring Quality 4.0 by a long list of technology advances in several arenas that together enable innovation, new insights, connectivity between people, and connectivity between people and machines (Jacob, 2017).

The powerful new data available to companies, together with new configurations and capabilities of smart, connected products, is restructuring the traditional functions of business—sometimes radically. This transformation started with product development but is playing out across the value chain. As it spreads, functional boundaries are shifting, and new functions are being created. Smart, connected products requires a fundamental rethinking of design. At the most basic level, product development shifts from largely mechanical engineering to true interdisciplinary systems engineering (Porter & Heppelmann, 2015). Products have become complex systems that contain software and may have as much or more software in the cloud.

Industry 4.0 makes factories more intelligent, flexible, and dynamic by equipment manufacturing with sensors, actors, and autonomous systems (Roblek, Meško, & Krapež, 2016). Accordingly, machines and equipment achieve high levels of self-optimization and automation. In addition, the manufacturing process has the capacity of fulfilling more complex and qualified standards and requirements of products, as expected (Roblek et al., 2016). Thus, intelligent factories and smart manufacturing are the major goals of Industry 4.0 (Sanders, Elangeswaran, & Wulfsberg, 2016).

Consistent with this, Albers, Gladysz, Pinner, Butenko, and Stürmlinger (2016) analyse quality-related production with an intelligent condition monitoring-based quality control system and develop a comprehensive descriptive model. Similarly, in order to achieve transparency and productivity of big data, (Lee, Kao, & Yang, 2014; Vijaykumar, Saravanakumar, & Balamurugan, 2015) address the trends of manufacturing service transformation and the readiness of smart predictive informatics tools. The prognostics-monitoring system is a trend of the smart manufacturing and industrial big data environment (Lee, Kao & Yang, 2014; Vijaykumar, Saravana Kumar & Balamurugan, 2015). This point out that at the most current rate, the quality focus has extended the view from a *networks focus* to a *smart focus* with the pivotal question now is about *how can we ensure quality in people in the smart environment*?

3 Research methodology

In this paper, literature is important that it is considered as the key part of the research methodology. Therefore, in designing the research, we have opted to use a structured approach for selecting literature for review. In general terms, a literature review can be defined as the process of describing and criticising relevant literature, which others have published in that particular subject area. In order to make sense of the literature, and to find out the literature pertinent to quality management, the literature search begins by identifying who the gurus and experts are in this

field, and then reviewing at their published works. Therefore, this study followed Martinez et al. (1998), who claim that the quality management movement can be tracked by looking at the Crosby, Deming, Feigenbaum, Ishikawa and Juran works', as they can be considered the most important gurus of the quality management field.

Thus, in the field of quality management, the gurus have been identified and universally agreed upon (Foster, 2001, pp. 35-49; Richardson, 1997, pp. 92-93); they are Walter Shewhart, Edward Deming, Armand Feigenbaum, Philip Crosby, Joseph Juran, Kaoru Ishikawa, Masaki Imai, Taiichi Ohno, and Genichi Taguchi. Identifying the gurus and the scholars in this field makes it possible for us to review their works, which are, mainly, in the form of books and journal articles. This allows us to build on their ideas and further investigate the particular issues by looking in-depth at the literature via an online database journal, such as Emerald, Science Direct, and ABI/Pro-Quest. These online databases cover journals in the area of quality management, namely the Journal of Production and Operations Management, Journal of Total Quality Management and Business Excellence, International Journal of Operation and Production Management, International Journal of Quality and Reliability Management, California Management Review, Managing Service Quality, The TQM Magazine, Journal of Operations Management, as well as other leading general management journals.

Further, a systematic approach to literature review is based on the knowledge that gives a major role in evidence-based practices (Denyer & Tranfield, 2008; Rousseau, Manning, & Denyer, 2008; Tranfield, Denyer, & Smart, 2003) was adapted in this research. In the essence of this, a substantial literature review that was published by Ahire et al. (1995) were referred. This was a mainly descriptive review, providing a thorough synthesis of articles published from 1970 to 1993 and categorizing the literature along the several components of QM. Likewise, Martinez et al. (1998) also have provided a substantial literature review of articles published from 1986 to 1997 and categorizing the literature according to the number of references with the terms TQM, quality management (QM) and total quality (TQ). Similar to this, (Sousa & Voss, 2002) also put forward their view to synthesize, organize and structure knowledge from an academic/research standpoint and offer suggestions for future research of quality. Schroeder et al. (2005) further reinforced this by reviewing papers on quality from 1992 to 2003 which mainly regarding the Total Quality Management (TQM) issues. While, Dahlgaard-Park, S.M. has reflected the quality movement (i.e. The evolution patterns of quality management and the evolution of Total Quality Management) through the work of Dahlgaard-Park, S.M. (1999, 2011). All of these reviews were a useful stepping-stone in helping to consolidate the field.

Essentially, systematic reviews are formulated around research questions, and the criteria for inclusion and exclusion of papers are clearly defined at the outset (Denyer & Tranfield, 2008; Rousseau et al., 2008; Watson, Wilson, Smart, & Macdonald, 2018). In this study, process in getting literature review that has been conducted includes the inclusion of quality management in general, as well as 'evolution of quality management' and 'development of quality management'. However, considering the objectives of this work, we found that the inclusion and exclusion criteria were emerging as we developed greater insights in quality management and global trends (i.e. Industrial Revolution 4.0 and Digital Manufacturing). We believe this dynamic and iterative nature of the literature review conducted, while not strictly following a systematic literature review approach, provided a 'fit for purpose' protocol for the intended purpose (see (Bititci, Garengo, Dörfler, & Nudurupat, 2012; Macpherson & Jones, 2010). The illustration of the protocol is presented in Figure 1, as in the following paragraphs.

Following from there, the initial search identified over 79,000 articles (See Table 1), which was reduced in two ways, based on the insights that were emerging from the parallel literature review on emerging global and business trends, and the researchers' previous knowledge of the field. This ensured that key contributions previously unknown to us were not missed. Obviously, it was still impossible to include all the articles that made a contribution. Also, it should be noted that the focus of the review was to identify the extant literature rather than reviewing and discussing all relevant contributions, as many contributions built upon each other (See Ahire et al. (1995), Martinez et al. (1998), Sousa and Voss (2002), Schroeder et al. (2005) and Dahlgaard-Park, S.M. (1999, 2011). In conducting the review, our objective was to describe how quality management field has developed and evolved to date, particularly by tracking its focus over time. Thus, we specifically looked for the key events and research question that were being addressed rather than identifying specific solutions, models and frameworks.

In parallel, we explored general literature on global and business trends. Here our objective was to uncover the global and business trends that are predicted for the near future in order to provide a contextual basis against which

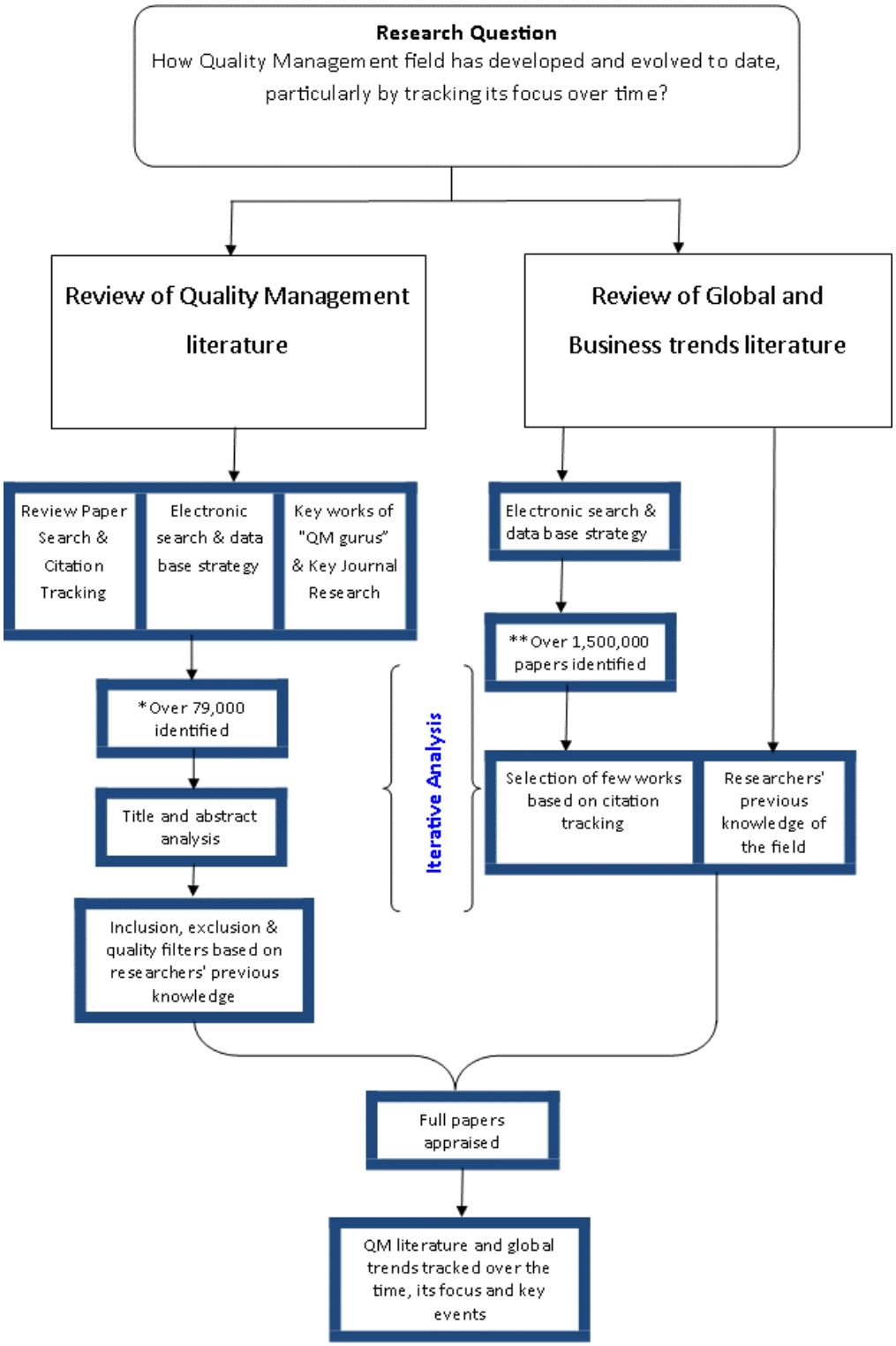

Figure 1: The methodological basis of the literature review. Source: Adapted from Bititci et. al (2012)

Table 1: Results of the qualitatively assessed identified papers

	Keywords Search	
	*(a) "Quality Management" or "Evolution of Quality Management"	**(b) "Global" or "Global Trends" or 'Business Trends'
EBSCOhost	24,583	978,307
ProQuest	37,699	1,516,047
Web of Science	31,116	1,121,332
Scopus	79,884	1,372,791

Note: Keyword search was performed in November 2018.

we could synthesize the quality management literature. Our initial search of the popular research databases with key words such as 'global', 'global trends' and 'business trends' resulted in over 1.5 million possible articles. Consequently, rather than conducting an exhaustive review of the literature, which would have been impractical and of little additional value, we have followed the work of Bititci et. al (2012) who pinpoint the works of a few 'gurus' such as Drucker, Mintzberg, Porter and Prahalad as the basis living contemporary gurus. We started by identifying the most significant commentators, including both academic and non-academic authors of the global trends. To this end, we consulted sources such as the http://www.thinkers50.com and 'Who are the gurus' gurus?' and What's the Big Idea? (Davenport & Prusak, 2003; Prusak & Davenport, 2003). We gathered the most important messages from these thinkers and extrapolated these in the context of the quality management key events that emerging from the literature. This approach provided us with a picture of the global and business trends that most relevant from a quality management perspective.

4 Findings and Discussion from literature review

This finding of the literature review is presented with a particular emphasis on how the development of the quality field tracked or related in terms of focus, principles, systems, and tools and techniques. We have followed the Dale's framework (Dale, 1994) of principles, systems, and tools and techniques. In order to describe this quality field using this framework, definitions of the framework terms are stated for clarity.

According to Slack, et al., (2006) principles are "*the core ideas that describe how operations behave, how they can be managed, and how they can be improved. They are not immutable laws or prescriptions that indicate how operations should be managed, nor are they descriptions that simply explain or categorise issues*". In this research, the we defines principles as the core ideas or the fundamental ways of thinking in performing things.

Betz (1998, p. 39) defines the concept of a system as "*to look at a thing, an object, with a view to seeing it as a totality, displaying change, and encompassed in an environment*". Additionally, American Society for Quality - (ASQ, 2002, p. 8) define a system as "*a set of interrelated or interacting processes*". Consistent with this, the we have synthesised their definitions and proposes that a system is a set of interrelated or interacting processes with a view to seeing it as a totality, displaying change, and encompassed in an environment.

Borrowing the definition from American Society for Quality (2002), a tool is defined as "*a device used to help accomplish the purpose of a technique*". In line with this and the work of (Phaal, Farrukh, & Probert, 2004), we defines a tool as something that facilitates the practical application of a technique and a technique is a structured way of completing part of a procedure.

According to the literature, quality management evolution can be divided into five specific eras, which are: (1) Quality Inspection (QI), (2) Quality Control (QC), (3) Quality Assurance (QA), (4) Total Quality Control (TQC), and (5) Total Quality Management (TQM). It should be noted that the terms used here are based on the emerging focus throughout the evolution of quality management. Consequently, the focus is believed to drive the principles, systems, and tools and techniques in the development of each quality era. Based on the review presented in the previous section, allowed the the researchers to identify nine quality management principles, these are namely as; 1. Continuous quality improvement, 2. Conformance to standard, 3. Management understanding, 4. Customer orientation, 5. Quality leadership, 6. Involvement, 7. Quality supplier relationship, 8. Process management and 9. System Management. Each era will now be discussed according to the framework introduced earlier.

Quality Inspection (QI) Era

During this period, quality was associated with inspection (J. J. Dahlgaard et al., 2002; Garvin, 1988, p. 5). Accord-

ingly, "*at one time inspection was thought to be the only way of ensuring quality*" (Dale, 2003, p. 22). Further, Dale (2003) based on BS EN ISO 9000 – British Standards Institute (2000) defines quality inspection as the "*degree to which a set of inherent characteristics fulfils requirements*". It is clear this period was focused around products.

Principles of Quality Inspection

Along the path of Quality Inspection era, the primary principle of quality was stressed as sorting good from bad, with continuous quality improvement based on the corrective action basis. The idea was to commit solely to conformance to product standards. The management understanding during this time laid on specialisation of labour that means every worker has his own task. This principle can be traced back to when Henry Ford came introduced the implementation of task separation and mass production manufacturing. The leadership style at this time was about command. In fact, the management understanding towards quality was very shallow with the assumption that quality was a subordinate to cost, and customers were seen as a necessary evil, as evidenced by the infamous quotation, "*Any customer can have a car painted any colour that he wants so long as it is black*" (Batchelor, 1994) based on (Ford, 1922). Therefore, the consumers bought what was available as the economy was dominated by the producers.

Systems

It is fair to say that the Ford mass production system was the main comprehensive system around during the QI era. This system combined all elements of a manufacturing system, consisting of people, machines, tooling, infrastructure (factory) and products, which worked together in a continuous system for manufacturing the Model T automobile (Batchelor, 1994). Therefore, the production system could be considered as the formal system that emerged at this point of time.

Tools and techniques

Inspection technique and moving assembly line could be considered as the key tools and techniques in this period, as inspection was used to grade the finished product and a moving assembly line made it possible for producing products in great numbers.

Quality Control (QC) Era

Continuing from the quality inspection era, the next movement was about quality control (J. J. Dahlgaard et al., 2002; Dale, 2003; Garvin, 1988). As a consequence, previous work by quality gurus such as Fredrick W. Taylor, Walter Shewhart, G.S Radford, Deming and Ishikawa stressed inspection activities that are linked more formally to quality control. Indeed, product was still the key focus during this era (i.e. product focus).

Principles of Quality Control

In this Quality Control era, one of the main ideas in continuous quality improvement was the use of statistical tools to control process output. However, at this time, quality improvement was limited to corrective action (i.e. finding and fixing problems). In term of conformance to standard, the idea was solely about meeting quality standards (i.e. product standard). Clearly, the ideas during this time were still on specialisation of labour and the assumption that quality was secondary to cost. Yet slowly and gradually, systematic documentation and the review of product specifications, inspection procedures and responsibilities emerged and became the central ideas during the QC era.

In the principle of leadership, command and control were the centred idea during this era. The products produced were depended on what the producers supplied. As it was not based on market demands customers had no freedom to select. The product quality was based on the perspective of the producer without the customers involvement. Process management was still fragmented at this time. Dale (2003, p. 23) claims that, "*there was lack of creative and systematic work activity, with planning and improvements being neglected and defects being identified late in the process*". For instance, the principle of system management occurred and it was about the product. The emphasis of the system was about the understanding of the isolated cause and effects in product quality.

Systems

In this period, no new system emerged with the production system still dominating during this era.

Tools and techniques

Several tools and techniques such as Statistical Quality Control (SQC), inspection link to quality control, sampling Acceptable Quality Levels (AQL), Average Outgoing Quality Limit (AOQL) and Total Preventive Maintenance (TPM) emerged and made an impact during the QC era. It is clear that statistical analysis became so influential played a big part in the movement of quality control during this period.

Quality Assurance (QA) Era

According to Dale (2003, pp. 24-25) quality assurance is about a "*prevention-based system which improves product and service quality, and increases productivity by placing the emphasis on product, service and process design*". While (Ishikawa, 1985, p. 75) defines quality assurance as a means to "*assure quality in product so that a customer can buy it with confidence and use it for a long period with confidence and satisfaction*". Accordingly, in this era, the focus of quality management shifted from product to process.

Principles of Quality Assurance

The principle of continuous quality improvement during this time seemed to be rather systematic but fragmented

improvement, with the agenda of quality improvement shifting from corrective action to preventive action. Thus, the quality conformance had changed from product to process standards in the operational system. On top of that, from a management understanding view, emphasis was on multi-skilled labour and not only about specialisation of labour as in previous times. Hence, the management understanding brought the idea of systematic documentation and review of quality policies, procedures and responsibilities (e.g. Quality Management System). This was a proactive approach rather than the reactive approach in the QC era. By this time, the principle of customer orientation had evolved to understanding customers' requirements through capturing, documenting and reviewing them as part of the quality process. The changes in quality principles of leadership became more systematic, where leadership was driven by the quality system orientation (leadership in the system) with some elements of control (i.e. decision-making and rectifying problems). In spite of that, the quality principles of involvement and supplier relationships were slow to emerged. At this stage, controlled involvement and controlled partner relationships had occurred. For example, staff in the organisation could be involved in quality programs and activities but still under the control of management. The same case applied with supplier relationships.

In short, involvement and supplier relationships became the issues and key ideas in quality development. Looking at the principle of process management and system management the transition happened from fragmented to integrated process control in the quality process; as there was recognition of quality as a process in itself. While system management underline the understanding of simple causes and effects in the process and discrete proven process (the quality system and practices were likely to have met as a minimum requirement). This suggests that the principle of the system management was not fully applied until the adoption of a systems approach during the Quality Assurance era.

Systems

Quality Assurance era could be considered as the focal point for the formal development of quality management systems. For example, the Deming Model was the comprehensive measurement system of quality standards developed during this time in 1951. The release of British Standard (BS) 5750 and International Standard Organisation (ISO) 9000 series were the formal quality systems that made a mark during this time. In line with this, Total Preventive Maintenance (TPM), which was primary focused on techniques for maintenance of assets (i.e. product and machine maintenance), evolved to Total Productive Maintenance (TPM) that focuses on productivity of entire system (including man, machine, method etc). This means that the Preventive Maintenance, which was very much process focused, became system focused by moving to Total Productive Maintenance (i.e. shifting to system focus).

Tools and techniques

During this era, the revolution of tools and techniques rapidly occurred. Plan-Do-Check-Act (PDCA) was extended to become Plan-Do-Study-Act (PDSA). Further, Cause and Effect Diagram, Failure Mode and Effect Analysis (FMEA), Reliability Engineering, Statistical Process Control (SPC), Kaizen, Kanban, Jidoka and Just-In-Time (JIT) were among the tools and techniques that emerged at this era.

Total Quality Control (TQC) Era

Total Quality Control era reflected the development of quality systems orientation in the context of quality management development. In some cases, there was an overlap in the context and application of tools and techniques, as this was the time when the focus of quality management shifted from process to systems. Ideally, the boundaries of quality had extended to a bigger scope, which completely covered the entire process embedded in the system. As noted by Feigenbaum (1961), "*total quality control is an effective system for integrating the quality development, quality maintenance and quality improvement efforts of the various groups in an organisation so as to enable marketing, engineering, production and service at the most economical levels which allow for full customer satisfaction*".

Principles of Total Quality Control

The changes in the principles of continuous quality improvement can be seen as it became much more systematic and manageable. We would describe this as systematic managed continuous improvement. Accordingly, the line of thinking improved with managed prevention and improvement. In terms of conformance to standard, it was about conformance to a systematic improvement standard which was managed by a team (i.e. Quality Control Circle and Problem Solving Group). As such, the management understanding evolved with the understanding of the need of multi-skilled and cross-functional teams working to improve quality on a daily basis. Team working became central to ensuring quality. This understanding included managing systematic use of tools and techniques, and facilitating objective and structured management. Occasionally, this was the time where quality was perceived as a project driven journey. On top of that, the idea of customer orientation transformed to customer satisfaction by fulfilling and exceeding customers' requirements. The principle of leadership changed to be more participatory where the leaders (i.e. top management) encouraged all staff to take responsibility for quality and managed the involvement of workers (e.g. Quality Control Circle and Kaizen activities). At this time, the issues of managing involvement and partnership relationships emerged in a quality context. Further, process management evolved and became more systematic, while system management dealing with the

understanding of complex causality in the operational processes.

Systems

The changing from quality assurance to total quality control era includes changes in quality systems deployment. The systems that emerged in this period were Toyota Production System (TPS), ISO 9000 revision 1992, Ford Q1 System, QS 9000, ISO 14000, OHSAS 18000 and TickIT. This reflected the progression of new standards in TQC era. In short, quality standards became the most dominant systems at this point.

Tools and techniques

Several tools and techniques that made the headlines during this time were Quality Loss Function, Quality Functional Deployment (QFD), Poka Yoke, Quality Control Circle (QCC), 7 Quality Tools (i.e. Pareto Analysis; Fish Bone Diagram; Stratification; Check sheet; Histogram; Scatter Diagram and Control Chart), Benchmarking, Lean tools and techniques, and Single Minute Exchange of Die (SMED).

Total Quality Management (TQM) Era

Total quality management is about the cooperation of everyone in an organisation and associated business processes to produce value-for-money products and services, which meet and exceed the needs and expectations of customers (Dale, 2003). In TQM era, the quality focus is not solely about the systems but includes people, so the focus is about people in the organisation (i.e. People focus) striving towards business excellence.

Over time, the development of TQM era is still focused on people with an extended view towards global collaborative networks. This period can be seen as the focus shifting to networks focus. It is heavily about managing/leading networks, people with multiple networks and networks of networks (Tao et al., 2011).

Today, aligning with the era of digitization, TQM is integrating with the Industrial Revolution 4.0 in which involved with the technology advances in several areas that together enable innovation, new insights, connectivity between people, and connectivity between people and machines (Jacob, 2017). It is becoming clear that the quality focus now has a further extended view from network-focus to a smart-focus.

Principles of Total Quality Management

In TQM era, the evolving principles of quality are centred on the people. For instance, the quality principle of continuous improvement has evolved to become more systematic and habitual. This means that improvement is not only about managing and rectifying mistakes or problems, but becomes habitual for prevention and improvement.

During this era, conformance to standard is about conformance to systematic improvement standard, which has become habitual for the workers. From the perspective of management understanding, the transformation of ideas happened, where multi skilled cross-functional teams and the use of tools and techniques for facilitating objective and structured management have become the norm among the employees. Along with this, the principle of customer orientation transformed from customer satisfaction orientation to customer delight (i.e. exceeding customer expectation) mainly in service dominant culture, which is about adding value to customers, business, life etc. The principle style of quality leadership centred on coherent leadership with excellence mindset. Leadership goes beyond participation to a mindset of excellence. In terms of involvement, it has extended to a bigger scope, encompassing all levels and the habitual involvement of suppliers and partner in continuous quality improvement activities. By this time, process management has evolved where processes are managed as an integrated system, and system management has evolved to become a complex system, concerning the understanding of causalities in business processes including operational, managerial, support and human factors.

Systems

During this time, the quality systems that emerged and impacted on the quality management field was the Malcolm Baldrige Model, Investors in People (IIP), EFQM Excellence Model, ISO 9001 revision 2000 and 2015, Lean concept (i.e. Lean Manufacturing), ISO 14001 revision 2015, ISO/TS 16949 standards for automotives and ISO 31000 revision 2009 and 2018.

Tools and techniques

The tools and techniques that make a mark during this time include Design of Experiments (DOE), 5S (i.e. Seiri, Seiso, Seiko, Seiketsu and Shisuke) and Six Sigma.

In summary, borrowing from the work of, (Slack et al., 2006, p. 376):

"*Quality was achieved by inspection – screening out defects before customers noticed them. Then the 'quality control' (QC) concept developed a more systematic approach to not only detecting but also solving quality problems. 'Quality assurance' (QA) widened the responsibility for quality to include functions other than direct operations, such as Human Resources, Accounting and Marketing. It also made increasing use of more sophisticated statistical quality techniques. TQM included much of what went before but developed its own distinctive themes, especially in its adoption of a more 'all-embracing' approach*".

Table 2 provides the brief summary of this evolution of quality management field organised into the focus, principles, systems, and tools and techniques framework. It should be noted that the table should be read not in a very detailed fashion, but what is more important is that the reader need to get the big picture of this table. The table is obviously an oversimplification of the reality. However,

it is actually done on purpose. It is impossible to capture the richness of the real world, let alone hundred years of evolution of the quality management field, and it is impossible to have everyone agree about the details, as different experts will have different perspectives.

Table 2: The origins and the evolution of quality management from Quality Inspection (QI) to Total Quality Management (TQM)

Dimension	Quality Inspection (QI)	Quality Control (QC)	Quality Assurance (QA)	Total Quality Control (TQC)	Total Quality Management (Business Excellent, Networks and Smart Environment)
Approximate Timings	1900s ~ 1920s	1920s ~ 1950s	1950s ~ 1980s	1960s ~ 1990s	1980s ~ present
Key References	Garvin (1988, p. 5); Foster (2001, p. 44) - Fredrick W. Taylor Batchelor (1994, p. 22); Womack, Jones, & Roos (1990, p. 26) - Henry Ford Garvin (1988, p. 5) - G.S Radford	ASQ (2002, p. 29) - Walter Shewhart ASQ (2002, p. 20) - Deming Garvin (1988, p. 9) - Bell Laboratories Dahlgaard, et al., (2002, p. 90) - Ishikawa Nakajima (1988); Richardson (1997) - Total Preventive Maintenance	Bound, Yorks, Adam & Ranney (1994, p. 58); Gower (1990, p. 193) - Failure Mode Effect Analysis (FMEA) Garvin (1988), Martinez-Lorente, Dewhurst & Dale (1998) and Bank (2000) - Statistical Process Control (SPC) Nakajima (1988) and Richardson (1997) - Total Productive Maintenance (TPM) Imai (1986); Dahlgaard, et al., (2002, p. 306) – Kaizen Gower (1990, p. 453) and Louis (1997, p. 21) – Kanban Dahlgaard, et al., (2002) – Jidoka	Feigenbaum (1961) - Total Quality Control Garvin (1988, pp. 189,198) - Genba-To-QC Ishikawa (1985); Bank (2000); ASQ (2002, p. 4) - Ishikawa Womack, et al., (1990)) - Toyota Production System (TPS) ASQ (2002) - Taguchi and Quality Loss Function Garvin (1988, p. 198); Bank (2000); Zairi (1994, p. 43) - Quality Functional Deployment (QFD) Nikkan Kongyo Shimbun (1988) – Poka Yoke	Foster (2001) - Total Quality Management Philosophy Foster (2001, p. 49) - Genichi Taguchi and DOE Imai (1986) – 5S Crosby (1984) – 14 Points ASQ (2002); Bank (2000) - Malcolm Baldrige National Quality Award Womack, et al., (1990) - Toyota and Lean Manufacturing Eckes (2005, p. 12) - Motorola & GE and Six Sigma Mason (1997, p. 1) - National Training Task Force and Investors In People

Table 2: The origins and the evolution of quality management from Quality Inspection (QI) to Total Quality Management (TQM) (continued)

			Gower (1990) - Taiichi Ohno and Just-In-Time (JIT) Garvin (1988, p. 198); Foster (2001, p. 36); Dahlgaard, et al., (2002, p. 23) - Union of Japanese Scientists and Engineers (JUSE) and Deming Prize Garvin (1988, p. 12); Bank (2000); ASQ (2002, p. 22); Juran (1951) - Juran Quality Control Handbook Bank (2000); www.bsigroup.com - British Standards Institute (BSI) ASQ (2002, pp. 4,30,32); (Bank, 2000); www.iso.org - International Standard for Organisation, Geneva	Shingo (1985) - Single Minute Exchange Die (SMED) Crosby (1979) - Crosby Zero Defects and "The Absolutes" Bank (2000) - Xerox Corporation and Benchmarking Womack, et al., (1990, p. 159) - Ford system Q1 Stamatis (1996, p. 76) - Daimler-Chrysler, Ford & General Motor and Quality System (QS 9000) International Standard for Organisation; Morris (2004) - ISO 14000 International Standard for Organisation - ISO 18000 DISC TickIT (1992) – TickIT	Dahlgaard, et al., (2002, p. 23) – EFQM, Business Excellence Model International Standard for Organisation; BSI (2000) - ISO 9001 Revision (2000) IATF (2002) - ISO/TS 16949 Castka and Balzarova (2008) - ISO 26000 International Standard for Organisation (2009) - ISO 31000 (Risk Management) (Bititci et al., 2008; Grant, 2008; Hamel, 2007; Tao et al., 2013; Tao et al., 2011) - Global Collaborative Networks (Network Environment) (Foidl & Felderer, 2015; Roblek et al., 2016) - Industrial Revolution (IR 4.0) for Quality Management (Albers et al., 2016; Jacob, 2017; Lee et al., 2014; Vijaykumar et al., 2015) - Smart Environment for Quality Management
Focus	Product	Product	Process	System	People in Organisation People in Network (Network – focus) People in Smart Environment (Smart-focus)

Table 2: The origins and the evolution of quality management from Quality Inspection (QI) to Total Quality Management (TQM) (continued)

Principles:	Sorting good from bad	Use of statistical tools to control process output	Systematic but fragmented improvement	Systematic managed continuous improvement	Systematic and habitual continuous improvement
Principle 1 Continuous Improvement	Corrective Action	Corrective Action	Preventive Action	Managed prevention and improvement	Habitual prevention and improvement
Principle 2 Conformance to Standard	Conformance to product standard	Conformance to product standard	Conformance to process standard in the operational system	Conformance to systematic improvement standard (Managed)	Conformance to systematic improvement standard (Habitual)
Principle 3 Management Understanding	Specialisation of labour	Specialisation of labour	Multi-skilled labour	Multi-skilled and cross-functional teams (Managed)	Multi-skilled cross- functional teams (Habitual)
	Quality subordinate to cost	Quality subordinate to cost	-	-	-
	-	Systematic documentation and review of product specifications and inspection procedures and responsibilities	Systematic documentation and review of quality policies, procedures and responsibilities (e.g., Quality Management System)	Managed systematic use of tools and techniques facilitating objective/structured management	Habitual use of tools and techniques facilitating objective/structured management
Principle 4 Customer Orientation	Customer is a necessary evil	Customer has no choice	Understanding customers requirements through capturing, documentation and review of customer requirements	Customer satisfaction by fulfilling and exceeding customers requirements	Customer delight in service dominant culture adding value to customers, business, life etc.
Principle 5 Leadership	Command	Command and control	Systems and control	Participatory	Coherent leadership with excellence mindset
Principle 6 Involvement	No involvement	No involvement	Controlled involvement	Managed involvement	Habitual involvement at all level
Principle 7 Supplier Relationships	Adversarial arm's length (i.e. no relationship)	Adversarial arm's length (i.e. no relationship)	Controlled partner relationships	Managed partner relationships	Habitual involvement of partner in continuous improvement activities
Principle 8 Process Management	No recognition of the process	Fragmented	Integrated process control	Systematic process management	Processes are managed as an integrated system

Table 2: The origins and the evolution of quality management from Quality Inspection (QI) to Total Quality Management (TQM) (continued)

Principle 9 **System Management**	No system thinking or understanding	Understanding isolated cause and effects in product quality Product	Understanding simple causes and effects in the process Discrete proven process	Understanding complex causality in the operational processes Operational processes	Understanding complex system causalities of business processes including operational, managerial, support and human factors Complex system causalities
Systems	Mass Production System	Mass Production System	Deming Model BS 5750 Quality Management series ISO 9000 Standards Total Productive Maintenance (TPM)	Toyota Production System (TPS) ISO 9000:1992 Ford Q1 System QS 9000 ISO 14000 ISO 18000 TickIT	Malcolm Baldrige Model Investors In People EFQM Excellence Model ISO 9001:2000; 2015 Lean concept ISO/TS 16949 ISO 14001:2015 ISO 31000: 2009; 2018
Tools & Techniques	Inspection Moving assembly line	Statistical Quality Control (SQC) Inspection link to quality control Sampling Acceptable Quality Levels (AQL) Average Outgoing Quality Limit (AOQL) Total Preventive Maintenance	Plan-Do-Check-Act (PDCA) Extend PDCA to become Plan-Do-Study-Act (PDSA) Cause and Effect Diagram Failure Mode Effect Analysis (FMEA) Reliability Engineering Statistical Process Control (SPC) Kaizen Kanban Jidoka Just-In-Time (JIT)	Quality Loss Function Quality Functional Deployment (QFD) Poka Yoke Quality Control Circle (QCC) 7 Quality Tools (Pareto Analysis, Fish Bone Diagram, Stratification, Check Sheet, Histogram, Scatter Diagram, Control Chart) Benchmarking Lean tools and techniques Single Minute Exchange of Die (SMED)	Design of Experiments (DOE) 5S Six Sigma

5 Research challenges in quality management

Implications of the research

As a result of this research, the managerial implications for future work are as follows:

Investigating a single organisation is futile, since the organisation will form part of a network. For example, there is less value for future research in continuous improvement based solely in a single company because in the future, it is about the improvement that comes from the network. The interactions and relationships throughout the network should be considered (i.e. internal and external ideas/innovation).

Further, future research should not only focus on a specific issue (e.g. continuous improvement for product design) and neglect to other issues/factors around it. It should consider the entire system. This means that the future researcher needs to understand the whole picture of the process internally and externally, as the future is not only about managing a specific problem in a single company, but what matters is how companies managing and dealing the wide resources of improvements and innovation across the networks with the architectural of participation and collaboration that come from all over the world (i.e. high involvement of communities of practice).

The fact that the future will be more about network, key quality principles such as; continuous improvement, standards, leadership and partnerships in the future will be managed in a network context (i.e. open source, open innovation, "smart" environment). For example, Sony has moved from lean production to open source, where Sony Corporation and Google Inc. announced an alliance to provide a range of new and rich entertainment experiences that combine Google's open-source Android OS platform with Sony's expertise in technology and product design. The two companies are exploring the joint development of compelling new Android-based hardware products for the home, mobile and personal product categories and are also exploring extending the alliance in connection with Sony's wide range of entertainment assets to establish new forms of cloud-based user experiences (Perakakis, 2017). Through this alliance, Sony aims to leverage the stability, future growth potential and open-source accessibility of Google's Android platform to further optimise its product development processes while also providing consumers with an open, expansive and evolving user experience (See also Sony Official website at: https://www.sony.com).This raises some interesting questions as follows:

- Do the collaboration and partnerships in the networks are equally and fairly beneficial for both parties? Are they willing to share their expertise (core competencies) with each other? Can this collaboration be extended to form partnerships with others in the network?
- Are they developing the standards? If not why? What is the impact of this?
- Are they managing continuous improvement across the network? How do they manage it?
- Do they recognise leadership across the network and not just from one company? How do they manage it?

All of the above discussion suggest that the collaborators/partners need to think about how to manage the standards comprising of open technologies standards, codes of practice and standard for control, and to deal with the issues of managing leadership, continuous improvement and partnerships; internally and externally.

Limitation of the Research

The quality management field has been studied for more than 100 years dating back to the early 1900s when Fredrick W. Taylor is known as the father of Scientific Management, stressed the importance of quality inspection. First, even though a variety of journals and several renowned books in the field of quality management were considered in this study, it may happen that this topic (i.e. Evolution of Quality Management) had also been covered in other journals and conferences. Additionally, there might be studies that we missed, because they investigate similar phenomena but discuss it with different terms.

However, as we have mentioned earlier the focus of the review was to identify the extant literature rather than reviewing and discussing all relevant contributions, as many contributions built upon each other (See Ahire et al. (1995), Martinez et al. (1998), Sousa & Voss (2002), Schroeder et al. (2005) and Dahlgaard-Park, S.M. (1999, 2011). In conducting the review, our objective was to describe how quality management field has developed and evolved to date, particularly by tracking its focus over time.

Thus, we specifically looked for the key events and research question that were being addressed rather than identifying specific solutions, models and frameworks.

6 Concluding remarks

This article has attempted to reflect on the history of quality management through chronology of its establishment over time. The key aim of this research is to describe how quality management field has developed and evolved to date, particularly by tracking its focus over time. We start the research with the question of; How quality management field has developed and evolved to date, particularly by tracking its focus over time?

In so doing, we have identified that quality management literature have evolved through time with their fundamental focus evolving, and as they evolved, the principles, systems, tools and techniques have changed.

This witnessed by the findings from the literature revealing that in the early evolution of quality management, this period was focused around products (i.e. How can we ensure quality in a product?). Then, in the later period of time, the focus of quality management has moved from product to *process* (i.e. *How can we ensure quality in the process?*). Following from there, the focus of quality management shifting to system focus (i.e. *How can we ensure quality in the system?*). Slowly but gradually, by the later period of time, there seems to be more attention given to people with the system (people spin), in the development of quality journey. So, the focus in this period was about people in an organisation - *people focus* (i.e. *How can we ensure quality in people?*).

Today's the current development of quality management is focused on people with an extended view towards *networks focus* (i.e. *How can we ensure quality in people in the network environment?*) and the most recent is the *smart focus* (i.e. *How can we ensure quality in people in the smart environment?*). Therefore, we would say that as the focus has changed, the principles have also changed and as the principles have changed, the systems, tools and techniques also have changed in quality management field.

This observation is consistent with Dale (1994) and several authors' works such as (Besterfield et al., 2003; Hellsten & Klefsjo, 2000; Mahadevan, 2010; Mukherjee & Kachwala, 2009) that organise their subject of study using the approach of 'principles, systems, and tools and techniques'. As a result of this study, we can confirm that there are emerging patterns and trends on how things have developed and evolved around the fundamental 'focus, principles, systems, and tools and techniques', in relation to the evolution of quality management. In summary, this research suggests that one can study the evolution of this field by looking at how the 'focus, principles, systems, and tools and techniques' have evolved over time.

t this will further increase their job satisfaction.

It is very important for practitioners to understand how important satisfaction with work itself is within the context of job satisfaction of employees. With the amount of time we are spending at work it is no doubt that any manager needs to use all the knowledge he or she has to help increase the job satisfaction of employees, this being even more important in service oriented industries.

Further research that we propose is to investigate job satisfaction among "employees" that manage their own apartments through platforms such as AirBnb, and we have to understand that jobs themselves are changing, Turnšek and Ladkin (2017) did extensive work on Airbnb that has hit the hotel sector hard in recent years, and noted that job satisfaction within the sharing economy, or platform economy, has a completely different position, that is why we propose this as an interesting area to conduct research in.

We have to understand that, not even the best managers can be overseeing how their employees treat their customers all the time. Thus, it is even more important that they can rely on their employees to provide the experience of hospitality for customers at every step of the way, since, as is seen by Rangus and Brumen (2016), the importance of tourism is, after all, visible in its huge impact on the local, national and global economies.

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Razvoj vodenja kakovosti in izzivi za jutri

Ozadje in namen: Področje upravljanja kakovosti so proučevali že pred več kot 100 leti. V zgodnjih 1900-ih je Fredrick W. Taylor, znan kot oče znanstvenega menedžmenta, poudaril pomen inšpekcijskega nadzora kakovosti. V tem prispevku je prikazano, kako se je področje upravljanja kakovosti razvilo in razvijalo do danes, s poudarkom na njegovi osredotočenosti skozi čas.
Oblikovanje / metodologija / pristop: V raziskavi je bil prilagojen sistematičen pristop k pregledu literature. Če prepoznajo guruje in eminentne znanstvenike na izbranem področju, lahko raziskovalci ovrednotijo svoja dela, ki so objavljena predvsem v obliki knjig in člankov v revijah. Proces presoje literature, ki smo ga uporabili, vključuje splošno upravljanje kakovosti, pa tudi „razvoj vodenja kakovosti“ in tako ponazarja, kako se je sčasoma razvijalo področje vodenja kakovosti.
Rezultati: Z razvojem literature o vodenju kakovosti so se načela, sistemi, orodja in tehnike vodenja kakovosti intenzivno spreminjali. Članek predstavi sintezo literature o vodenju kakovosti skozi čas glede na ključni poudarek in daje novo perspektivo za nadaljnje raziskave.
Zaključki: Zgodovinski pregled omogoča raziskovalcem, da sčasoma določijo vzorec kakovosti - „osredotočenost, načela, sisteme ter orodja in tehnike“. Naša opažanja so potrdila, da so se s poudarkom na spremembi spreminjala tudi načela; ker so se načela spreminjala, so se spreminjali tudi sistemi, orodja in tehnike na področju upravljanja kakovosti.

Ključne besede: upravljanje kakovosti; osredotočenost; načela; sistemi; ter orodja in tehnike.

Appendix

Table 1 below summarises the quality management literature over time. It should be noted that the 'key events' in Table 1 indicates the important events in Quality Management field over time that considered been seen as were giving a larger scale of impact to the quality management in general.

Table 1: Important events in the quality management movement

Key Focus	App. Time	Key Events	Key References
How can we ensure quality in product?	1900	**Fredrick W. Taylor** calls as the father of Scientific Management stressed on inspection activities	Garvin (1988); Foster (2001)
	1910s	**Henry Ford** came out with Model T (became the Ford car) and introduced of moving assembly line which lead to mass production concept (quality interchangeability)	Batchelor (1994); Womack, et al., (1990)
	1920s	**Walter Shewhart** of Bell Laboratories developed a system for measuring variance in production system, known as statistical process control. Shewhart also created the Plan-Do-Check-Act (PDCA) cycle, which applies a systematic approach to improving work processes	Garvin (1988)
	1922	Inspection activities were linked more formally to quality control with the publication of **G.S Radford's** The Control of Quality in Manufacturing. Quality was viewed as a distinct management responsibility and as an independent function	Garvin (1988)
	1924	**Walter Shewhart** of Bell Laboratories developed **Statistical Process Control** (SPC)	American Society for Quality (2002)
	1926	**The Bell Telephone** began to apply statistical control methods	Martinez-Lorente, Dewhurst and Dale (1998)
	1931	Shewhart has published **Economic Control of Quality of Manufactured Product**, giving the discipline a scientific footing for the first time. Shewhart gave a precise and measurable definition of manufacturing control, developed powerful techniques for monitoring and evaluating day-to-day production, and suggested a variety of ways of improving quality	Garvin (1988); American Society for Quality (2002)
	1938	Deming published a technical book and taught courses in the use of his statistical methods	American Society for Quality (2002)
	1939	Shewhart wrote Statistical Method from the viewpoint of Quality Control Shewhart's idea for the Plan-Do-Check-Act cycle was used extensively by Deming and others to help manage quality improvement projects	American Society for Quality (2002) Garvin (1988); American Society for Quality (2002)

Table 1: Important events in the quality management movement (continued)

	1940	A committee was formed in December by the American war department to draft standards in the area quality	Garvin (1988)
	1942	A quality control section was established in the war department staff mainly by statisticians from Bell Laboratories. This group developed a new set of sampling, tables based on the concept of acceptable quality levels (AQL)	Garvin (1988)
	1943	Ishikawa invented Fish-Bone diagram which bears his name as **Ishikawa Diagram** as management problem solving tools	Dahlgaard, et al., (2002)
	Mid-1940s	The American army pushed the use of sampling methods during World War II	Martinez-Lorente, Dewhurst and Dale (1998)
	1946	Japanese Industrial Standards Committee is established. Union of Japanese Scientists and Engineers **(JUSE)** is established Deming involved with the Union of Scientists Engineer (JUSE) after its formation	Garvin (1988) American Society for Quality (2002); Foster (2001)
How can we ensure quality in process?	1950	First visit of Deming to Japan. Deming give a talk and taught Japanese's leaders about statistical quality control techniques (SQC) **JUSE** publishes the magazine Statistical Quality Control. Japanese Industrial Standards are established under the Industrial Standardization Law	Garvin (1988); Foster (2001); Bank (2000); Martinez-Lorente, Dewhurst and Dale (1998)
	1950s	**Failure Mode Effect Analysis (FMEA)** developed by US military after the Korean war. **Reliability engineering** developed by American Department of Defence which formed an Ad Hoc Group on Reliability of Electronic Equipment The basis of the **kaizen** revolution in Japan that took place in the 1950s along with the used of **Kanban, Jidoka** and **Just in Time (JIT)** together to continually improves production processes Taiichi Ohno, who is generally recognised as the 'father of JIT' due to his pioneering work at Toyota in the 1950s and 1960s. Preventive maintenance was introduced in the 1950s where in Japan Total Productive Maintenance (TPM) is called Preventive Maintenance	Bounds, Yorks, Adams and Ramney (1994); Gower (1990) Richardson (1997); Gower (1990); Louis (1997); Dahlgaard, et al., (2002) Nakajima (1988); Richardson (1997)

Table 1: Important events in the quality management movement (continued)

	1951	**Deming Prize** is established in Japan Juran published his first edition of **Quality Control Handbook**	Garvin (1988); Foster (2001); Dahlgaard, et al., (2002) Garvin (1988); Bank (2000); American Society for Quality (2002)
	1954	First visit of Juran to Japan	Garvin (1988); American Society for Quality (2002)
	1956	Armand Feigenbaum introduced total a principe called **Total Quality Control** (TQC) which underlying principles to provide genuine effectiveness control must start with the design of the product and end only when the product has been placed in the hand of the customer who remain satisfied	Garvin (1988); Feigenbaum (1961)
How can we ensure quality in system?	Early 1960s	Ishikawa is best known as a pioneer of the "**quality circle**" movement in Japan	American Society for Quality (2002)
	1960s	Crosby invented the concept of **Zero Defects** Goals in the1960s. Crosby lists for new essentials of quality management which he calls "**The Absolutes**"	Crosby (1979); Garvin (1988); American Society for Quality (2002); Bank (2000)
	1961	First edition of **Feigenbaum's Total Quality Control**	Martinez-Lorente, Dewhurst and Dale (1998)
	1962	Ishikawa's quality circles where first piloted at Nippon Telegraph and cable company. Published a book named **What Is Total Quality Control** The idea of quality circles appeared in the first issue of the Japanese journal Quality Control for the Foreman (Genba-To-QC)	Bank (2000); American Society for Quality (2002) Garvin (1988)
	1968	Ishikawa produced a non-technical quality analysis textbook for quality circle members Most large Japanese companies had adopted what Ishikawa called **Companywide Quality Control** (CWQC) in Japan to produce world-class quality products	American Society for Quality (2002) Garvin (1988); American Society for Quality (2002)
	Early 1970s	Taguchi developed the concept of the **Quality Loss Function**. The method provides an efficient technique to design product tests prior to entering the manufacturing phase	American Society for Quality (2002)

Table 1: Important events in the quality management movement (continued)

	1970s	The established of **Toyota Production System (TPS)** with the key elements are Just-In-Time (JIT), Jidoka, Standardised Work and Kaizen	Womack, et al., (1990)
	1972	**Quality Function Deployment** was first practiced at Kobe Shipyard, Mitsubishi Heavy Industries, Ltd.	Garvin (1988); Bank (2000); Zairi (1994)
	1973	After the 1973 oil crisis, the JIT system was adopted by a vast number of Japanese companies. A small number of American and European companies began to apply this system in the 1980s	Martinez-Lorente, Dewhurst and Dale (1998)
	Mid-1970s	Quality circles began to be widely introduced in the USA, the first quality circle programme was launched in Lockheed in 1974 and in the UK it was Rolls-Royce which introduced the concept in 1979	Martinez-Lorente, Dewhurst and Dale (1998)
	1979	First edition of Crosby's Quality Is Free Xerox Corp. started to apply the benchmarking concept to processes Publication of the BS 5750 quality management series	Crosby (1979); American Society for Quality (2002) Bank (2000) Bank (2000); Hill, et al., (1996); Callan (1992)
	1980	The Taguchi method design of experiments **(DOE)** was first introduced by Dr. Genichi Taguchi to AT&T Bell Laboratories	Foster (2001)
	1980s	The establishment of **Total Quality Management (TQM)** which is a management approach that originated in the 1950s	Foster (2001)
	1982	First edition of Deming's Quality, Productivity and Competitive Position	Martinez-Lorente, Dewhurst and Dale (1998)
How can we ensure quality in people?	1984	Crosby published his second bestseller "Quality Without Tears"	Crosby (1984); Foster (2001)
	Mid-1980s	**Ford** started a systematic supplier grading system, called **Q1**	Womack, et al., (1990)
	1986	First edition of Deming's Out of the Crisis. It became a bestseller	American Society for Quality (2002)
	1987	First edition of **ISO 9000** quality management system series Publication of the **Malcolm Baldrige National Quality Award** **BS 5750** revised in 1987	American Society for Quality (2002); Bank (2000) Bank (2000); Dahlgaard, et al., (2002)

Table 1: Important events in the quality management movement (continued)

	1990s	**Xerox** introduced leadership through quality as a vehicle for change. **Six Sigma** was developed at Motorola. Lean Manufacturing derives from the Toyota Production System or Just in Time Production. The "lean manufacturing" concept was popularized in American factories in large part by the Massachusetts Institute of Technology study of the movement from mass production toward production as described in **The Machine That Changed the World: The Story Of Lean Production.**	Garvin (1988) Eckes (2005, p. 12) Womack, et al., (1990)
	1991	National Training Task Force introduced **Investors in People (IIP)** in October 1991	Mason (1997)
	1992	The **EFQM Excellence Model** was introduced at the beginning of 1992 as the framework for assessing organisations for the European Quality Award	Dahlgaard, et al., (2002)
	1994	**QS 9000** is developed by Daimler-Chrysler, Ford & General Motor where it is based on ISO 9001: 1994. The system became effective on September 1, 1994	Stamis (1996)
How can we ensure quality in people in the network environment?	1996	First edition of **ISO 14000** environmental management series First edition of **OHSAS 18000** - occupational health and safety management series, which derived from the British Standard BS8800:1996	International Organisation for Standardisation at www.iso.org; Moris (2004) International Occupational Health and Safety Management at www.ohsas-18001-occupational-health-and-safety.com; British Standards Institute at www.bsigroup.com
	1998	**QS 9000** reissued in March 1998	Stamatis (1996)
	Early 2000	**TickIT** originally set up by UK Department of Trade and Industry and administered by British Standards Institution (BSI), which applies to all types of information system supply, which involve software development processes	TickIT (1992)
	2000	**The 2000 edition** of the **ISO 9000** was established	American Society for Quality (2002)
	2002	**International Automotive Task Force (IATF)** - automakers General Motor, Chrysler and Ford developed ISO/TS 16949:2002	International Automotive Task Force (IATF) (2002)

Table 1: Important events in the quality management movement (continued)

	2007	**Global Collaborative Networks** - to deliver innovative value propositions to global markets and customers	Hamel 2007
	2010	**ISO 26000** standard for Social Responsibility	Castka and Balzarova (2008)
	2010	**Collaboration** sony and google corporation - Sony and Google Establish Strategic Alliance to Deliver Compelling New Cloud-based Products and Services with the Android Platform	Kenney and Pon (2011)
	2011	**ISO 50001:2011 Energy management** Supports organizations in all sectors to use energy more efficiently, through the development of an energy management system (EnMS)	Official International Organization for Standardization website https://www.iso.org/home.html
	2014	**ISO 50002:2014 Energy audits --** Requirements with guidance for use Specifies the process requirements for carrying out an energy audit in relation to energy performance. It is applicable to all types of establishments and organizations, and all forms of energy and energy use	
	2015	**ISO 9001:2015 Quality Management System** This standard is based on a number of quality management principles, including a strong customer focus, the motivation and implication of top management, the process approach and continual improvement **ISO 14001:2015 Environmental Management Systems** Specifies the requirements for an environmental management system that an organization can use to enhance its environmental performance	

Table 1: Important events in the quality management movement (continued)

	2016	**ISO 13485:2016 Medical devices – Quality management systems** Internationally agreed standard that sets out the requirements for a quality management system specific to the medical device industry. It has recently been revised, with the new version published in March 2016 **ISO 37001:2016 Anti-bribery management systems** Specifies requirements and provides guidance for establishing, implementing, maintaining, reviewing and improving an anti-bribery management system	
	2017 to Present	**The Emerging of Quality 4.0** The digitalisation of quality management on quality technology, processes and people	Jacob (2017)

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Mediating Role of Dynamic Capabilities on the Relationship between Human Resource Development and Organizational Effectiveness

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Background and purpose: The recent literature established that human resource development (HRD) is significantly related to organizational effectiveness (OE). In rapidly changing environments, the organizations should strive to address the shifts in the environment and cope with markets conditions through developing dynamic capabilities, in return, enhance organizational effectiveness. The main purpose of this study is to examine the mediating role of dynamic capabilities on the relationship between human resources development and organizational effectiveness in the Iraqi public universities context.
Design/Methodology/Approach: Data were collected through an online questionnaire survey from 215 employees executive and non-executive employees working in the selected public universities in Iraq. Structural equation modeling (SEM) was employed to test the proposed research model.
Results: The analyzed data supported all the hypothesized relationships of the study. This study finds that HRD practices have a significant influence on organizational effectiveness and dynamic capabilities. Further, dynamic capabilities significantly influence on organizational effectiveness. Also, the study empirically supports the mediating effect of dynamic capabilities on the relationship between HRD practices and organizational effectiveness.
Conclusion: In the literature, there is still a lack of how HRD practices impact on organizational effectiveness through the mechanisms of dynamic capabilities. Therefore, this research contributes to the literature by pointing out the mediating role of dynamic capabilities on the relationship between HRD and organizational effectiveness. Based on the existing literature and empirical results, the study provides the theoretical and practical implications which are further discussed in detail.

Keywords: *Human resource development, Dynamic capabilities, Organizational effectiveness*

1 Introduction

Business environments today, characterized by knowledge-based competition and rapidly changing markets, require organizations use effective strategies to invest and maximize knowledge and skills. Organizations continually attempt to leverage human resource to achieve organizational success. The concept of human resource development (HRD) has emerged as a strategy to develop and improve employee's knowledge, skills, and abilities to enhance organizational effectiveness (Gberevbie, 2012). Developing HRD practices have the potential to improve organizational performance. Some empirical researches have proved that such as (Brockbank, 1999; Garavan, 2007; Clardy, 2008 and Han et al., 2006) emphasis that

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HRD as a set of responsibilities, competencies, practices, programs, initiatives that have a potential influence on organizational effectiveness. Also, Several researchers (McCracken & Wallace.2000; Otoo et al. 2018; Shoo 2016; Alagaraja & et al. 2015; and Nilsson & Ellstrom 2012) established that there is a significant relationship between human resource development and organizational effectiveness. Nevertheless, in rapidly changing environments it is compulsory that organizations are prepared for change and have the human capital to meet and cope with the environmental turbulence. HRD plays a key role to maintain and develop human resources in accordance with the changing direction of corporate goals and objectives (Shanahan et al. 2012). Hence, in such an environment, superior organizational effectiveness based on organizations ability to integrate, build and reconfigure internal and external resource to address environmental changes, the process of which is termed as dynamic capabilities. Dynamic capabilities contribute to organizational effectiveness through an effective modification of existing operating routines, enabling the organization to adopt environmental changes by way of sensing environmental conditions, learning response patterns and reconfiguring operating routines. (Teece et al.,1997). Furthermore, many strategic management researchers (Lado and Wilson 1994; Lepak and Snell 1999; Wright et al. 2001) argue that dynamic capabilities can enhance and sustain organizational effectiveness over time when they are developed with complementary human resource development practices. Despite this progress, there is still a lack in the literature about an understanding of the mediating mechanisms of dynamic capabilities on the relationship between HRD practices and organizational effectiveness. More recently, studies such as (Wang et al. 2011; Wilhelm et al.,2015; and Helfat et al.,2007) focus on how developing dynamic capabilities by human resource. Based on the knowledge of the authors there were no studied investigated the alternative relationships except Lopez-Cabrales et al. (2017) investigate the relationship between dynamic capabilities and HRM considering the mediating role of leadership styles Hence, the purpose of this study is to investigate the mediating role of dynamic capabilities on the relationship between human resource development and organizational effectiveness in the selected public universities context. Consequently, this study tries to address this gap through proposing an empirical model that demonstrates dynamic capabilities constructs i.e. sensing capabilities, learning capabilities and reconfirmation capabilities mediate the relationship between HRD constructs i.e. talent development, training and development, organizational development, and career development and organizational effectiveness. In addition to, this study is novel which tries to meet the need of the higher education sector in Iraq to such studies, for its influential role in society.

The remainder of the article is organized as follows: the first section presents the introduction. The second section describes the literature review. The third section presents the research methodology. The fourth section shows the data analysis and results. The last section presents a discussion of the findings including theoretical and practical implications, study limitations and future research.

According to the discussion above, the following questions guided the study design:

company B:

- Do HRD practices influence organizational effectiveness?
- Do HRD practices influence dynamic capabilities?
- Do dynamic capabilities influence organizational effectiveness?
- Do dynamic capabilities mediate the relationship between HRD practices and organizational effectiveness?

2 Literature review and hypotheses development

2.1 Human resource development contributions to organizational effectiveness and dynamic capabilities

This study argues that HRD practices have a direct impact on organizational effectiveness regardless of environmental changes. Several researchers such as (Mohammed 2006; Alagaraja et al., 2015; and Shoo 2016) have discussed this issue. Mohammed (2006) argues that the success and progress of an organization lie in its ability to explore and attract the talent and potentials of its workforce, and this is can be achieved through the HRD practices. Riordan el at (2005) argue that appropriate, ongoing training and development and career development enable employees to develop the skills, abilities, and knowledge required for effective performance, in turn, improve organizational effectiveness. Likewise, Adhikari, (2010) indicates that HRD supports and strengthening of an organization's human capital base by increasing the level of knowledge, skills, and capabilities of individuals in an organization and thus contributes to improved performance and competitive advantage. Sahoo (2016) argues that HRD practices training, career development, and performance management have an impact on the building of employee competencies which, in turn, enhance organizational effectiveness. Agwu & Ogiriki, (2014) argue that use of HRD practices training and development, organizational development and career development lead to improving organizational effectiveness through improvement in individual,

group knowledge, skills, attitudes, and behavior. Otoo et al., (2019) argue that HRD practices such as performance appraisal, career development, and training and development have a significant impact on organizational effectiveness through their impact on employee performance. Similarly, Swanson and Holton (2009) emphasize that HRD practices improve employee competence, in turn, enhance organizational effectiveness.

Alagaraja et al., (2015) state that there are five significant approaches for investigating the linkage of HRD and organizational performance and effectiveness: First, the best-fit approach which is an emphasis that HRD practices must convenient the characteristics of the organization. Second, the best-practice approach suggests HRD practices have a positive influence on performance and these practices can be adopted by other organizations for improving performance. Third, a combination of a best-fit approach and best-practice approach suggests that HRD contributions to the organizational effectiveness and performance through the combining of both the approaches. Fourth, the stake holder's perception approach indicates that investigating the impact HRD on organizational effectiveness and performance through the contribution of stakeholder perceptions. Fifth, focus on the aforementioned approaches.

Nevertheless, in the rapidly changing environment, the organizations need to address environmental shits and changes through developing so-called dynamic capabilities. This study states that HRD practices have a significant impact on building dynamic capabilities. However, the relationship between HRD and dynamic capabilities is still under developing (Wright and Snell, 2009). Only a few studies address the linkage between HRD and dynamic capabilities (Teece et al., 1997; Eisenhardt and Martin, 2000; Zahra & George, 2002; Teece, 2007; Hsu and Wang, 2012) have confirmed that learning, sensing, integrating, and reconfiguration capabilities of the organization are highly lie on employee's knowledge, skills, abilities and experienced these are the outcome of human resources development practices. Likewise, Garavan et al. (2016) argue that HRD practices help employees to work effectively in different environmental conditions and improve knowledge, skill, behavioral, and attitudinal outcomes that provide employees with the flexibility to respond to shifts in the environment. When organizations use human resource development practices to develop and leverage human capital, in turn, may catch the benefits of complementarities and co-specialization to develop dynamic capabilities (Barney 1991; Grant 1996). Human resource development practices such as training and development performance evaluation and compensation systems have the potential to enhance the dynamic capability and maintain the sustainable competitive advantage of organizations (Yan and Gao,2016). In changing environmental conditions HRD practices can increase the flexible organization, organizational learning, resources integration, and environmental perception (Chengcheng, 2010). Teece et al., (1997) define dynamic capabilities as the firm's ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments. Garavan (2007) argues that HRD supports the development of dynamic capabilities that are critical in developing and maintaining a sustained competitive advantage.

This study argues that HRD practices have a direct impact on dynamic capabilities. In order to explore in an integrated way, the linkage between HRD and dynamic capabilities, this study determined the dynamic capabilities in three measured dimensions: sensing capability, learning capability, and reconfiguration capability. Sensing capability is the firm's ability constantly to discover, explore and interpret opportunities in the environment (Pavlou and El Sawy 2011). Therefore, HRD helps organizations to make sense of shifts in the environment, set plans, and seize opportunities (Garavan et al., 2016). Eisenhardt & Martin, (2000) state that learning capability is the firm ability's acquiring or creating specific knowledge necessary to seize the identified opportunities. HRD practices improve learning mechanisms such as experience accumulation, knowledge creation, and sharing knowledge are critical to the formation of learning capability (Zollo and Winter (2002). Reconfiguration capability refers to the recombination and transformation of existing resources that enable firms to address the changes in market conditions (Teece, 2007). HRD enhances the creation of new capabilities, configure assets and organizational development to address the markets and technologies changes.

This study contributes to the theory and research on human resource development contribution to organizational effectiveness and dynamic capabilities by examining the direct impact of HRD practices on organizational effectiveness and dynamic capabilities. Based on the aforementioned contributions, this study hypothesizes

H1: HRD practices have a significant impact on organizational effectiveness.

H2: HRD practices have a significant impact on dynamic capabilities.

2.2 Dynamic capabilities and organizational effectiveness

The dynamic capabilities concept has emerged due to the changes in environments and market. Scholars (Hammer, 2001 and Zott, 2003) have stated that to sustain a competitive advantage in a rapidly changing environment, organizations need to develop dynamic capabilities for improving core competencies and enhance organizational effectiveness. This study argues that dynamic capabilities have a significant potential on organizational effectiveness. But, The association between dynamic capabilities and organizational effectiveness and performance is still unclear (Zhou & Zhou, 2017). However, some scholars (Teece et al. 1997; Eisenhardt & Martin, 2000; López, 2005 and Wilden et al, 2013) argue that dynamic capabilities enable organizations to link the resource base with environmental shifts, create market change, and facilitate resource access and resource development, in turn, enhance the organizational effectiveness. Teece (2007) argues that dynamic capabilities enable an organization to achieve competitive advantage in a changing business environment through developing specific capabilities and competencies which support organizational effectiveness and performance. Fainshmidt et al., (2016) argue that dynamic capabilities are significantly related to organizational effectiveness. The scholars (Rehman and Saeed, 2015; Takahashi et al.,2016 and Zhou and Zhou,2017) emphasize that dynamic capabilities have an indirect impact on the organizational effectiveness through mediated by the development of operational capabilities. Based on the above discussion, the third hypothesis can be derived as follows:

H3: Dynamic capabilities have a significant impact on organizational effectiveness.

2.3 Human resource development, dynamic capabilities, and organizational effectiveness

The aforementioned literature have established that HRD practices significantly influence organizational effectiveness. But, in rapidly changing environments, HRD is often not enough to support organizational effectiveness (Teece et al., 1997 and Aminu and Mahmood, 2015). Thus, this study, argues that in such dynamic environment HRD practices have potential to influence organizational effectiveness indirectly through mediating of dynamic capabilities. Moreover, due to rapidly changing in the environment, the organizations should prepare for the change to address the shifts in the environment and cope with markets conditions. The originations strive to develop capabilities to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments, in return, support make decisions within the organization which has the potential to enhance organizational effectiveness and performance (Eisenhardt and Martin, 2000; Teece, 2007). HRD plays a key role to maintain and develop human resources in accordance with the changing direction of corporate goals and objectives (Shanahan et al. 2012). HRD contributes to the creation of new capabilities and the renewal and reconfigures of existing capabilities to cope with dynamic environments (Zollo and Winter 2002). Therefore, it is significant to study the mediating role of dynamic capabilities in the relationship between HRD and organizational effectiveness. However, due to limited studies in the literature, there is still confusion about how dynamic capabilities mediate the relationship between HRD and organizational effectiveness. Even though, there are few researchers (Lado and Wilson 1994, Tseng and Lee, 2014; Aminu and Mahmood, 2015; and Garavan et al, 2016) investigated this issue. Furthermore, (Lado and Wilson 1994; Wright et al. 2001) argue that dynamic capabilities can ensure sustainable organizational effectiveness when they are developed through HRD practices. Similarly, Garavan et al. (2016) argue that HRD practices, structures, and processes can, develop unique dynamic capabilities that enhance the organizational effectiveness in the environmental turbulence. Wang et al.,(2012) argue that to maintaining dynamic capabilities requires organizations to develop the human resources that enable them to improve the organizational effectiveness and preference and in correspondence with the dynamic environment. As such, the present study hypothesized that dynamic capabilities mediate the relationship between human resources development practices and organizational effectiveness. The hypothesis is presented as follows:

H4: Dynamic capabilities significantly mediate the relationship between human resources development practices and organizational effectiveness.

Considering the above-mentioned hypothesizes, the study proposed the following model as a conceptual model of this paper (Figure 1).

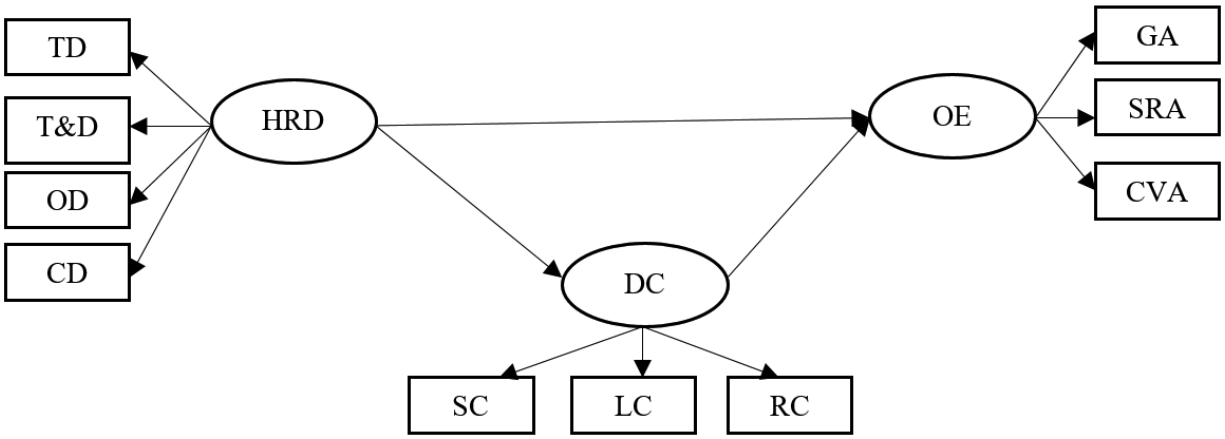

Figure 1: Conceptual model

HRD=Human Resource Development, DC=Dynamic Capabilities, OE=Organizational Effectiveness, TD=Talent Development, T&D=Training & Development, OD=Organizational Development, CD=Career Development SC=Sensing Capability, LC=learning Capability= Reconfiguring Capability, GA=Goal Approach, SRA=System Resource Approach, CVA=Competing Values Approach.

3 Research methodology

3.1 Research design, sampling and data collection

To test the proposed model, this research employed a deductive approach based on a quantitative method. The purpose of this quantitative method is to examine the mediating role of dynamic capabilities on the relationship between human resource development and organizational effectiveness. According to Sekaran & Bougie, (2013) quantitative method is appropriate to use in hypotheses testing of the relationship between independent and dependent variables. The study took place in top ten Iraqi public universities. For collecting the primary data this research used the survey method because it is considered an economical and efficient method to gather quantitative data concerned to a given population for the purpose of generalizing the result. This study employed a web-based survey for collecting data from the sample of the study. An online questionnaire was developed based on the literature (see table 2 and appendix 1) to collect the primary data. The questionnaire was created by the google-forms tool, which is commonly used by researchers for collecting data. The web-based questionnaires were distributed through E-mail designed to collect the primary data from the selected universities. The sample is including a number of deans, heads of departments, faculty members, principals, and administrative staff which seems to provide a corresponding sample for conducting data collecting and analyzing. The questionnaire was distributed to around 342 employees, out of which 215 completed questionnaires were obtained, with a response rate of 62.86 % of the respondents. The demographic data of the respondents are presented in Table 1. It shows that out of the 215 respondents, (76.74%) were males. The majority of the respondents (44.65%) were in the age category within 31-40 years. Most of the respondents at (61.86%) were non-executive designation and (38.13) were an executive designation. The majority of the respondents (47.44%) were holders Ph.D. degree while (40.46%) were holders master's degree and (12.93%) were holders bachelor's degree. A little lower than half of the respondent (41.39%) had work experience 11-20 years.

3.2 Data analysis procedure

Data analysis was conducted to address the research questions, objectives and hypotheses. Statistical Package for Social Science (SPSS) version 23 and the Analysis of Moment Structures (AMOS) software version 24 were used for analyzing data. Before conducting data analysis, the data preparation was done on the completed questionnaires by editing, coding, entering and cleaning the data. Descriptive statistics such as the frequency and percentage, mean, standard deviation, were used to provided data summarization of demographic characteristics of respondents. Also, the Pearson correlation coefficient was used to describe the correlations among the variables. Confirmatory factor analysis (CFA) was carried out to assess the validity of the measurement model, fitting and modification.

Table 1: The demographic data of the respondents

Item		Frequency	Percentage
Gender of the respondent	Male	165	76.74
	Female	50	23.25
Age of the respondent	20-30 years	34	15.81
	31-40 years	96	44.65
	41-50 years	65	30.23
	51-60 years	14	6.51
	More than 61 years	6	2.79
Designation	Executive	82	38.13
	Non-Executive	133	61.86
Educational achievements	Bachelor's Degree	26	12.93
	Master's Degree	87	40.46
	Ph.D. Degree	102	47.44
Work Experience	Less than 5 years	31	14.41
	5-10 years	63	29.30
	11-20 years	89	41.39
	More than 21 years	32	14.88

Also, Cronbach's Alpha was used to examine the reliability of the scale items. The overall model fit was assessed using five goodness-of-fit indices, namely the chi-square/degree of freedom ($\chi 2$/df) ratio, the comparative fit index (CFI), the Tucker-Lewis index (TLI), the goodness of fit index (GFI), the root means square error of approximation (RMSEA). In addition, squares structural equation modeling (SEM) was used to test empirically the proposed hypotheses. SEM is commonly used in the social sciences because of its ability to explain the relationships between unobserved constructs (latent variables) from observable variables (Henson & Roberts., 2006). SEM is comparable to common quantitative methods, such as correlation, multiple regression, and analysis of variance to estimate and test the relationships among constructs.

3.3 Instrumentation development and measures

The questionnaire was developed based on an extensive review of the literature related to the topic of the study. The questionnaire comprises of two sections. Section one collects participant & institutional background information of the respondents such as age, gender, a position held, educational attainment, work experience, and organization size. Section two includes questions are designed to measure the variables of the study by using a comparative seven-point Likert-type scale ranging from 1-7, in which (1 = strongly disagree, 7 = strongly agree). The variables used in this study were assessed using multiple items from different studies in the extant literature.

Human resource development: was operationalized as a four-dimensional construct: talent development, training and development, organizational development, and career development. 20 items are designed to measure HRD constructs by employing five items for each construct respectively, these items were adopted from (Mahfoozi et al.,2018),(Asfaw et al.2015),(Spirina,2015), (Zadeha & Ghahremanib, 2016), (Xueling,2017), (Weng&McElroy, 2012).

Dynamic capabilities: dynamic capability was operationalized by three dimensions: sensing capability, learning capability, integrating capability. 15 items are designed to measure dynamic capabilities constructs by employing five items for each construct respectively. The items were adapted from (Teece et al., 1997), (Eisenhardt and Martin, 2000), (Nieves& Haller, 2014).

Organizational effectiveness: was measured by three approaches: goal approach, system resource approach, and competing values approach. 12 items were used to measure organizational effectiveness by employing four items for each construct respectively. The items were adapted from (Gold et al., 2001), (Rahman et al., 2013),(Banat,2002),(Abu el Khair,2016). Also, Cronbach 's alpha coefficient was used to evaluate the internal consistency of the scales where Cronbach 's alpha coefficient for all the constructs ranges between 0.874 and 0.962 and it is considered acceptable which indicates that all the items

are internally consistent. Table (2) shows detailed information regarding the variables, sources, number of the items and Cronbach's alpha.

Table 2: The study measures in regard to the variables, sources, and Cronbach's alpha

variables		Source	Number of items	Cronbach's alpha
Human Resource Development	Talent development	(Mahfoozi et al., 2018)	5	0.946
	Training and development	(Asfaw et al., 2015)	5	0.932
	Organizational development	(Rastgoo, 2016) and (Zadeha & Ghahremanib, 2016)	5	0.947
	Career development	(Weng & McElroy, 2012) and (Xueling, 2017)	5	0.953
Dynamic Capabilities	Sensing capability	Teece et al. ,1997);(Eisenhardt and Martin ,2000);(Nieves&Haller,2014)	5	0.924
	Learning capability		5	0.962
	Reconfiguring capability		5	0.938
Organizational Effectiveness	Goal approach	(Banat,2002)	4	0.931
	System resource approach	(Abu El Khair, 2016)	4	0.874
	Competing values approach	(Gold et al., 2001),(Rahman et al., 2013)	4	0.936

4 Results

4.1 Descriptive statistics

Table 3 shows a descriptive analysis (mean and standard deviation) of the data and the correlations matrix among variables. The means score for all the constructs is located between (3.29-3.80) and standard deviation (1.48-1.62) that indicates a good implementation of HRD practices and dynamic capabilities in enhancement organizational effectiveness in the selected public universities of Iraq. Also, the results show that each of the constructs is positively and significantly correlated with each other.

4.2 Measurement model

To assess the validity of the measurement model and to test the fitting of the data with the proposed model confirmatory factor analysis (CFA) was used to assess the fitness of a measurement model. This study used some indexes like CMIN/df, GFI, TLI, CFI, and RMSEA to investigate the goodness of fit of the model. Table 4 presents the results of the index of confirmatory factor analysis. The results indicate that the goodness-of-fit indicators of all three models are satisfied with the suggested threshold value by (Jacob et al., 2003) thus, indicated good model fitness.

Table 3: Descriptive and correlation results

	Mean	S. D	TD	T&D	OD	CD	SC	LC	RC	GA	SRA	CVA	HRD	DCs	OE
TD	3.29	1.59	1.0												
T&D	3.49	1.56	.77**	1.0											
OD	3.46	1.60	.77**	.82**	1.0										
CD	3.35	1.59	.75**	.79**	.83**	1.0									
SC	3.38	1.53	.79**	.79**	.84**	.80**	1.0**								
LC	3.41	1.54	.80**	.81**	.86**	.84**	.88**	1.0							
RC	3.53	1.56	.77**	.81**	.84**	.79**	.84**	.86**	1.0						
GA	3.80	1.62	.73**	.83**	.85**	.78**	.80**	.84**	.84**	1.0					
SRA	3.44	1.48	.70**	.79**	.76**	.71**	.77**	.85**	.82**	.85**	1.0				
CVA	3.80	1.53	.62**	.69**	.70**	.69**	.67**	.72**	.73**	.77**	.74**	1.0			
HRD	3.39	1.58	.90**	.92**	.93**	.92**	.87**	.90**	.87**	.87**	.80**	.74**	1.0		
DCs	3.44	1.54	.82**	.84**	.88**	.85**	.95**	.96**	.94**	.87**	.85**	.74**	.92**	1.0	
OE	3.68	1.54	.73**	.83**	.83**	.79**	.80**	.87**	.86**	.94**	.93**	.90**	.87**	.88**	1.0

**. Correlation is significant at the 0.01 level (2-tailed).
HRD=Human Resource Development, DCs=Dynamic Capabilities, OE=Orginzational Effectiveness, TD=Talent Development, T&D=Training & Development, OD=Organizational Development, CD=Career Development SC=Sensing Capability, LC=learning Capability= Reconfiguring Capability, GA=Goal Approach, SRA=System Resource Approach, CVA=Competing Values Approach. Measurement Items used for calculation of the listed variables are explained in Appendix 1.

Table 4: Index of confirmatory factor analysis

	HRD model	DC model	OE model
CMIN/df	1.895	1.547	1.828
GFI	0.874	0.883	0.900
TLI	0.931	0.970	0.955
CFI	0.944	0.978	0.973
RMSEA	0.0721	0.073	0.070

4.3 Reliability and Validity

In this study and before testing the hypotheses reliability and validity of measurement scales were assessed by using confirmatory factor analysis (CFA), and AMOS 24 was used to estimate convergent validity and discriminant validity. The reliability of the scales was evaluated using Cronbach's alpha coefficient as it is seen in table 2, Cronbach's alpha coefficient for all constructs ranges between 0.874 and 0.962 and it is considered acceptable which indicates that all the items are internally consistent (Hair et al., 2010). In order to determine the convergent validity, there are three important indicators of convergent validity which are factor loadings (standardized estimates), Average Variance Extracted (AVE) and Composite Reliability (CR). Hair et al., (2006) suggests that the items with loadings in between .50 to .70 can be maintained. This study investigates that the item loadings all exceeded the threshold value and statistically significant ($p<0.05$) (see table 4). Composite reliability (CR) for all constructs ranges between 0.767 and 0.955 which are above 0.50 that indicates that all the constructs have a good level of composite reliability (CR) as recommended by (Hair et al., 2012). The average variance extracted (AVE) value for all the constructs are in the range between .632 to .827 which are above the threshold value .50 which is suggested by (Hair et al., 2010).

Table 5: Constructs evaluation

Constructs	Measurement Items	Factor Loading	CR	AVE	P.Value
Talent Development	TD5	0.852	0.947	0.780	.000
	TD4	0.884			.000
	TD3	0.896			.000
	TD2	0.898			.000
	TD1	0.852			.000
Training &Development	T_D5	0.807	0.932	0.732	.000
	T_D4	0.902			.000
	T_D3	0.886			.000
	T_D2	0.855			.000
	T_D1	0.827			.000
Organizational Development	OD5	0.900	0.948	0.785	.000
	OD4	0.900			.000
	OD3	0.904			.000
	OD2	0.875			.000
	OD1	0.850			.000
Career Development	CD5	0.854	0.955	0.808	.000
	CD4	0.952			.000
	CD3	0.904			.000
	CD2	0.922			.000
	CD1	0.861			.000
Sensing Capability	SC1	0.769	0.767	0.709	.000
	SC2	Deleted			.000
	SC3	0.769			.000
	SC4	0.915			.000
	SC5	0.876			.000
Learning Capability	LC1	0.875	0.899	0.827	.000
	LC2	0.871			.000
	LC3	0.919			.000
	LC4	0.961			.000
	LC5	0.918			.000
Reconfiguration Capability	RC1	0.818	0.837	0.762	.000
	RC2	0.783			.000
	RC3	0.938			.000
	RC4	0.951			.000
	RC5	0.863			.000

Table 5: Constructs evaluation (continued)

Goal Approach	GA4	0.901	0.932	0.789	.000
	GA3	0.837			.000
	GA2	0.904			.000
	GA1	0.910			.000
System Resource Approach	SRA4	0.883	0.872	0.632	.000
	SRA3	0.733			.000
	SRA2	0.722			.000
	SRA1	0.797			.000
Competing Values Approach	CVA4	0.904	0.936	0.772	.000
	CVA3	0.940			.000
	CVA2	0.824			.000
	CVA1	0.841			.000

CR =Composite Reliability and Average, AVE=Variance Extracted

Discriminant validity was assessed by using two methods: First,(Fornell & Larcker, 1981) method. He suggested that to support for discriminant validity if the square root of the AVE for a latent construct is greater than the correlation values among all the latent variables. Table (5) shows that the square root of the AVE values of all the constructs is greater than the inter-construct correlations which supports the discriminant validity of the constructs. Second, (Hair et al., 2010) he suggests if AVE for a latent construct is larger than the maximum shared variance with other latent constructs that indicates discriminant validity can be maintained Thus, the measurement model indicates a good construct validity and desirable psychometric properties.

Table 6: Discriminant validity of the constructs

	AVE	MSV	TD	T_D	OD	CD	SC	LC	RC	GA	SRA	CVA
TD	0.780	0.682	**0.883**									
T_D	0.732	0.706	0.823	**0.855**								
OD	0.785	0.749	0.816	0.817	**0.886**							
CD	0.808	0.664	0.785	0.827	0.866	**0.898**						
SC	0.709	0.697	0.532	0.721	0.781	0.421	**0.842**					
LC	0.827	0.807	0.621	0.608	0.801	0.305	0.723	**0.909**				
RC	0.762	0.714	0.712	0.512	0.601	0.541	0.801	0.621	**0.872**			
GA	0.789	0.701	0.798	0.836	0.821	0.850	0.721	0.653	0.812	**0.888**		
SRA	0.632	0.501	0.788	0.648	0.771	0.708	0.765	0.541	0.700	0.695	**0.795**	
CVA	0.772	0.727	0.068	0.744	0.754	0.737	0.321	0.652	0.756	0.691	0.609	**0.886**

Notes: Bold values in diagonal represent the squared root estimate of AVE. AVE= Average Variance Extracted, MSV= Maximum shared variance

4.4 Common method bias Checks

Due to this research is employed a cross-sectional with a self-report questionnaire, common method variance (CMV) may affect systematic measurement accuracy (Podsakoff and Organ, 1986). Harman's single-factor test was used to address this issue by using exploratory factor analysis (EFA). The results show that the total variance for a single factor is less than 50% which means that common method bias does not confound the interpretations of the results.

4.5 The structural model: test of hypotheses

4.5.1 The direct effects

Structured equation modeling (SEM) was used to test the hypothesized model. The results of the proposed structural model show the good fit (CMIN/df=1.418, GFI=0.925, TLI= 0.986, CFI=0.990, RMSEA=0.064). In order to verify the following hypotheses, H1, H2, H3 direct effects were assessed. The results, presented in (Figure 2 and Table 5) indicate that the three hypotheses are supported. In particular, HRD practices have a significant impact on organizational effectiveness (β=0.390, p<0.001) supporting H1. Similarly, the results revealed that HRD practices have a significant impact on the dynamic capabilities (β=0.982, p<0.001), therefore the hypothesis H2 is supported. Also, the results confirmed that dynamic capabilities significantly influence organizational effectiveness (β=0.568, p<0.001) which is supporting the hypothesis H3.

Table 7: Results of direct effects

NO.	Hypotheses path	Beta Coefficient	P. Value	Result
H1	HRD→OE	0.390	0.001	Supported
H2	HRD → DC	0.982	0.001	Supported
H3	DC→ OE	0.568	0.001	Supported

Table 8: Results of mediating effect

NO.	Hypotheses path	Beta Coefficient	P. Value	95%LL	95%UL	Result
H4	HRD→ DC→ OE	0.558	0.001	0.073	0.533	Supported

Hypothesis is supported, when there is no zero between lower and upper limits, LL: Lower limit, UL: Upper

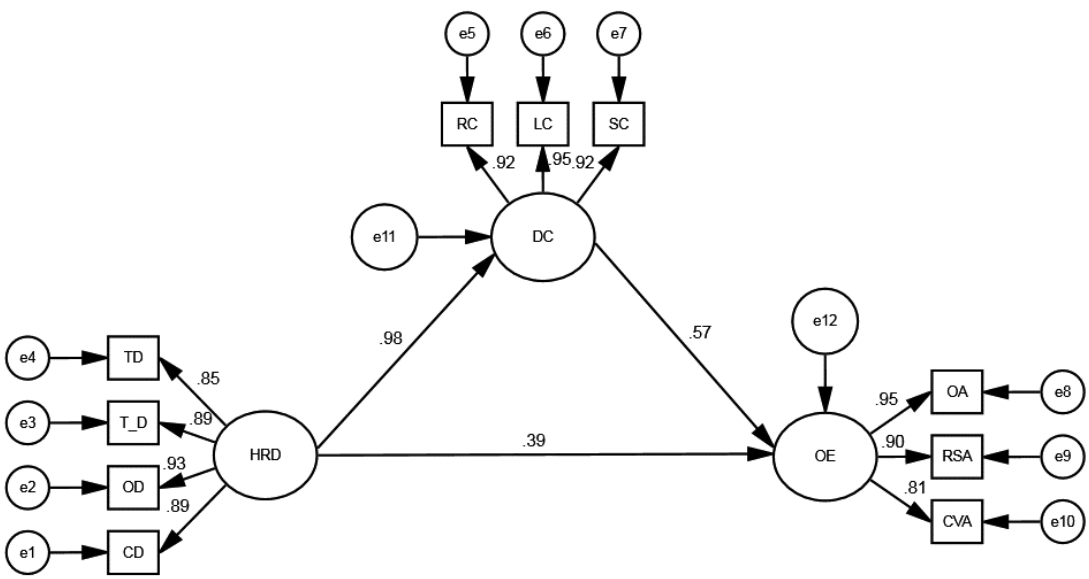

Figure 2: The SEM model analysis

4.5.2 The mediating effects

In order to test hypothesis H4 indirect effect was assessed. The results showed in table 6 indicate that dynamic capabilities are significantly mediate the relationship between HRD practices and organizational effectiveness (β=0.558, p<0.001). Also, the bootstrapping was used in order to calculate the 95% confidence interval of the indirect. The results show there is no zero between lower and upper limits which is provided evidence that hypothesis H4 is supported.

5 Discussion and Conclusions

Due to limited studies in the literature, there is still confusion about how the impact of HRD practices on organizational effectiveness through the mechanisms of dynamic capabilities. The aim of this study is to investigate the mediating role of dynamic capabilities in the relationship between HRD practices and organizational effectiveness in the selected Iraqi public universities context. This study proposed a causal model that explains the relationship between HRD practices and organizational effectiveness through the role played by dynamic capabilities. The present study found out four key findings. First, HRD practices significantly influence organizational effectiveness which is in line with the suggestions of (Mohammed 2006; Alagaraja et al., 2015; and Shoo 2016). Second, HRD practices have a significant impact on dynamic capabilities which is in line with the opinions of (Garavan et al.,2016; Yan and Gao,2016 and Teece, 2007). Third, dynamic capabilities significantly influence organizational effectiveness which is consistent with (Zhou,2017; Fainshmidt et al., 2016 and Teece et al, 1997). Fourth, dynamic capabilities significantly mediate the relationship between HRD practices and organizational effectiveness which is in line with the opinions (Zollo and Winter 2002; Aminu and Mahmood, 2015). In conclusion, this study argues that the relationship between HRD practices and organizational effectiveness is not direct in changing business environments but through the mediating role of dynamic capabilities. Consequently, in such shifts and turbulences in business environments, organizations need to develop not only a human resource but also dynamic capabilities for sensing environmental conditions, learning response patterns and reconfiguring operating routines, in turn, organizations will be able to achieve superior organizational effectiveness.

5.1 Theoretical contributions of the study

Regarding the theoretical contribution, this study provides a research model for empirical literature in the field of human resource devolvement, dynamic capabilities, and organizational effectiveness. Specifically, this study developed a model to investigate the direct relationship between HRD and organizational effectiveness and dynamic capabilities and the relationship between dynamic capabilities and organizational effectiveness as well as to examine the mediating role of dynamic capabilities on the relationship between HRD and organizational effectiveness. The results from a structural equation modeling approach have confirmed all the hypothesized relations. The results show that HRD practices significantly impact on organizational effectiveness and dynamic capabilities. The study shows that dynamic capabilities have a positive impact on organizational effectiveness. Also, the study empirically supports the mediating effect of dynamic capabilities on the relationship between HRD practices and organizational effectiveness. Despite of, that HRD, dynamic capabilities and organizational effectiveness have attracted considerable attention in the literature but, only very limited studies have highlighted the mediating role of HRD capabilities in the relationships between HRD and organizational effectiveness. Therefore, the empirical findings of this study have potential significant to fill the gap in the literature.

5.2 Managerial implications of the study

Besides the theoretical implications, this study provides practical implications for universities management, the present study provides significant insight and demonstrates a good understanding of HRD practices, dynamic capabilities and organizational effectiveness in the selected Iraqi public universities context. The findings of this study have the potential to help decision-makers to design their HRD practices to contribute to enhance organizational effectiveness. The study brings universities management closer to understand the role of dynamic capabilities to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments, in turn, support make decisions within the organization which has the potential to enhance organizational effectiveness and performance. In such an environment, universities management should develop not only HRD practices but, also adopt dynamic capabilities mechanisms to improve organizational effectiveness.

5.3 Limitations and future research

Despite of the theoretical and managerial contributions, this study has some limitations that need to be addressed in future research. First, this study focuses on the top ten Iraqi public universities context, which may not be exclusively generalizable to other sectors. Therefore; future research may investigate this phenomenon in other businesses and economic context. Second, the sample of the study somewhat is small because of the unsafe situation in Iraq the

authors couldn't get an appropriate sample. However, future research may conduct in big enough and appropriate sample. Third, this study adopts a cross-sectional research method for data collection, which does not allow the researcher to examine the causality of the relationships between the variables in greater depth. Thus, future research should aim to use longitudinal data which could explain the highlighted relationships more insights. Fourth, this study focuses on four dimensions of HRD, three dimensions of dynamic capabilities and three dimensions of organizational effectiveness, therefore, future research may include other potential dimensions. The findings of this study are limited to the selected Iraqi public universities context and cannot be generalized to other countries and other businesses context.

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Vloga dinamičnih sposobnosti pri odnosu med razvojem človeških virov in organizacijsko učinkovitostjo

Ozadje in namen: Novejša literatura je pokazala, da je razvoj človeških virov (HRD) pomembno povezan z organizacijsko učinkovitostjo (OE). V hitro spreminjajočih se okoljih bi si morale organizacije prizadevati za reševanje sprememb v okolju in se spoprijeti s tržnimi razmerami z razvojem dinamičnih zmogljivosti, v zameno pa povečati organizacijsko učinkovitost. Glavni namen te študije je preučiti posredovalno vlogo dinamičnih zmogljivosti pri povezavi med razvojem človeških virov in uspešnostjo organizacije na iraških javnih univerzah.
Zasnova / metodologija / pristop: Podatki so bili zbrani s spletno anketo med 215 zaposlenimi na izbranih javnih univerzah v Iraku. Za testiranje predlaganega raziskovalnega modela je bilo uporabljeno modeliranje strukturnih enačb (Structural Equation Modelling - SEM).
Rezultati: analiza podatkov je podprla vsa predpostavljena razmerja študije. Pokazalo se je, da HRD prakse pomembno vplivajo na organizacijsko učinkovitost in dinamične sposobnosti. Nadalje dinamične zmogljivosti pomembno vplivajo na učinkovitost organizacije. Študija tudi empirično podpira posredovalni učinek dinamičnih sposobnosti na odnos med praksami HRD in organizacijsko učinkovitostjo.
Zaključek: Literatura še ni v celoti pojasnila, kako HRD prakse vplivajo na učinkovitost organizacije s pomočjo mehanizmov dinamičnih sposobnosti. Naša raziskava ugotavlja posredniško vlogo dinamičnih sposobnosti na povezavi med HRD in organizacijsko učinkovitostjo. Na podlagi obstoječe literature in empiričnih rezultatov študija ponuja teoretične in praktične posledice, ki so podrobneje predstavljene v članku.

Ključne besede: razvoj človeških virov, dinamične sposobnosti, organizacijska učinkovitost

Appendix: List of Measurement Items

HRD practices:
1.Talent Development
TD1. Our university\institute attracts and recruit the right talent
TD2. Our university\institute identifies existing talent
TD3. Our university\institute nurtures and develop talent
TD4. Our university\institute ensures the talent engagement
TD5. Our university\institute ensures the talent retention
2.Training and Development
T&D1. Our university\institute has effective training and development programs
T&D2. The activities of training development programs provided enable to improve skills, knowledge, attitude change, new capability of the employee.
T&D3. The activities of training programs provided help to increase job satisfaction and work efficiency.
T&D4. Our university\institute uses a modern training and development methods and tools.
T&D5. Evaluate the trainees' overall satisfaction with the training program.
3.Organizational Development
GD1. Our university\institute makes efforts to development of human resources according to organizational change
GD2. Our university\institute encourages the change management
GD3. Our university\institute ensures the organizational restructuring
GD4. Our university\institute encourages the teamwork
GD5. Our university\institute encourages the problem-solving culture
4.Career Development
CD1. The organizational structure of the university\institute facilities the career planning and development
CD2. Our university\institute offers career counseling.
CD3. Our university\institute gives training to help develop my career
CD4. Our university\institute has a fair promotion
CD5. Our university\institute ensures the growth of remuneration.

Organizational effectiveness:
1.Competing Values Approach
CVA1. Our university\institute makes efforts to improve the productivity
CVA2. Our university\institute adapts to the changing environment
CVA3. Our university\institute makes efforts to the optimization of resources
CVA4. Our university\institute makes efforts to the stability

2.Goal Approach
GA1. Our university\institute ensures goal achievement
GA2. Our university\institute has an effective strategic planning
GA3. Our university\institute encourages the innovation
GA4. Our university\institute makes efforts improve the quality
3.System Resource Approach
SRA1. Our university\institute has the ability to acquire resource
SRA2. Our university\institute has good physical infrastructures and equipment
SRA3. Our university\institute ensure the accreditation
SRA4. Our university\institute encourages the organizational health

Dynamic capabilities
1.Sensing capability
SC1. Our university\institute conducts environmental assessment to identify new job opportunities
SC2. Our university\institute ensures the performance assessment
SC3. our university/institute dedicates much time to applying ideas for new educational programs and improving existing educational programs
SC4. Our university\institute encourages the collaboration readiness
SC5. Our university\institute encourages the changing and renewal
2.Learning Capabilities
LC1.Our university\institute has effective routines to identify, value, and import new information and knowledge.
LC2.Our university\institute has appropriate routines to assimilate new information and knowledge.
LC3.Our university\institute has effective in transforming existing information into new knowledge.
LC4.Our university\institute has effective in utilizing knowledge in new services.
LC5.Our university\institute has effective in developing new knowledge that has the potential to influence service
3.Reconfiguration Capabilities
RC1. Our university\institute has a clear human resource re-allocation procedure
RC2. Our university\institute makes efforts to organizational response to environmental changes.
RC3. Our university\institute fasts response to competitor's actions.
RC4. Our university\institute has an effective communication with cooperative organization.
RC5. Our university\institute fasts response to changes in the needs of its clients.

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How Robot/human Orchestration Can Help in an HR Department: A Case Study From a Pilot Implementation

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Background and Purpose: Motivation of this research is to explore the current trend in automating the business processes through software robots (Robotic Process Automation – RPA) and its managing within enterprise environment where most of the processes are executed by human workforce. As the RPA technology expands the demand for its coordinating grows as well. The possible solution to this challenge is shown in case study research in form of implementing orchestration platform to a concrete business process of onboarding in HR department of a multinational company. The aim of this paper is to explore the phases and activities of the pilot project implementation of Robotic Service Orchestration (RSO) in combination with RPA technology and to assess the potential benefits.
Design/Methodology/Approach: Case study research approach was selected to explore the research phenomena, which is the implementation of RSO platform in combination with RPA technology and assessing incoming benefits. The case is formed with 2 companies – (1) multinational company with ongoing effort of automating onboarding process, (2) technology and consulting company delivering the automation solution. Data were collected through semi-structured interviews with respondents from two involved companies and by analysing internal documents.
Results: The analysis of case provided in this paper revealed some key insights: (1) strategical position of RSO and tactical position of RPA towards the existing legacy systems, (2) need for increased focus on initial process modelling phase, (3) Application Programming Interface (API) integration is more viable solution for RPA, (4) the biggest benefit of RPA - its agility, (5) future potential of the RSO replacing the BPMS.
Conclusions: First of all, there is a need of higher number of software robots adopted in a company before orchestration could pay off. On the other side, current Business Process Management Systems (BPMS) solutions don't offer functionalities for managing human and software robots workforce altogether. RPA is expected to expand and without proper orchestration the effectivity will not grow constantly.

Keywords: *Robotic service orchestration, Robotic process automation, Pilot implementation, Case study, Human resources.*

1 Introduction

Workflow management (WfM) was trending at the end of the 20th century, but as Abbott and Sarin (1994) noted, the emphasis in workflow management was on using computers to help manage business processes, which could be comprised of many individual tasks, and not on using computers to automate the individual tasks. This approach distinguishes between WfM and the recent practical trend of Robotic Process Automation (RPA). Van der Aalst et al. (2018) shared his opinion about RPA. According to his research, "RPA is an umbrella term for tools that operate on the user interface of other computer systems in the way a human would do. RPA aims to replace people by automation done in an 'outside-in' manner." This 'outside-in' manner is considered to be a great advantage, mainly in comparison with WfM. In this approach, existing informa-

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tion systems (IS) remain unchanged. Redesigning old IS or designing new IS is often costly in the context of an automation project as a whole. These steps are replaced by robot agents with RPA usage. RPA is a tool that adopts some profound elements from WFMSs but enhances them with the latest technology options. The practical definition provided by Gartner is as follows: "Robotic process automation tools perform 'if, then, else' statements on structured data, typically using a combination of user interface interactions, or by connecting to APIs to drive client servers, mainframes or HTML code. An RPA tool operates by mapping a process in the RPA tool language for the software 'robot' to follow, with runtime allocated to execute the script by a control dashboard." (according to Tornbohm and Dunie (2017)).

To support the statement of the trending RPA, the predictions of research companies are clear. This discipline arises from real companies' problems and the fact that they have been trying to automate routine tasks and business processes for so long, often without proper Return on Investment (ROI). The RPA market has reached US $250 million in 2016 according to the US research company Forrester (Le Clair, 2017), and they are expecting to grow significantly with help of Artificial Intelligence (AI), which is starting to be implemented in existing RPA solutions. There are approximately 12 key vendors of RPA solutions on the market. The estimated growth provided by Forrester (Le Clair, 2017) is that the RPA market will reach US $2.9 billion in 2021. These numbers are too large to be ignored. Academic researchers are catching up, but RPA in the academic environment is still in its infancy.

With RPA, organizations are deploying technology that can create virtual workforces of robotic workers. They are operating within the company's computational capacity to automate structured office processes. The difference opposite classic business process automation is the scope, where previous automation capabilities were there to assist the human process participants and owners. With RPA, we are dealing with potential replacement of the whole resource, which takes care of the workflow execution with no need to interrupt or redesign the background system. As Brocke et al. (2018) noted, RPA uses AI technologies to bring decision-making intelligence, flexibility and adaptability into business process environments. With this increase in AI incorporation into the processes, RPA became a significant tool in the BPM domain. Mendling et al. (2018) panel report construe the question of AI in RPA more specifically by raising question which RPA brings to the BPM research domain: "how to design and program robots and to integrate them with BPM systems, how to leverage RPA as a vehicle to support AI-enhanced processes, and how to use artificial intelligence techniques to program RPA solutions based on goals".

Human-robot cooperation (HRC), used in the research in manufacturing and assembly productions (Pellegrinelli et al., 2016; Michalos et al., 2014) has a different conception, than the human/robot orchestration - the Robotic Service Orchestration (RSO) - used in this paper, perceives robots as a physical embodiment rather than intangible software. Because the BPMSs classification is quite broad, the RSO belongs into one of its categories. The purpose of RSO is similar because, according to the developers of Enate software tool, RSO is a platform that enables the delivery, management and execution of business processes that stand behind every service across both the digital and human workforce. The business logic is largely the same, but the distinction comes with the technology they are using to automate the business processes. RSO is built for close cooperation with external services such as RPA. RSO cooperates most of its functionalities from BPMSs, but it upgrades the redistribution of work among the available resources while considering humans, as well as robots. It attempts to answer a formidable question: which processes should be automated, and which should be performed by humans (Aalst et al., 2018).

With the growth of the RPA domain also comes some criticisms. As it was with Business Process Reengineering in the 1990s or BPM in the beginning of the new century, new trending technologies are very attractive to consulting or software vendor companies, which are offering a solution in the B2B market but often fail to deliver real value in terms of increasing the process effectiveness. According to Ernst & Young report, 30-50% (Lamberton, 2016) of initial RPA implementations fail. Nevertheless, a research report from Hindle et al. (2017), provides data about different aspects of RPA implementation (specifically the Blue Prism software tool) based on a survey research strategy. This report (Hindle et al., 2017) shows that except for one case, every other case (23) had positive ROI. This contradiction shows how this rapidly growing industry is unstable and unclear. This circumstance, of course, provides a great opportunity for researchers to uncover the vail of uncertainty and bring valid conclusions into this newly formed domain.

The aim of this paper is to explore the phases and activities of the pilot project implementation of RSO in combination with RPA technology and to assess the potential benefits. The subject of the research is the whole implementation process, which consists of different phases and activities sorted on a time scale. Two companies are cooperating on showcasing the benefits of RSO and RPA technology with the aim of improving the process of onboarding (HR department). The research questions support the aim of the paper, as follows:

What was the process of the implementation of the examined project?

What are the benefits for companies A and B that arise from the examined project?

According to our knowledge, this type of a case study,

with implementation of BPO and RPA, has never been covered in academic journals. Thus, this research area is a white space in the literature, and only the research process will demonstrate how this particular research design suits the new wave of approaching process improvement and automation. This circumstance often occurs in exploratory research projects.

As is usual with a new stream of research, the first exploratory studies in the field are necessary for achieving in-depth insights, which is the reason why we choose exploratory study, and the subsequent content is structured accordingly. After the related work section, a methodology section is offered where an appropriate research design is described. Next, we present an actual case study that is subsequently structured as the project (case). A discussion followed by conclusion is provided at the end of this paper.

2 Related work

Recently, papers on RPA have started to emerge. Most of them are presented in the form of a case study, such as (Fernandez and Aman, 2018; Aguirre and Rodriguez, 2018; Lacity et al., 2015a; Lacity et al., 2015b; Lacity and Willcocks, 2016). In research from Lacity et al. (2015), single case studies are presented. They investigate real examples of practical usage of RPA in companies such as O2[1]. In the case of O2, 2 pilot processes were selected, and the results show higher ROI in comparison with BPMS implementation. Other interesting results are displayed in the Aguirre and Rodriguez (2018) case of implementing RPA into a business process outsourcing company, where an increase in productivity and capacity of approximately 20% was reported.

From a methodological standpoint, researchers should be aware of the overall methodological selection and preparation of case studies. There is a need to distinguish between the case study, which is commonly presented as marketing material from software providers and consulting companies, and case study research (Saunders et al., 2016). The most significant paper is that of Fernandez and Aman (2018), because it is the only paper that outlines the research design and methodological selection. They also used a single case study, and data were collected through semi-structured interviews with various respondents, mostly process participants. They conducted 11 interviews, and the results from those interviews are presented, including the impact on individuals and the company context.

The most positive results are shown in the case studies from Lacity et al. (2015) and Lacity and Willcocks (2017), where the subjects were the companies Xchanging and UTILITY (anonymized name). In the first case of Xchanging, the results exceeded the first expectations. Overall, 14 key processes were automated with a help of 27 implemented robots. They processed 120 thousand instances per month with an average savings of 30% on every automated process. The UTILITY case was even larger, with 25 processes involved in the RPA initiative and with 1 million instances per month. This amount of work is performed by 300 robots, which are orchestrated with 2 employees, and they substitute for the work of 600 people. The ROI from this project is 200% for the first year after the implementation. The overall return on investment with the RPA project mentioned in the work of Lacity and Willcocks (2016) is typically 1 year.

In the most recent work from 2019 is clear that the RPA technology is starting to engage with diverse industries. The research paper from Houy et. al. (2019) demonstrates an example of implementing cognitive RPA to public administration, Moffitt (2018) outlined how audit could benefit from use of RPA and another research is testing RPA in digital forensics (Asquith and Horsman 2019). Also another case studies from more traditional industries are still emerging. For example Schmitz et al. (2019) described case of German telecommunications operator where RPA was use as an enabler to realize digital strategy. The RPA is not used only in new areas, but with help of AI, to a new strategic business task such as decision-making (Ranerup, Henriksen 2019).

3 Research methodology

The aim of this section is to construct research questions and to propose a research design that will serve to answer the research questions. The research design guides the investigator in the process of collecting, analysing and interpreting the observations during the case (Yin 2014).

To better understand this methodology section, a case definition is presented first. The definition specifies the scope of the case. In this study, a case is a pilot project implementation, which involves two companies in a specific time horizon. The first company is developing and providing an RSO and RPA solution (company A) to another company, which is a multinational company that operates in a business process service market (company B). Company A is a start-up company, which was founded in 2014 in the Czech Republic and currently has 12 employees. Company B is an international enterprise founded in 2004 in the Czech Republic that specializes in providing business processes and services for large corporations across the globe, with approximately 1600 employees.

Company A operates in the RPA market and has a strong background in data science and text mining. They already cooperate with company B on a project on the automation of a certain task through the deployment of an

1 https://www.telefonica.com/en/home

RPA solution. Given the fact that Company B is operating on a business process services market, they are embracing new automation technology, which company A is deploying. Their cooperation creates a mutually beneficial synergic effect. The case in this case study research is a pilot project of implementing RSO and RPA in the HR department of company B, in particular, an onboarding process. The implementation is led by company A.

The methodological choice of this paper reflects the fresh essence of this domain. That is precisely why we decided on an exploratory study in our research. A small sample and deep dive into the research phenomenon are characteristics of a qualitative exploratory study. As a prime research technique, unstructured interviews were chosen.

It is necessary to define the purpose and scope of the case study. As Schramm (1971) noted, the essence of a case study and the central tendency among all types of case studies is that it attempts to illuminate a decision or set of decisions - why they were taken, how they were implemented, and with what result. This illumination comes from examining the contextual conditions, believing that they might be highly pertinent to the phenomenon of study (Yin, 2014). According to Feagin et al. (1991), case studies concern decisions, programmes, implementation processes and organizational change. The case study in this paper concerns implementation processes.

Only one case was chosen, and thus, it is single case study research, which is common for exploratory studies. A rationale justification for building this paper on only one case comes from Yin (2014). He states that the reasoning for single case study research comes from a situation in which the case represents an extreme or unique case, such as conducting a pilot project.

The units of analysis are the individuals who are part of this project and the documents, which provide data about the course of the project and about the deployed technology. Case boundaries are set by the pilot project, which determines everything directly related to the implementation process: its content, participants, procedures, logical structure and IT technology. On the other side, everything outside is context - the ambient conditions that influence the project as well. Another boundary is the time frame of this case: the beginning is when both sides (companies A and B) kick-off the first idea of this pilot project, and the end is when the deployment was evaluated in the form of a report with a follow-up meeting.

To secure the construct validity in the research design, Yin (2014) recommends using multiple sources of evidence, which in our case study are narratives from different participants (from both company A and company B), project documentation and other documents (about the BPO and RPA solution).

To obtain access to the data within these companies, the authors had to negotiate first. They were involved in the project during its realization, and they signed a nondisclosure agreement with company B, which has strict rules for research within its span.

One unit of analysis is formed by the technique for collecting data - semi-structured interviews. They were conducted in the first half of 2018 and form the main source of data for this case study. Access to four respondent (Table 1) narratives was negotiated, and the methodological preparation for these interviews was completed. Clear boundaries for the interview were set for the pilot project. Each interview took approximately 2 hours. This span is the average length for in-depth exploratory interviews, and they were recorded for consequent transcription. First, the respondents were acquainted with the flow of the interview and with moral and ethical concerns. After this acknowledgement, the respondents were invited to interpret their narrative onto this pilot project. Next, additional questions were asked to gain supplementary information, which provided thoughts that emerged from a further narrative. Other questions addressed the information that shapes the broad illustration of the context that surrounds the case. These questions were split into a few groups, each of which addressed different aspects:

- Describing the motivation for the examined project
- Describing the phases and activities in the pilot project
- Addressing success in these different phases
- Evaluating the benefits that resulted from the examined project

Table 1: Summary of Respondents

Respondent number	From company	Position within the project	Length of the interview
1	A	solution designer	1,5 hours
2	A	RPA Developer	2 hours
3	A	CEO	2 hours
4	B	process owner	1,5 hours

The composition of the respondents can be seen in Table 1. Three are from company A, and one is from company B. This aspect is caused mainly by the fact that most of the work in the project was performed by company A representatives and that this project was taken as a pilot to validate the new technology for optional launch and further implementation projects. These interviews provide authors with the main source of evidence, but the conclusions cannot be based entirely on interviews. For this reason, the authors asked for documents from software providers (supplied with software instructions and training materials) and project documentation (including process models) held by company A in an unstructured format, but supported with tutorial videos. After the interviews, addi-

tional conversations via email were engaged because, as Yin (2014) noted, case study data collection is not merely a matter of recording data in a mechanical fashion. You must be able to interpret the information as it is being collected and to know immediately, for example, if several sources of information contradict one another and lead to the need for additional evidence. This assertion is aligned with the authors' interpretative research philosophy.

As Yin (2014) noted, critics often discuss the subjective manner in which judgements are used to collect the data in case study research. The same circumstance occurs for generating interpretations in the research philosophy, since its purpose is to understand and not necessarily to measure a phenomenon (Saunders et al., 2016). For this reason, we discuss the methodology very broadly to ensure the validity and reliability, which will preventively serve to eliminate errors and biases in the study.

4 Pilot implementation of RSO and RPA

A brief introduction of the company involved in the project was given in the previous section, but to provide broader information, the specific software used in this case must be introduced. One product is the RSO software platform called Enate. The next important technologies in this case are two RPA tools – Blue Prism and UiPath. There are additional systems (HR system Target, K2 BPMS) that were incorporated into the process within this cooperation, but they did not represent the main units of analysis, and thus their introduction is not needed.

The internal training materials provided to company A by Enate allow an operations manager to remain in control of "who does what", even when the work is being performed by robots. In other words, Enate is a platform where the workflow is created and human workers, RPA robots or other digital agents execute activities within this workflow, which comprises the end-to-end service. Additionally, a console for monitoring and measurement is provided by Enate. Process owners can manually intervene when pertinent to override the standard business rules that are being used by the system to prioritize and distribute the work. Another large benefit in the context of this case is that the operations manager can decide which robots are assigned to individual work *queues*. Thus, multiple RPA solutions can be integrated to draw coherent benefits. This integration is accomplished through API. As the CEO of company A said in an interview "Enate is a workflow management system (WfMS) with the function to integrate and thus manage robots as well as the human workforce."

Both UiPath and Blue Prism work within the premise of RPA. According to the Forrester report (Le Clair, 2017), UiPath, Blue Prism and AutomationAnywhere are the top 3 RPA vendors. UiPath uses Microsoft´s Workflow Foundation in its design studio, and it relies on external partners for direct implementation. UiPath's advantages come out form an open platform and in the creation of their global community, which serves as a home for RPA developers. On the other hand, Blue Prism provides strong load balancing, restart functionality, encryption at rest, audits, and desktop-aligned robots, which are defined and managed centrally. Blue Prism does not have open access to training materials, and it is harder for users to learn and explore its capabilities.

Next, we outline the motivation component, where the summary of reasons to participate from both companies is presented. Subsequently, the concrete flow of activities is described, and in the end, the evaluation of the project is showcased. The next part is already interpreting the interviews as a source of primary data.

4.1 Motivation from both companies to participate

Because the scope of this pilot project implementation is large and its potential is far-reaching in terms of investments and costs, which are primarily significant for company A, there should be a strong motivation toward this case. This stands at the very beginning of applying the new approach and sparks its initiation. This section unveils the initial expectations, which are to be further compared with actual outcomes.

The CEO of company A attended an international conference where he met the CEO of Enate, who has a strong opinion about his product, which was aligned with how he was thinking about the future for RPA and BPM as a whole. The CEO of company A said "I see in the last 2-3 years a tendency of enterprises to pull back from traditional tools, which are in most cases burned out and already fully used on behalf of process change. Therefore, they already have their processes straightened, but now they are facing an unpleasant situation with inhouse systems and with their centralization or transition towards one system, which is tedious and complicated. That's the reason why RPA has a chance to catch their attention." His statement is supplemented with a review in the introduction of this paper, where one of the main benefits of RPA is that it is built upon existing systems. The outcome from this part of the interview is that this benefit is the number one reason why RPA attracted a large number of enterprises.

As he continued, he explained the role of RSO: "The tendency of RPA is reaching enterprises not only in Western Europe but also Central and Eastern Europe, and this trend will continue. Enterprises will continue to invest in increasing robot capacities, gaining more robot instances and of course combining robots and the human workforce. In this stage, there is a room for manager or orchestrator, who will have the ambition and power to manage the task in real time, organize working queues, manage robot utilization and coordinate how transfer between robot/human or human/robot works. This kind of orchestration will have

significant importance in the future." This statement also concurs with researchers in the BPM domain, who already see this shift, and as Aalst (2018) noted, the larger question is which processes should be automated and which should be performed by humans? RSO has the ambition and potential to answer this question. This point was the beginning, where company A started to think about initiating the orchestration of a project. Another reason was that they wanted to expand their portfolio of RPA tools from Blue Prism to another platform - UiPath - to be able to leverage advantages for different opportunities.

On the other side, motivation to start this cooperation from company B is built on the ongoing initiative, which has been already running since 2017 and has an ambition for improving 4 large processes in the HR department of company B:

- Onboarding
- Change in labour-law relationship
- Offboarding
- Managing maternity/parental leave

According to the owner of the onboarding process, who is also incorporated in this initiative: "These 4 processes are administratively very demanding, and activities within them are repetitive, which offers great potential for their standardization and automatization." This initiative starts with the onboarding process, where migration to the K2 BPM system was initiated to manage the whole process under one system. During the implementation, they ran into a problem, where data from the K2 system to the HR system Target had to be imported. While solving this problem, they encountered RPA, which struck them as a "great solution" according to the onboarding process owner. That is how the cooperation between the companies involved in this case study started.

Choosing the right partner for company A in this pilot project was clear because of the good relationship between the two companies and because of the RPA implementation, which was already in place at company B. Another reason for testing the RSO comes from the initiative at company B (described earlier), where the implementation of additional robots is planned for future projects. Thus, the CEO from company A and the HR process owner from company B started to negotiate the conditions and course of the pilot orchestration project. According to the solution designer, who also attended this negotiation, the aim of the project was "to improve the business process."

4.2 Process discovery and building an as-is process model

After approval from both sides, an appropriate process must be selected. Given the fact that the RPA robot is already incorporated into one process, while company B is under an ongoing change initiative in the HR department, the onboarding process within the HR department was chosen as an ideal candidate for this pilot project. Parts of this process are highly structured. Two core systems and two external services operate within the process, and before the RPA implementation, a large amount of manual work (data manipulation) must be done. As Fersht and Slaby (2012) noted, these are the very fundamental characteristics for the process to be the right candidate for RPA implementation. The proper selection for RSO subjects uses the same criteria as suitable RPA candidates, with the exception that it is advantageous if the process has handovers between human and robot workers throughout the flow. That is correct in the case of onboarding processes, where a large number of personal contacts with the applicant is required. When the process for the project was set, working groups were organized on both sides. On the company B side, an onboarding process owner and a project manager supported the owner from the IT standpoint. On the company A side, a group around the main solution designer had the RPA developer at their disposal with the support of the CEO of company A.

Company B did not have the initial workflow model according to the CEO of company A, but in the interviews, the process owner from company B said that they already had "some" model that served as the main input for building an as-is process model. This contradiction only shows insufficient terminology alignment, which could cause further problems in a project. Thus, according to team members from company A, the first phase led to process discovery, which finished with as-is process. The discovery was based on several interviews with process owners and process participants and on process documentation from company B. After a few weeks, the workflow model was built and validated.

Company B operates with K2 software, which is presenting itself as a BPM system. In the workflow, the map is represented in green activities. Another system entering into workflow model is the so-called portal, which runs under the K2 system. It is a cloud solution, where applicants have an access point and can communicate through it. It is symbolized by red colour activities. Finally, yellow activities represent email actions, and one blue activity (entering data into the HR system), Target, represents the HR system.

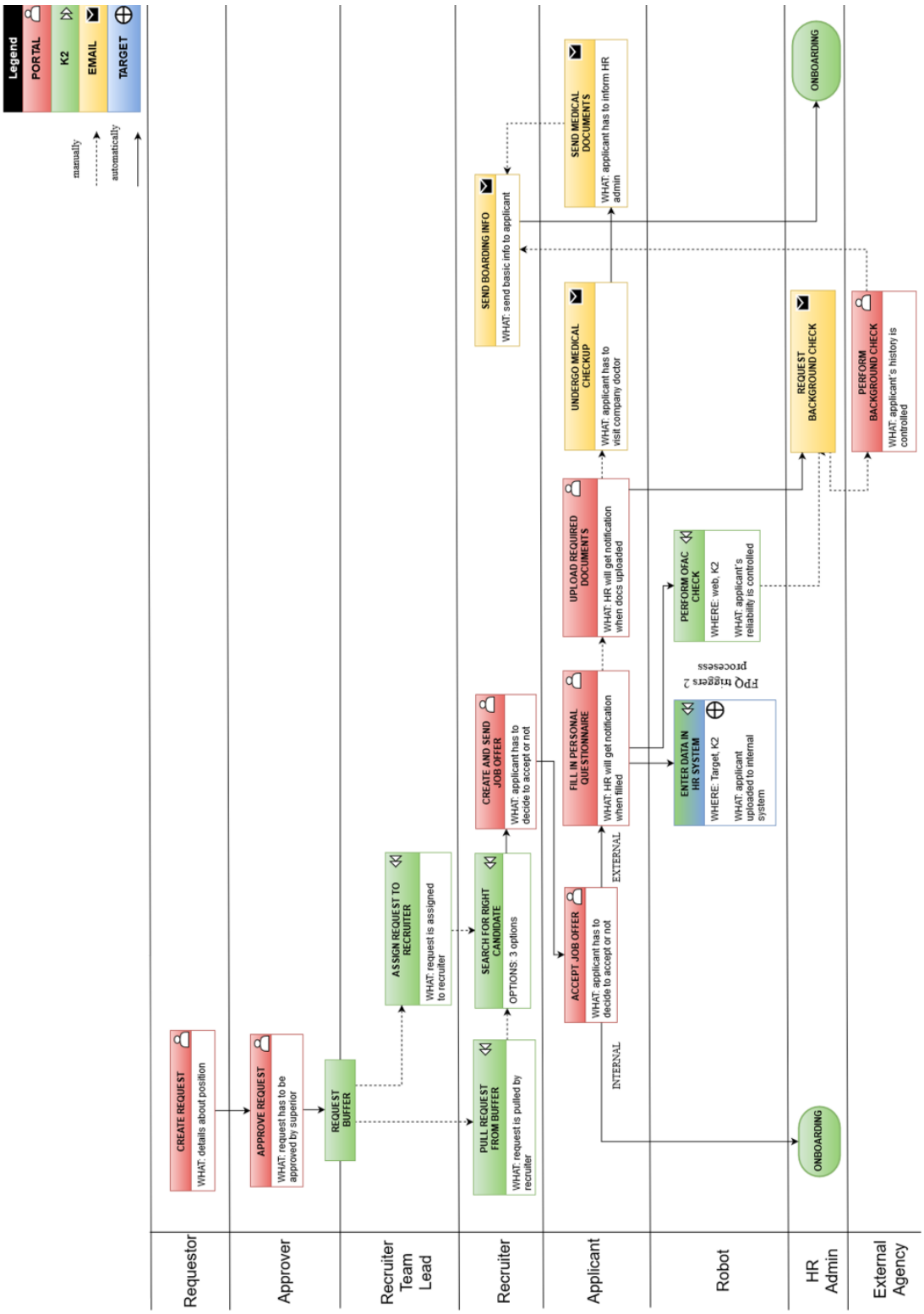

Figure 1: As-is process model. Source: internal documents of Company A

4.2.1 As-is process description

The as-is process description was put together by analysing a transcript of narratives of representatives from both companies which was done by project team from company A. Final process model is shown in figure 1. It should clarify the onboarding process itself, which is a prerequisite for grasping the whole implementation project. The onboarding process starts with a requestor creating a request that contains details about the position (job description). This requestor is typically a team leader who has the competency to raise a request about the new job. This step must be approved in the internal portal by an approver, and then it routes to the request *buffer* in the K2 BPM system. From this *buffer*, the individual cases are pulled from the queue by recruiters or are directly assigned to some of the recruiters. Then, the actual selection of the right candidate is performed through a series of interviews - one phone interview and then two rounds of recruitment procedure. From this step, the successful candidate is chosen, and at the same time, a job offer is generated, and a recruiter then determines if the candidate will be onboarded. After this step, there are two options. If the applicant is (1) an internal employee, the process is now finished because he/she had already been through the following steps. If it is (2) an external applicant, then a series of further actions is necessary. After filling out the personal questionnaire in the portal, the RPA robot (Blue Prism) performs 2 tasks (Figure 2). The first task is to enter data from the K2 portal into the HR system in Target, and the second task is the OFAC (Office of Foreign Assets Control) check, which is done through a publicly available database on the internet and ensures foreign verifiability in terms of terrorism, financial crimes, and so on. Hereafter, the applicant is requested to upload documents such as a certificate confirming their education, personal photo and, depending on the position, specific security documents. This step is not dependent on tasks performed by a robot, but the series of subsequent tasks already are. These steps assure a medical check-up for the applicant and that the document will head back to the recruiter. In combination with a successful background check performed by the external agency, the HR admin finishes this process with complete onboarding. The onboarding process frequency is approximately 30-50 instances per month.

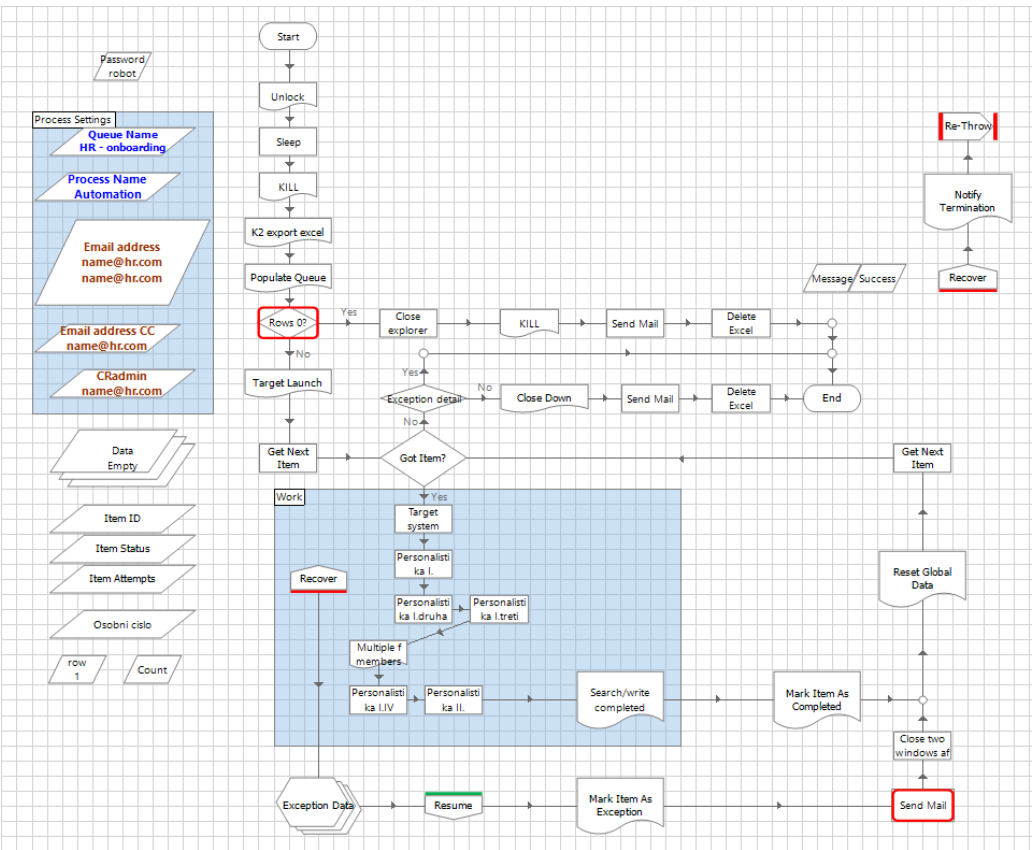

Figure 2: Illustration of part of the workflow from Blue Prism, representing the "enter data in HR system" task. Source: Internal documents from company A

4.3 Process discovery and building an as-is process model

Simultaneously with the process discovery phase, the training in the RSO took place in company A. They already obtained training in the RPA because that is the core business of company A, but RSO and Enate software were completely new for them. There were 3 levels of training. A total of 3 developers entered training level 1, which was more generally focused on an introduction to the Enate tool from the end-user viewpoint. Level 2 training continued as a gradual to-be process model was built. Only one RPA developer advanced to this level. Training in this phase was based on individual appointments via online calls to discuss the progress on the case. The content of this training was formed around the developers' issues, such as the connectivity to RPA platforms. Right after the first level of training, the RPA developer and solution designer from company A started to build the to-be process model in Enate, which was to experiment with all of the tool capabilities. Training in the RPA implementation was not necessary because the RPA developer and solution designer were already trained in the Blue Prism and UiPath software.

4.4 Designing the to-be process model and implementation

As a solution designer said: "In order to succeed with this project, we needed to consult the support from Enate iteratively within weekly cycles because this type of project was a pilot even for them". The solution designer meant that even Enate did not integrate these two (Blue Prism, UiPath) RPA platforms before. The reason is the new essence of RSO tools such as Enate. This support from the solution provider turned out to be crucial. The aim of this phase was to transform the as-is model to the to-be process model in Enate and to secure its functionality. First, the overall process logic had to be created in Enate. The complexity of the as-is model was altered by a simple 5 phase workflow. To better understand the logic of Enate, the basic archetype definition from the Enate training materials is required. First, there is a case, which represents one process instance and a series of follow up steps. On the same level as a case, there is a ticket (used for do-done diagrams). The *case* is split into *steps*, and *steps* are further divided into *actions*. The initial reflection was that this process will be composed of several *cases*, but after the feedback from Enate's designers, they decided that the whole process will be classified as one case to simplify the process logic. As was previously stated in the motivation section of the paper, one of the incentives was to widen the portfolio of provided RPA solutions by company A. To fully exhibit and discover the potential of Enate, the main idea was that two RPA platforms (Blue Prism, already engaged in the as-is process, and UiPath) will be deployed to this process - each of them integrated within Enate. "We can talk about real human/robot orchestration only by providing this solution", the solution designer noted.

When the overall logic was set, there was time for RPA integration. The RPA developer proclaimed: "We used the API interface working on REST services for integrating both robots from UiPath and Blue Prism. The original solutions were that robots will work just like a human, even on this interface, which could cause problems. However, our final solution was that the robot was not working on the Enate interface as a human worker, but instead entered orders through the web service." Robots were working based on the pre-defined *scheduler* because of RPA robots interacting with the *pull from the queue* command, which serves as a check on whether there is some instance in the queue waiting for a robot. There are 3 types of working items in Enate:

- Manual type action
- Email action
- Actions that could be performed by a robot – run the robot task

4.4.1 To-be process description

The description was obtained from the internal documents (project video) of company A. The to-be process model itself is showcased in figure 3. First, part of this phase was to determine the potential for process redesign and enables the process to enter the next step in the best manner possible. The process redesign merged the first 2 steps of the process because there were 2 non-value adding steps to create and approve the new request, and they were redesigned into a request validation step. This redesign is rather cosmetic, but it provides simplification for the process model, which is now more definite. By opening a new position, the new case (*work packet*) in Enate is created. The output from this initial step is assigned to a specific recruiter. Further actions are dedicated to selecting the right candidate, and after the selection, the right candidate's profile is created in Enate by the recruiter. Next, it is time for processing all of the necessary documents and data about the candidate. These actions are performed by the RPA robots - each of them (Blue Prism, UiPath) performing different tasks. The UiPath robot now performs the OFAC check previously done by Blue Prism, and the Blue Prism robot retains the execution of administrating HR related data in the Target HR system. All of these steps are performed in real time and are controlled by Enate. When both of the robots are finished, the Enate automation capacities come into play. Enate generates a new email to the applicant with medical check instructions attached, and the system sends out the information automatically. When the medical check-up is completed, a new email is generated with on-boarding information. After this step, the candidate is ready to be on-boarded, the case is closed, and a full history of action is provided and available.

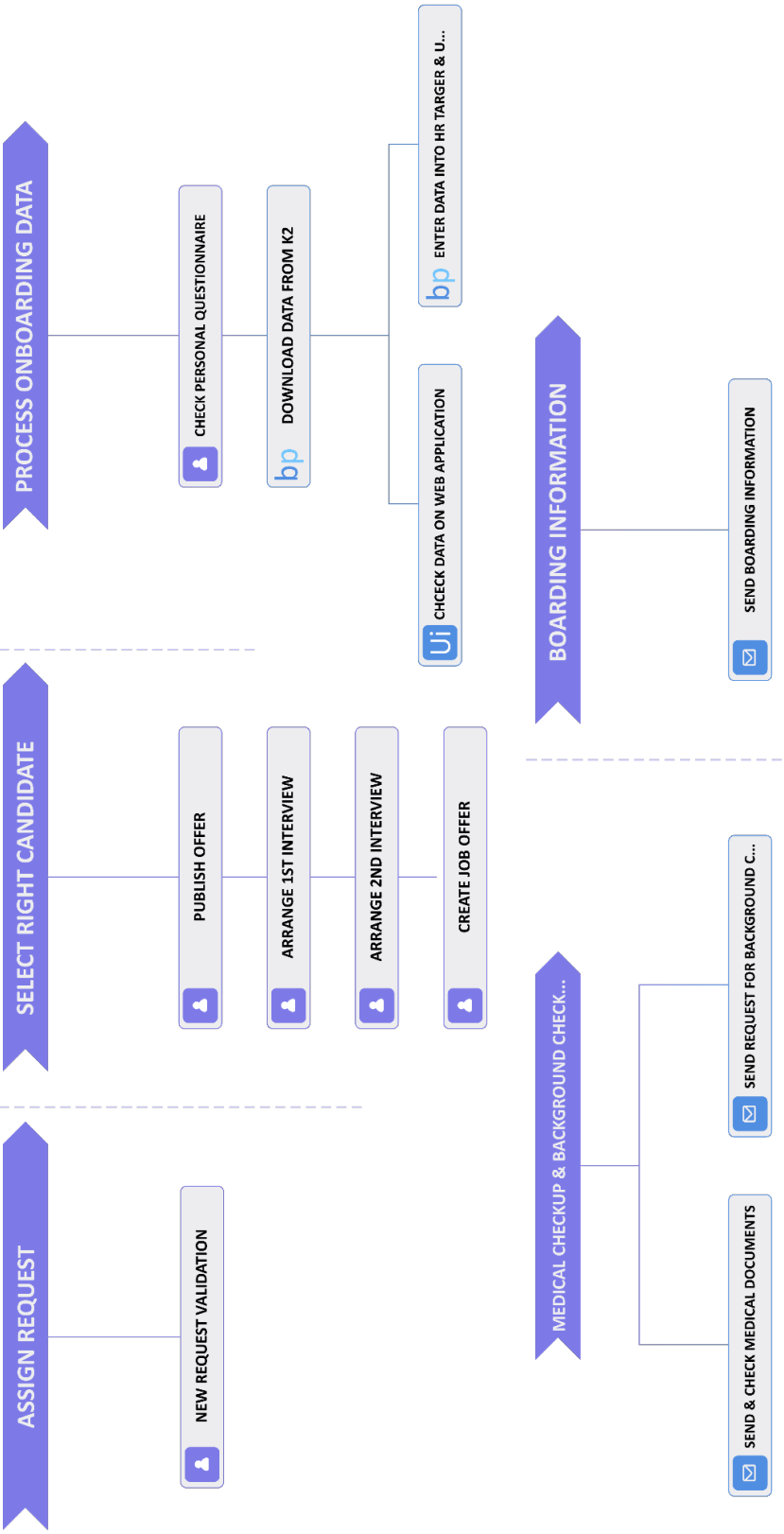

Figure 3: To-be process model designed in Enate

4.5 Testing and Validation

To validate the proposed solution, a series of tests must be done to secure the proper functionalities. According to the solution designer, the testing was logically split into two phases. Separate testing is performed for the RPA robots and - then for the RSO platform - Enate. In the case of RPA robots, according to the RPA developer: "Testing was done in close cooperation with company B, where we obtain an anonymous dataset that we ran through the workflow." This is an ordinary procedure, which focuses on the part of the workflow where a human worker makes many mistakes. From this part of the testing *exception handling models* are created and built into the original workflow. Company B established the test environment in the final destination - Target system. The RPA developer then could set up the robot on the real interface without potentially causing issues in the real-time version. After the *exception handling models* are created and the data test shows no more exceptions arising, the access to the real-time version of Target was managed. Under the tight supervision of HR administrator, the first real workflow was done through robots and then was checked to confirm the correctness of the embedded data. This test was conducted several times, and then the robot went fully into life. The overall time requirement for testing the RPA robots was the same as the time intended for robot developing, and thus, if one robot took 10 hours to construct, an additional 10 hours was the approximate time required for the testing. The follow-up testing continued onto the RSO layer. Here, the integration of robots was tested to validate the ability of Enate to communicate with both RPA platforms - Blue Prism and UiPath.

4.6 Innovation and benefits (evaluation)

The original agreement between companies A and B did not account for advancing the project into the production phase - live operations. The main purpose of this pilot project was to show the potential and test the new platform (Enate) in real conditions and to prove technical feasibility, much as it is in proof-of-concept scenarios. Outputs from this pilot project will be used in the future when company B is planning to scale robot capacities within the broad HR initiative, as was mentioned in the motivation section. The RPA developer noted: "To achieve real results, there is a need to scale the robots, which will proportionally increase the value brought by the RSO." This claim is supported by the HR process owner from company B: "In the context of our whole initiative in HR, we are talking about hundreds of cases per month, where several robots will participate. When this happens, Enate will run above K2, and other systems and managers will have a global view on the human/robot execution of processes."

The evaluation went on immediately after testing and validation. According to the CEO of company A, the evaluation was split into two groups, namely, internal (company A) and external (company B) factors (Table 2). Internal here means the amount of time resources dedicated towards this project in order to assess it on behalf of similar future projects. Quantification was measured in Man Days (MD), which represents one working day (8 hours) of one employee. According to the RPA developer of the company A, this whole pilot project took 28 MD: 5 MD for the process analysis, 13 MD for RPA development and 10 for RSO implementation.

The external factors are further split into soft and hard benefits. As the CEO of A company said, "The hard metrics remain the same as usual - different sets of key performance indicators (KPIs), processing time, quality, throughput, resource utilization or bottleneck identification." A boost to all of these metrics could be delivered by RPA and RSO, as seen in the presented case. According to the process owner of company B, the improvements in partial activities performed by robots are astonishing. The processing time of the first robotic workflow - entering data into the HR system (Target), was reduced from 15 minutes (done before by humans) to 3 minutes (done now by a robot), without any intervention needed. The OFAC check workflow time was reduced from 5 minutes to 1 minute. Based on the reported average number of cases per month (30-50), the overall savings from these two workflows are 10 hours per month, which could be recalculated to 1,25 MD saved for every month. In the context of the entire onboarding process, these savings did not cause much improvement in the processing time because the process is too complex. It still takes several days or weeks to be completed and relies on the participation of external subjects such as applicants, external companies, medical check-ups, job interviews, and so on. However, the most important qualitative benefit according to the process owner and solution designer is rooted in the reduction of error rates, in which the robots contribute close to zero errors.

Another large benefit arises from the soft metrics. The CEO of Company A shares thoughts on this topic: "Our company could use this robotic capacity when human resources are over-utilized or when the HR department can't manage to onboard or train on time. Another huge field of opportunity is the highly repetitive tasks, which are still done by humans and could cause burnout and other professional issues. This could be undertaken by robot capabilities, and in a time where work-life balance is a trend, it could be communicated as an employee benefit." Next, advantages are provided to the HR managers, who can organize work in real time and obtain reports with analytics. The RPA developer mentioned additional value for the process participants, who execute the workflow, as it is an opportunity to obtain support when guidance through the process is needed. Then, the participant could ask directly for support through Enate to the IT department or colleague. The perspective of the process owner from compa-

Table 2: Summary of quantified evaluation

Company A		Company B		
Activities	Time consumption	Task	Done by human	Done by robot
Process analysis	5 MDs	Enter data from K2 to Target	15 min.	3 min.
Developing UiPath	3 MDs	Perform the OFAC check	5 min.	1 min.
Developing Blue Prism	10 MDs	Number of cases per month	30-50 cases	
Developing Enate	10 MDs	Savings	1.25 MDs/per month	
Sum	28 MDs			

ny B is rather pragmatic. She said that with the shortening of the processing time of key activities by transferring the workload to robots within onboarding process, there is additional space for recruiters to take care of applicants and to serve them more quickly, which is a competitive advantage in the labour market. Simplification of process management is achieved as well. The HR process owner claims that "I didn't have to go through several systems to manage the process. I will have everything organized on one dashboard." This feature is a great benefit because it saves time for the manager, who is considered to be a more expensive resource in the company.

The CEO of company A speaks about the innovation in the approach taken in this project as one of the first of its type, when both human and robot workforces are working together under one auspice. He explained the situation by saying: "If we use BPMSs, we can manage human resources and through this platform see everything we need except for the work done by robots. On the other hand, RPA provides us with analytics and dashboards to support our decision making, but only on the robotic part. Enate is standing above both these systems to provide managers with a complex picture of robots and humans working together." The interview shows that respondents perceive RPA as a main provider of quantitative benefits (improvement in the processing time) and RSO as a technology that brings qualitative benefits (better management and quality). Even though the last part of the case study is presenting an evaluation, it is meant to strengthen the exploratory findings. The authors consider the evaluation of such a unique case important because it will affect the future potential of this type of technology.

5 Discussion

The overall case study brings insight into the implementation of orchestration solution. This could inspire other companies which are considering usage of RPA or RSO technology and provide them with exemplary case outlying the course of implementation project. The theoretical implications are predetermined by exploratory nature of this study which helps authors deeply analyse this trendy technology and grasp for the future research. It also uncovers the future potential for this technology and showcase its strengths.

The limitations of this study are rooted in single case study research, where every outcome arises from the one particular case. Even though this case is a very specific and unique case, it draws the additional question of how these outcomes are replicable and useful for future research. The authors consider the pilot nature of the project to be a limitation because it could cause divergence in behaviour in comparison with the fact that the involved participants will anticipate that this project will transfer to live operations. These questions can only be answered by further research because of the RPA and the predominant RSO frame are white space in the BPM community. Another limitation of this study is the number of respondents from company B. Authors interviewed only one respondent from company B, which limits the conclusions.

For future research, the authors intend to work with the premise that RPA and RSO are changing the BPM domain from the standpoint of implementation/deployment approaches and/or critical success factors. Authors intend to create a valid framework for implementing RPA as an effective automation tool. It should help companies adapt to even more agile approach of automating business processes. Additionally, with increases in the numbers of robots implemented and growing RPA initiatives in companies such as company B, the need for robot/human orchestration will increase. Hence, multiple case study research or research based on larger samples is required, which could bring these assumptions to a more reliable and generalizable form.

RSO expansion is according to CEO of company A not matter of present. Companies are occupied with digital transformation and implementing RPA, so RSO will come after RPA achieves higher level of maturity, which will lead to broader adoption. Authors predict that human/robot orchestration will be an emerging topic in BPM community.

In the interview, the solution designer stumbled upon the forecast for the RSO. "The development of IT capacity and overall technology will move forward to a state where robots will not only execute the workflow but also assign the work across the company to both robots and humans. This step needs considerable development of AI and self-learning algorithms." Another associated topic is

a question of ethics and morale, because the robot in this forecast serves more as a manager. This shift is considered across society and is a controversial theme for discussion, but as was said by the CEO of company A in the evaluation section, robots are made for serving humans in automating highly repetitive tasks, which are often quite unpleasant and implacable for human workers. Another interesting topic of future research could be how internally communicate changes in ration of human-to-software robots workforce.

6 Conclusion

Our research paper addresses the current trend in the field of automation of business processes among consulting and technology companies - RPA, and adding an orchestration layer assured by the RSO system Enate.

In presented exploratory case study, the main focus was to explore the driving forces, the variables and the overall approach, which are represented by a set of consecutive phases and activities in implementing the pilot project

To distill the descriptive form of case study to the usable ideas which are signature for exploratory studies, authors extract these key insights:

- The implementation phase shows that the integration through API is a more reliable solution as using screen scraping or screen recordings techniques. When using screen scraping, the RPA robots are depending on the stability of underlying IS.
- The BPM maturity or previous experience is not needed for RPA as it is „only" the automation tool. On the other hand, in terms of RSO, BPM maturity is needed. RSO have to build on existing process architecture or outgoing process initiative. RPA is perceived by respondents as a tactical tool but RSO is already implemented in the strategy level of management.
- RSO is concurrent and RPA is complemented towards BPMS. The positioning of RPA and RSO in comparison with BPMS is crucial. In analyzed case, there was mentioned about potential replacement of existing BPMS (K2) with RSO as the RPA robots will scale up.
- The biggest advantage of RPA is agility and flexibility provided to users with its short implementation cycles. It enables the RPA to quick scale up and to reach to the point where the robots have to be manageable inhouse – potential for RSO platform.
- Focus on process modelling and description is a key initial phase as the RPA is built on exact rules. The selection of process needs to focus on the ones precisely specified. The AI in RPA or RSO is still in its infancy and according to respondents, RPA tools are still rule-based.

Next few years will show if RPA and RSO are considered as a generally accepted tools for automating business processes and not only another package of existing technology, which is hyped by consulting and software houses. Further rigorous view has to be taken in order to reliably discover the benefits of this technology and how to achieve them.

Acknowledgement

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Kako lahko orkestracija robot / človek pomaga kadrovskem oddelku: Študija primera pilotne implementacije

Ozadje in namen: Cilj naše raziskave je proučiti trenutni trend avtomatizacije poslovnih procesov s programskimi roboti (Robotic Process Automation - RPA) in njihovo upravljanje znotraj podjetniškega okolja, kjer večino procesov izvaja človeška delovna sila. Z vse večjo uporabo tehnologije RPA raste tudi povpraševanje po njenem usklajevanju. Na možno rešitev tega izziva kažejo v študije primerov, kjer so uvedli orkestracijsko platformo konkretnega poslovnega procesa na kadrovskem oddelku. Namen tega prispevka je raziskati faze in dejavnosti pilotnega projekta orkestracije robotskih storitev (RSO) v kombinaciji s tehnologijo RPA in oceniti morebitne koristi.
Oblikovanje / metodologija / pristop: Za namene naše raziskave smo uporabili pristop študije primera, to je implementacije platforme RSO v kombinaciji s tehnologijo RPA, in predlagali oceno prihodnjih koristi. Primer je vključuje dve podjetji - (1) večnacionalno podjetje, ki si nenehno prizadeva za avtomatizacijo postopka, (2) tehnološko in svetovalno podjetje, ki ponuja rešitve za avtomatizacijo. Podatki so bili zbrani s polstrukturiranimi intervjuji z anketiranci iz teh dveh podjetij in z analizo internih dokumentov.
Rezultati: Analiza primera iz tega prispevka je pokazala na nekaj ključnih spoznanj: (1) strateški položaj RSO in taktični položaj RPA do obstoječih sistemov, (2) potreba po večji osredotočenosti na začetno fazo modeliranja procesa, (3) uporaba oz. vključevanje programskega vmesnika (API) je izvedljiva rešitev za RPA, (4) največja prednost RPA je njegova prilagodljivost in (5) RSO ima potencial, da v prihodnosti nadomesti BPMS.
Zaključki: Preden bi se orkestracija lahko izplačala, je najprej potrebno v podjetju uvesti večje število programskih robotov. Na drugi strani pa sedanje rešitve sistemov za upravljanje poslovnih procesov (BPMS) ne ponujajo funkcionalnosti za upravljanje človeške in programske robotske delovne sile. Pričakuje se, da se bo RPA razširil, brez ustrezne orkestracije pa učinkovitost ne bo mogla rasti.

Ključne besede: orkestracija robotskih storitev, avtomatizacija robotskih procesov, pilotna izvedba, študija primera, človeški viri

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Strategic SCM's Mediating Effect on the Sustainable Operations: Multinational Perspective

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Background and Purpose: The comparative cross-sectional study examines the strategic supply chain management's mediating effect on the sustainable operations through environmental and social sustainability within the businesses operating in Canada, Iran and Turkey to attain global perspective.
Methodology: Over 200 small businesses in each country are included through combining purposive sampling, referrals, networking, and connections. For quantitative data analysis, the Smart partial least square structural equation modeling (SmartPLS-SEM) is employed.
Results: Results showed that there is statistically significant positive mediating role of strategic supply chain on the sustainable operations (environmental and social sustainable) performances in all three selected economies. Findings further confirmed that within the multinational perspective, the SCM factors have higher significant positive impact within Canada in contrast to Iran and Turkey.
Conclusion: This study offers a new theoretical contribution by examining the mediating role of strategic supply chain from multinational perspective to enhance existing body of knowledge. Furthermore, it offers a practical contribution by providing the strategic research framework to facilitate managers in improving the small businesses' performance in sustaining operations.

Keywords: *Environmental sustainability, multinational perspective, social sustainability, sustainable operations, strategic supply chain management*

1 Introduction

At national and international level, the economic growth improves to a larger extent through the operations of Small businesses (OECD, 2009). For the survival and thriving within the complex business environment, it is essential for the SMEs operating in different economies to develop and execute appropriate strategies (Kljucnikov, Belas, Kozubikova and Pasekova, 2016; Kozubikova, Homolka and Kristalas, 2017). Therefore, the conceptual application of the supply chain management within the SMEs related to functioning strategies forms as most important aspect

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because of the operations of supply chain closely associated with the set of activities, starting from extraction of raw material by means of transformation and flow of products till reaching the end-consumers (Kovács and Kot, 2016). Within the procedure of supply chain activities, the flow of information is also very important. Liberko, Bednarová, Hajduová and Chovancová (2015) stated that the supply chain perspective is more vital focus in the present era because of intense competition. To larger extent in modern era, there has been growth in the technological advancement for accessing information, on time deliver and providing good quality products at affordable prices to meet expectations of the consumers (Kovács and Kot, 2016; Liberko et al. 2015). Conversely, it is vital that businesses take proper measures and actions to ensure there is preferably no or limited negative impact on the environment and societies because these firms do not operate in vacuum. Thus, it is pivotal for the small businesses to ensure that the functionality of supply chain management is carried out in rightly strategic manner.

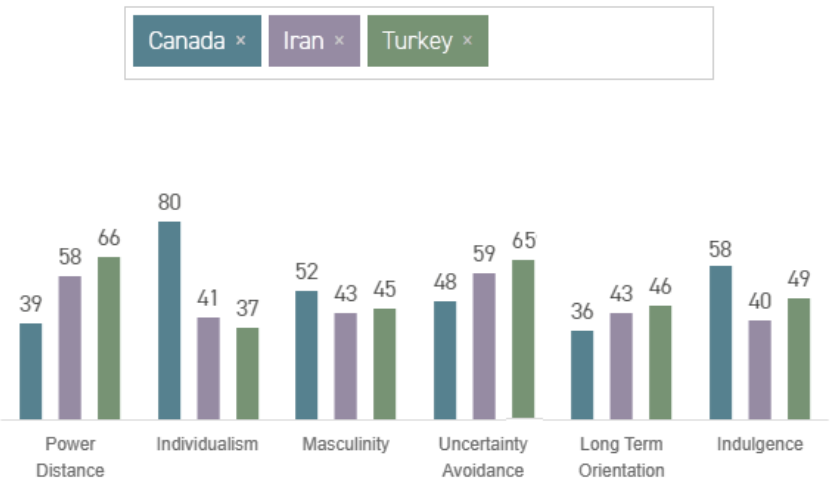

Figure 1: Hofstede's Cultural Dimension Comparison (Source: Hofstede-insight.com)

Kovács and Kot (2016) found that the operations and process of supply chain management remain similar to larger extent in all types of economies. In order to have multinational perspective, three distinctive economies are considered that shares similar features and trends within the SMEs sector. Moreover, Hofstede's cultural dimensions are considered as another criteria for selection of the distinctive countries. Considering Hofstede's cultural dimension, the criteria was set to ensure 50% of the dimensions to be similar in properties. In this regard, masculinity is one dimension that are closed to similar as of now Canada (52), Iran (43) and Turkey (45) masculinity. Hence, all three have almost over 40 scores in masculinity, which means there is higher masculine culture. Another dimension is "long-term orientation" having fractional variation among Canada (36), Iran (43) and Turkey (46). Additionally, "uncertainty avoidance" are also similar to large extent Canada (48), Iran (59) and Turkey (65) while indulgence is Canada (58), Iran (40) and Turkey (49). Thus, to some extent, four dimensions have almost similar types of set of properties and therefore, these are considered cases for this study.

Another criterion for the selection of these cases is based on the Human Development Index (HDI) for considering these countries as cases. The Human Development Report (2017) revealed that although, Canada has higher HDI (0.926) but there is not much difference between Turkey (0.792) and Iran (0.798) while employment vulnerability, work, gender, human security, communication and mobility in all three considered economies are same, thus, these three countries are considered for the purpose of study.

Ducker (1998) argued that there is a visible shift in the paradigm of managerial literature with the passage of time. Habib (2011) stated, "one of the most significant changes in paradigm of modern business management is that individual businesses no longer compete as solely autonomous entities, but rather as supply chains. Business management has entered the era of inter-network competition and the ultimate success of a single business will depend on management's ability to integrate the company's intricate network of business relationships". Hence, it is important in explaining the concepts of intricated network theory. Relational view theory of firm's dyads and network

in the supply chain management has been used often to understand strategic supply chain management. Within the complex competitive environment, due to flexible intricated approach there is often a usage of the relational view theory in the SCM (Dyer and Singh, 1998). Nevertheless, firm's dyads and network are significant in understanding the business dynamics and firm's overall performance (Lavie, 2006).

Resource-based theory is also used for understanding the supply chain management's functionality, but it is limited in explaining the higher overall performance within the business in order to attain competitive advantage (Blanchard, 2010). Nonetheless, "from the unit of analysis, this is evident that RBV fails to confirm the competitive advantage while the dyads and network theory as part of relational view reveals that the organisations having higher level of networking have more strong grip on the market as they remain competitive in reducing the inventory time and improve the quality of the work through shared expertise" (Ramsay, 2001). Barney (2012) argued that many aspects of the strategic supply chain management are implemented and understood by using the relational view perspective (Barney, 2012). Yet, through adoption of relational view theory of firm's dyads and network for investigating the supply chain management in the manufacturing and services industry operating in the cross-cultural context is under research. The comparative mode to attain multinational perspective is effective in delimiting the region specificity by offering superior knowledge in broader context. Hence, the gap in the literature is filled by offering evidence from cross-cultural comparative perspective. In addition to that, the resource-based view (RBV) has a biggest drawback of using "unit of analysis" by primarily focusing on internal resource whereas there is need to find a right-fit between internal and external attributes associated with strategic supply chain management. This limitation of RBV to be overcome through this study.

The study aim is, "to examine the mediating effect of strategic supply chain management within the small businesses on the sustainable operations (environmental and social sustainability) from multinational perspective".

2 Literature Review

Higher variations and inconsistent findings are traced in the considered wide range of supply chain management related empirical studies. For instance, Truong et al. (2017) found that the small businesses operations are significantly affected by the strategic SCM. Nevertheless, same study did not find the small businesses operations in relation to social and environmental sustainability.

The strategic SCM components including practices, determinants, and supporting factors are found to add competitive advantage to operations through cost reduction and effective adoption of sophisticated technology (Arend and Wisner, 2005) while still less is researched from the sustainability perspective.

SCM practices are not always right fit for SMEs because of the challenges related to proper execution and implementation as the operations are frequently carried on small scale whereas the rate of investment remains lower that further weakens the strategic SCM execution (Arend and Wisner, 2005). Nevertheless, plethora of research found that SMEs' sustainable operations as well as overall performance improved due to strategic SCM because it helps the businesses in keeping a steady focus on the activities to ensure they remain competitive, transparent, and sustainable (Thakkar, Kanda and Deshmukh, 2011; Tvaronavičienė, Razminienė and Piccinetti, 2015). Strategic supply chain has a positive linkage with the factors supporting supply chain management (Awheda et al. 2016; Malik et al. 2014). On the other hand, Kherbach and Mocan (2015) found statistically no significant impact of supporting factors of SCM on the strategic supply chain management within the SMEs. Having said that, there is no conclusive evidence confirming the nature of relationship from multinational context.

Hypothesis 1 - *Strategic supply chain management of small businesses is significant positively affected by factors supporting SCM in Iran, Turkey, and Canada.*

However, although, often SMEs perceive that strategic SCM is linked with the process of ensuring higher satisfaction of the consumers through large investment in advanced information technology (Kumar, Singh and Shankar, 2015), instead of taking into consideration the strategic SCM's impact on the environmental and social sustainability (separate dimensions of sustainable operations). Interestingly, plethora of empirical studies have frequently used the terminologies such as "small and medium-sized enterprises", "strategic management" and "supply chain" in their titles but failed to explain in-depth the impact of strategic SCM in relation to sustainability (Kot et al. 2018).

Zowada (2011) argued that SMEs via its SCM channelized activities and performances is the way to tackle the challenges related to environmental and social sustainability. In this regard, practices of supply chain management are highly invaluable for the SMEs. Adaptability, flexibility, and low-cost strategies so that environmental challenges along with fulfilment of requirements of the consumers are vital features that to some extent facilitate business to sustain stable positioning in the environment" (Zowada, 2011). SMEs support functioning is vital in linking activities chain in sustainable and desired manner (Kisperska-Moroń, Klosa, Świerczek and Liniecki, 2010). Interestingly, key performance indicators (KPIs) are also important in determining the impact of SCM activities within the SMEs (Dumitrascu and Hila, 2017). Nevertheless, considering the challenges of environmental and

social sustainability, the KPIs are less significant and effective because every organisation is different from one another.

"Literature provide the insight regarding services, quality, speed and value formation for the end-consumers are some of the dimensions to measure the strategic outlook and performance of SCM" (Ghicajanu, 2014). These aforementioned dimensions are most appropriate way to explain the business model and solutions for meeting unique external environmental challenges (Ghicajanu, 2014). Thus, it is found that open and flexible approach for redesigning and restructuring activities of supply chain are part of strategic SCM so that various external challenges could be dealt. Procter & Gamble (P&G) is one of the examples that has modified supply chain activities so that SCM operates in effective and efficient way to cope up with environmental challenges (Sundarakani, 2006).

Vasiliu and Dobrea (2013) carried out a research on issues and challenges related to SCM in different organisations, yet their findings are inconclusive because it fails to explain the causes for lower sustainable impact in the presence of integrated and incorporated activities. Additionally, Dumitrascu and Hila (2017) highlighted the drawback of Vasiliu and Dobrea's research that sample size is relatively small for drawing comprehensive conclusion. Nonetheless, Diaconu and Alpopi (2014) argued that SCM has both; strengths and weaknesses when opts for being more strategic and rational in its approach to deal with the environmental uncertainties. Same study argued that coordination, measurements, IT support, processing pattern and strategic orientation have its pros and cons. Nevertheless, at times the strategic SCM is highly effective in enhancing services level yet end short in reducing the negative impact on the operational environment (Diaconu and Alpopi, 2014). Hence, communication needs as well as SCM supporting factors are required to be improved so that sustainable desired operations develop and reduction in the adverse impact on external stakeholders (Diaconu and Alpopi, 2014).

Different organisations use a peripheral tool "Enterprise Resource Planning" (ERP) in order to have financial and other resources being used highly effectively, although, the operations and process of SCM does not improve significantly because of ERP (Ţarţavulea and Petrariu, 2013). Conversely, Kherbach and Mocan (2015) argued that large enterprises have advantage over the SMEs because of the tendency to use human, technological, and financial resources for reducing negative effect on the external environment. The organisational flexibility has a tendency of improving the effectiveness in meeting and fulfilling the requirements of the market and ensure the reduction in the negative impact on the operational environment (Kherbach and Mocan, 2015).

Although, however the Oracle survey on IDG connect was executed in four different regions, namely, (a) Asia Pacific, (b) Europe, Middle East and Africa (EMA), (c) Central and South America and (d) North America for examining the cloud-based SCM solutions having an impact of the societies and environment (Oracle, 2016). Findings showed that this strategic move leads to increase operational efficiency and productivity, reduction on operational cost while enabling businesses to deal with different types of environmental challenges (Oracle, 2016). However, the work of Lorentz, Touli, Solakivi and Ojala (2013) found that IT components of several types as part of strategic SCM are not always effective in the reduction on negative impact on social and environmental sustainability. In fact, they become a barrier for smooth flow of operations. Despite mix evidences, there are no conclusive evidence about the practices affecting strategic supply chain management in different economies. Therefore, hypothesis 2 is developed:

Hypothesis 2 - *Strategic supply chain management of small businesses is significant positively affected by practices of SCM in Iran, Turkey, and Canada.*

Fung, Morton and Chong (2010) argued that the environmental sustainability improves due to channelizing and executing the environmental-friendly policies and practices within the supply chain management process. However, Harms (2011) found the obligatory incorporation of environmental and social dimensions within the SCM operations is effective in the expansion of diverse socio-economic aspects. Having said that, yet the research area is under studied because there is no conclusive evidence about the environmental and social sustainability (separate dimensions of sustainability) linkage with the strategic supply chain management in SMEs within different types of economies.

The strategic SCM of SMEs are significant affected by the determinants whereas practices are non-significant in doing so (Harasi, 2015). There is inconclusive evidence regarding the varying impact of strategic SCM on social and environmental sustainability in emerging-middle ranged-developed economies. In the absence of appropriate strategic SCM, there is negative impact on the social sustainability of the organisation (Awheda, Rahman, Ramli and Arshad, 2016; Malik, Musa, Ahmad and Mohamad, 2014; Mani, Agrawal and Sharma, 2015). "The operational efficiency tends to reduce to negative affect of inadequate strategic SCM on social sustainability" (Mani et al. 2015).

The previous empirical studies showed that determinants of supply chain management have a significant positive impact on the strategic supply chain management among different SMEs (Arend and Wisner, 2005; Koh et al. 2007). Furthermore, work of Harsi (2015) revealed that different organisational components (determinants) develop a strong positive impact on the strategic supply chain management for the SMEs because of the nature of these organisational component are un-observe variable. Still, there is no clear evidence from the previous studies

confirming the nature of impact of determinants of SCM on the strategic supply chain management. In addition to that, there are no studies to assess the relationship from the multinational context. Hence, in the light of identified literature, third hypothesis is drawn:

Hypothesis 3 - *Strategic supply chain management of small businesses is significant positively affected by determinants of SCM in Iran, Turkey, and Canada.*

The study of Koh et al (2007) found no statistically significant impact of strategic SCM on the operational efficiency of SMEs as well as found non-significant impact on the environmental and social sustainability. This indicates that two distinctive studies found different results, yet both found non-significant impact in terms of environmental and social sustainability. Having said that, those studies were single cases offering limited generalizability whereas comprehensive cross-sectional research is still under research because the earlier studies have smaller sample size and largely focused on region-specificity. To larger extent, available literature concentrated on the direct relationship between strategic SCM and SMEs' performance, while still under research is the strategic SCM's mediating effect on the environmental and social sustainability, especially in the context of comparison between advanced, middle-range, and emerging economy.

Kherbach and Mocan (2015) study found that practices, supporting factors and determinants of SCM are very effective in meeting the needs of consumers, enhancing organisational efficiency and dealing with various environmental challenges. Thus, the strategic SCM is pivotal in dealing with the challenges of environment. Nonetheless, the study falls short in explaining the mediating effect on environmental and social sustainability resulting from strategic SCM. Hence, the area is under research when the mediating role of strategic SCM on sustainability is to be considered, especially in multinational context because studies largely focused on direct linkage of strategic SCM instead of considering it as a mediator. The identified gap in the existing literature drives this research to fill it by offering multinational perspective within one construct. Following hypotheses are developed.

Hypothesis 4 - *Strategic supply chain management of mediates environmental sustainability in Iran, Turkey, and Canada.*

Hypothesis 5 - *Strategic supply chain management mediates social sustainability in Iran, Turkey, and Canada.*

3 Research Framework

The research framework of this study includes independent variables, namely. Factors supporting SCM, practices of SCM and determinants of SCM while environmental and social sustainability are the dependent variables. Strategic supply chain management is the mediating variable. The variables of interest are illustrated below:

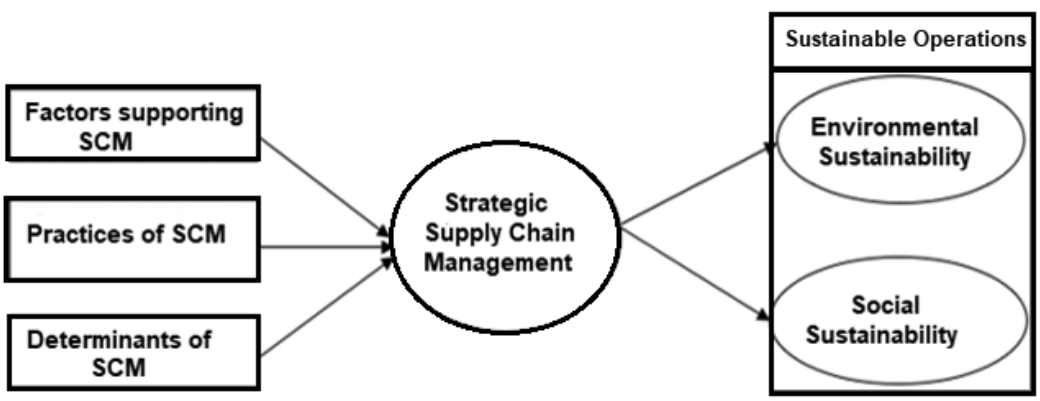

Figure 2: Own-illustrated research framework

4 Research Methodology

This comparative cross-sectional research comes under scientific paradigm thus, have critical realism ontology and objective epistemology to numerically express the social reality. Mackenzie and Knipe (2006) explained that positivism philosophy is considered for the research that focuses on attaining the factual truth by means of numerically expressing the relationship between variables of interest. Independent variable "factors of SCM" is formed of five factors on the scale of 1-to-5 (1=doesn't matter, 2=unimportant, 3=neutral, 4=important and 5=very important). Concentration on end consumers, organisational structure, importance of IT, knowledge sharing, and trust and openness are the factors supporting SCM (for detail see Appendix). Second variable on same scale is "determinants of SCM" that contains seven questions. Global competitiveness, customer needs, cooperation, integration process, and cost reduction were the factors constituting determinants of supply chain management (for details see Appendix). Third variable "practices of SCM" contains eight questions on 1-to-5 (1=no implementation, 2=low level of implementation, 3=partial implementation, 4=implementation, and 5=full implementation) scale. In line internal strategy with Supply chain strategy, sustainability, coordination and communication, and standardized guidelines are factors determining the practices of supply chain management (for details, see Appendix).

The factors, determinants, and practices of SCM along with the social and environmental sustainability scale is adopted from the survey of Kot et al (2018) as it has been used previously in different countries. Both dependent variables of the study, "environmental" and "social sustainability" contained six questions each on the scale of 1-to-5 (1=doesn't matter, 2=unimportant, 3=neutral, 4=important and 5=very important). Environmental sustainability contained factors related to environmental-friendly, waste reduction, reduction of negative impact, and creating environmental awareness whereas ethical standards, community related operations, safety standards, and poverty reduction are factors for social sustainability that combined together forms sustainable operations (See Appendix for construct of variables).

Strategic SCM contains five questions on the scale of 1-to-5 (1=Strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree). Harasi's (2015) scale is used to measure the strategic supply chain management, containing intern-organisational communication, cross-organisational team, strategic planning and long-term orientation (for details see Appendix).

Hyman, Lamb and Bulmer (2006) stated that the adoption of pre-existing questionnaire helps researchers in ensuring higher construct and content validity. Inter-rater and test-re-test reliability is availed by using pre-existing questionnaire (Haque and Aston, 2016; Healy and Perry, 2006).

Hofstede's cultural dimensions were one of the criteria for the selection of three distinctive countries. Moreover, the HDI was another criterion for this selection. Higher similarity in employment vulnerability, work, gender, human security, and communication and mobility in all three considered economies are same, thus, these three countries are considered for the purpose of study. According to the official report of Senate Canada (2013), foreign affairs and international trade has strengthened the relationship between Canada, Turkey, and Iran. There has been collaboration and cooperation to improve the relations and trade. Since, there has been trade, production and services promoting the mutual supply chain activities therefore, these three countries have been considered cases.

Total 610 SMEs participated through one respondent per organisation. For fair representation, the strategy of Haque, Aston and Kozlovski (2018) was adopted, therefore, purposive sampling technique was employed to have fair representations in all three countries because in present scenario other sampling techniques were impractical and costly. Minimum 200 each is a target selection in distinctive geographic regions. Total 202 from Turkey whereas 204 each from Iran and Canada participated. Haque, Faizan and Cockrill's (2017) strategy was considered to ensure over 200 respondents participate in the comparative study. The response rate is 56.38% as total 1050 survey questionnaires were circulated (350 in each economy).

The strategy of Haque et al. (2018) was adopted by combining purposive, referrals, networking, and connection were sampling techniques used in this study to avoid over reliance on one specific technique. The list of registered SMEs was attained from the official ministry portal while questionnaire was formed on Googledoc and circulated through networking and connections. Smart partial least square structural equation (PLS-SEM) modeling is used for the data analysis.

All ethical considerations were maintained during and after research commencement and as part of it, there was no disclosure of respondent's personal detail to general public and participants were informed about the purpose of research.

5 Results Analysis

5.1 Descriptive Statistics

It is found that majority of the small businesses have a workforce ranging between 50-250 (52.5%), operating for 'more than 15 years' (42%), followed by '8 to 15 years' (38%). This reflects that small businesses in considered economies have been active for a longer time duration. Majority of SMEs are involved in logistics and transportation (30.4%), followed by clothing and textile (28%) and

cars and automotive (13.7%) whereas majority of respondents are "Director of Logistics" (29%), followed by "Marketing Director" (22%) and "Owner" (18%).

5.2 Measurement model

Henseler et al.'s (2009) suggestion regarding the usage of prominent statistical method for primary data analysis has been considered. Imran, Hameed and Haque (2018) explained that two major sections of statistical analysis include; measurement model assessment and structural model assessment. "The measurement model assessment is the first step to assess the model's validity before performing structural model assessment. As part of measurement model, the reliability is assessed through Cronbach's alpha and composite reliability while Average Variance Extracted (AVE) through factor loadings ae considered for external consistency to form convergent validity" (Imran et al. 2018). "Convergent validity, a parameter frequently utilized in social sciences research, refers to the degree to which two measures of constructs that theoretically should be related are in fact related" (Imran et al. 2018). A value less than 0.40 on factors loadings are excluded from the scale while only above 0.40 is included as it indicates the acceptable validity (Hair et al. 2016). Therefore, four factors are considered on all the variables of interest because they scored over 0.4. Acceptability is determined through Cronbach's alpha (α=<0.70), composite reliability (C.R=<0.70) and Average Variance Extracted (AVE=<0.50). Item loading values and AVE are presented visible in figure 3, 4 and 5 for considered economies while Table 1 contains Cronbach's alpha (α), composite reliability (C.R), and Average Variance Extracted (AVE), which are all found satisfactory. Table 2 contains discriminant (external) validity by following Fornell and Larcker's (1981) criteria.

Internal consistency is acceptable because Cronbach's alpha (α) and composite reliability (C.R) for all items in Iran, Turkey and Canada is above 0.7 (Table 1). The model is acceptable because Average Variance Extracted (AVE) is found to be greater than 0.5. External validity is measured through cross loadings by using Fornell and Larcker's (1981) criteria. "The AVE of the exogenous (latent) variables higher than the extracted square root average variance reflects results validity" (Fornell and Larcker, 1981). All three countries are found to be greater than 0.50, thus, all the constructs are acceptable (Table 2).

Table 1: Measurement model (results)

Constructs	Iran			Turkey			Canada		
	(α)	CR	AVE	(α)	CR	AVE	(α)	CR	AVE
Factors supporting SCM	0.817	0.732	0.521	0.721	0.826	0.601	0.988	0.861	0.682
Practices of SCM	0.710	0.731	0.613	0.760	0.765	0.602	0.771	0.785	0.656
Determinants of SCM	0.723	0.727	0.513	0.749	0.754	0.623	0.756	0.766	0.629
Strategic supply chain management	0.766	0.717	0.545	0.759	0.728	0.687	0.796	0.798	0.743
Environmental sustainability	0.711	0.776	0.607	0.715	0.767	0.601	0.746	0.863	0.644
Social sustainability	0.832	0.736	0.561	0.718	0.737	0.588	0.751	0.762	0.615

Table 3: Discriminant Validity (Fornell-Larcker criterion)

Constructs	Determinants of SCM	Factors supporting SCM	Practices of SCM	Strategic supply chain management	Social sustainability	Environmental sustainability
				Iran		
Factors supporting SCM	0.541					
Practices of SCM	0.703	0.624				
Determinants of SCM	0.627	0.563	0.671			
Strategic supply chain management	0.659	0.571	0.572	0.595		
Environmental sustainability	0.595	0.651	0.609	0.633	0.515	
Social sustainability	0.528	0.613	0.65	0.641	0.561	0.663
				Turkey		
Factors supporting SCM	0.632					
Practices of SCM	0.611	0.721				
Determinants of SCM	0.517	0.569	0.626			
Strategic supply chain management	0.518	0.565	0.541	0.526		
Environmental sustainability	0.658	0.525	0.651	0.518	0.522	
Social sustainability	0.672	0.521	0.502	0.511	0.517	0.519
				Canada		
Factors supporting SCM	0.711					
Practices of SCM	0.712	0.814				
Determinants of SCM	0.732	0.698	0.755			
Strategic supply chain management	0.765	0.754	0.571	0.697		
Environmental sustainability	0.799	0.793	0.656	0.699	0.763	
Social sustainability	0.622	0.727	0.737	0.789	0.792	0.724

In second part, the research hypotheses developed from the available literature are tested through the structural model. Using structural model assessment, the research findings are attained.

5.3 Structural model assessment

Structural model assessment is used to examine the relationship between research variables. For testing hypotheses, we used mainly t-value to reject or retain hypotheses. The threshold t-value=1.96 at the 0.05 level of significance, hence, t-value above it is significant while below it will be non-significant. In the same vein, the p-value of less than 0.05 reflects statistically significant relationship. Moreover, R2 indicates the predictors (determinants of SCM, factors supporting SCM, practices of SCM, causing variability in dependent variable "sustainable operations" (environmental sustainability and social sustainability) while (f2) determines the size effect of the relationship.

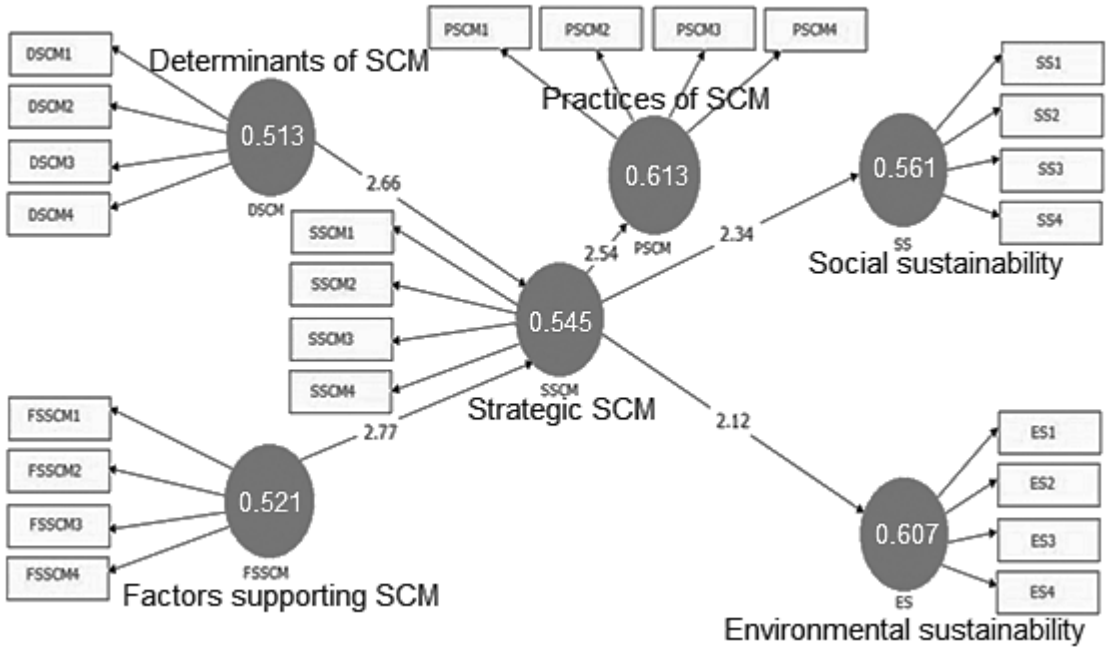

Figure 3: Factor loading reflecting AVE and t-values attained through structural model - Iran

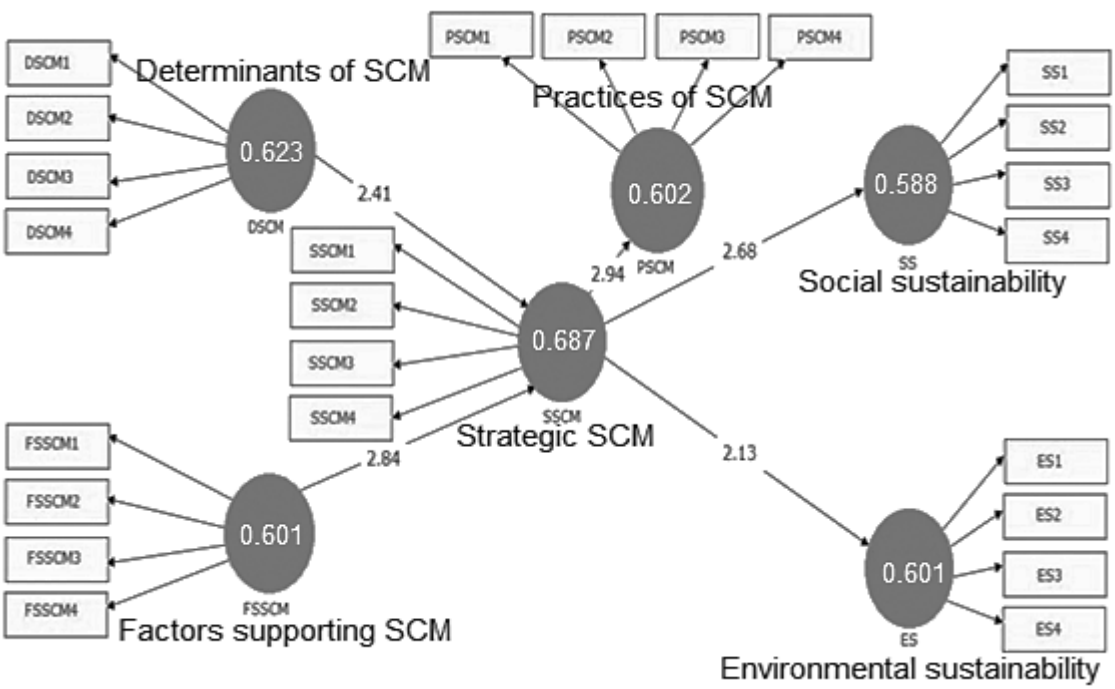

Figure 4: Factor loading reflecting AVE and t-values attained through structural model -Turkey

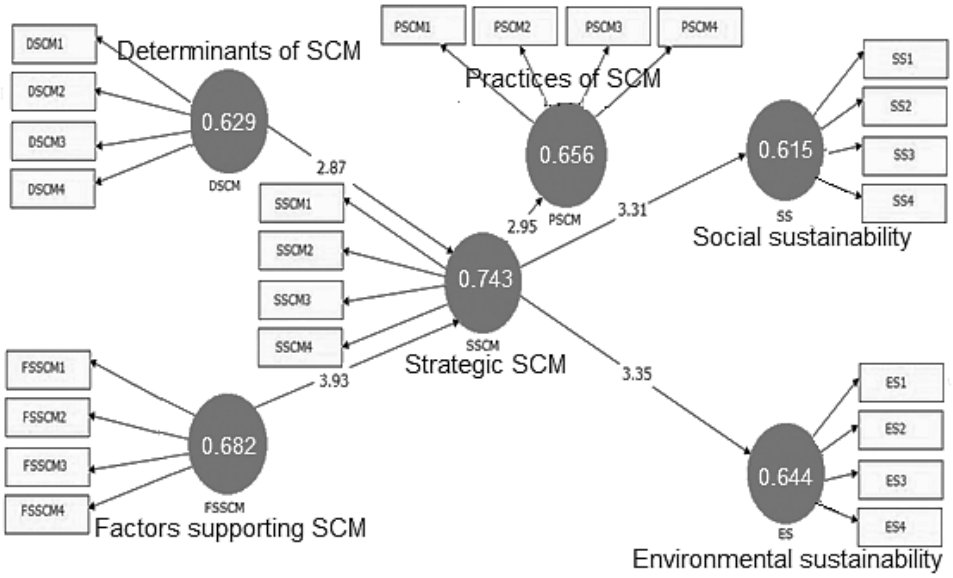

Figure 5: Factor loading reflecting AVE and t-values attained through structural model -Canada

Table 4: Findings of Structural Model

Hypotheses	(β)	SD	t-Value	P-value	f^2	R^2
Iran						
H1: Factors supporting SCM-> Strategic SCM	0.61	0.22	2.77	0.000	0.15	0.62
H2: Practices of SCM -> Strategic SCM	0.79	0.31	2.54	0.000	0.22	0.66
H3: Determinants of SCM -> Strategic SCM	0.88	0.33	2.66	0.000	0.16	
H4: Strategic SCM -> Environmental sustainability	0.66	0.31	2.12	0.000	0.36	
H5: Strategic SCM -> Social sustainability	0.54	0.23	2.34	0.000	0.35	
Turkey						
H1: Factors supporting SCM-> Strategic SCM	0.71	0.25	2.84	0.000	0.16	0.59
H2: Practices of SCM -> Strategic SCM	0.64	0.31	2.94	0.000	0.24	0.68
H3: Determinants of SCM -> Strategic SCM	0.82	0.34	2.41	0.000	0.17	
H4: Strategic SCM -> Environmental sustainability	0.49	0.23	2.13	0.000	0.37	
H5: Strategic SCM -> Social sustainability	0.51	0.19	2.68	0.000	0.35	
Canada						
H1: Factors supporting SCM-> Strategic SCM	0.59	0.15	3.93	0.000	0.18	0.67
H2: Practices of SCM -> Strategic SCM	0.68	0.23	2.95	0.000	0.26	0.69
H3: Determinants of SCM -> Strategic SCM	0.89	0.31	2.87	0.000	0.19	
H4: Strategic SCM -> Environmental sustainability	0.57	0.17	3.35	0.000	0.39	
H5: Strategic SCM -> Social sustainability	0.96	0.29	3.31	0.000	0.36	

Note: ***p<0.1, **p<0.05, ns= nonsignificant (p>.05) (Two Tail)

6 Discussion

Strategic supply chain management is statistically significantly affected by the factors supporting SCM in all three countries (See Table 4, H1). We fail to reject hypothesis 1. It confirms that factors supporting SCM in all three considered countries affect positively the strategic SCM of small businesses. Our findings are aligned with the works of Awheda et al. (2016) and Malik et al. (2014) because mentioned studies found positive linkage between considered variables while our findings partially differs with Kherbach and Mocan's (2015) findings as their study found non-significant impact of supporting factors on the Strategic SCM within SMEs. Present findings offer a new insight by confirming the positive linkage between considered variables from the multinational perspective. Deviation from standard by 1-unit led to create a positive impact by supporting SCM factors in strategic SCM in Small businesses (Iran--> β=0.61, Turkey--> β=0.71, Canada--> β=0.59; Table 4).

Strategic SCM of Small businesses is significant positively affected by the practices of SCM in all three countries (See Table 4, H2). Based on obtained findings, we fail to reject hypothesis 2. The work of Koh et al. (2007) is confirmed that practices of SCM is positively affecting the strategic SCM that further increases SME's operational efficiency. Since we found no variations within the strategic SCM in different countries despite deferring practice standards, thus, the work of Dumitrascu and Hila (2017) and Ghicajanu (2014) is contradicted. Interestingly, adaptive approach within the practices of SCM is higher effective in enhancing the strategic planning as well as operational efficiency is the argument posed by Faizan and Haque (2015), which to some extent is supported. Using funnel approach, it is found that adaptive approach used by business in all three countries have much improved strategic SCM. Furthermore, practices of SCM causes positive variation in all three countries (Iran--> β=0.79, Turkey--> β=0.64, Canada--> β=0.68; Table 4).

Strategic SCM of Small businesses is significant positively affected by the determinants of supply chain management in all three countries (See Table 4, H3). Hence, we fail to reject hypothesis 3. Our work supports the earlier work of Arend and Wisner (2005) and Koh et al. (2007) as we found positive linkage between strategic SCM and determinants of SCM within Small businesses. Additionally, it is confirmed that strategic SCM is explored through interlinked other organisational components because of being by nature un-observed variable, thus, we support the argument of Harsi (2015). The organisational component within this study is the determinants of SCM that creates positive impact on strategic SCM in Small businesses in all three considered countries. Furthermore, determinants of SCM's beta value (β) are positive, reflecting that strategic SCM is positively affected by determinants of SCM with change in 1-unit of standard deviation (Iran--> β=0.88, Turkey--> β=0.82, Canada--> β=0.89; Table 4). Nevertheless, there is not much difference, but from the comparative lens Iran and Turkey scored less than Canada.

After determining the different organisational components linkage with the Strategic SCM, next step is to measure the mediating effect of Strategic supply chain management on the environmental sustainability. It is found to have statistically significant positive mediating effect in all three countries (See Table 4, H4). Similarly, strategic SCM has a significant positive mediating effect on social sustainability in all three countries (See Table 4, H5). Therefore, we do not reject hypotheses 4 and 5.

Considering the environmental sustainability, we support the findings of Fung et al. (2002), Kherbach and Mocan (2015), and Zowada (2011) as we found strategic SCM mediates positively the environmental sustainability where we contradict the work of Awheda et al. (2016), Malik et al. (2014) and Mani et al. (2015) in this regard. We confirm the argument of Kot et al. (2018) that strategic supply chain management is effective in dealing with various types of environmental challenges. We further extend Kot et al.'s argument by confirming it from multinational perspective. Strategic SCM causes a positive variation in the environmental sustainability (Iran--> β=0.66, Turkey--> β=0.49, Canada--> β=0.57; Table 4).

Moreover, our findings support the work of Harms (2011), Kherbach and Mocan (2015), Koh et al. (2007), and Zowada (2011) whereas oppose the Awheda et al. (2016), Ghicajanu (2014), Malik et al. (2014) and Mani et al. (2015) work by confirming positive linkage between strategic SCM and social sustainability. Strategic SCM causes positive variation in the social sustainability when there is an increase in 1-unit standard deviation (Iran--> β=0.54, Turkey--> β=0.51, Canada--> β=0.96; Table 4).

"The value of variance (R2) is a value that indicates that the variability in the independent variable causing the variation in dependent variable" (Chin, 1998). In Iran's Small businesses, 62% variations are caused by variable in environmental sustainability while 66% variation caused in social sustainability. In Turkey's small businesses, 59% in environmental sustainability is caused by variables while 68% variation in social sustainability. Lastly, in Canada 67% variation caused by variables in environmental sustainability whereas 69% in social sustainability. "The values of effect size (f2) are considered as small (0.02), medium (0.15) and large (0.35) respectively" (Cohen, Cohen, West and Aiken, 2013). In present study, the size effects (f2) are moderate for determinants of SCM in Iran, Turkey and Canada (0.16, 0.17 and 0.19); factors supporting SCM (0.15, 0.16 and 0.18); and practices of SCM (0.22, 0.24 and 0.26). Furthermore, strategic SCM has a large size effect (f2) on social sustainability and environmental sustainability in Iran, Turkey and Canada (Social Sustainability (f2) =0.35. 0.35 and 0.36; Environmental Sustainability (f2) =0.36, 0.37 and 0.39. See Table 4).

7 Conclusion

7.1 Findings

The gathered data from the small businesses operating in Iran, Turkey, and Canada was to gain a multinational perspective about the strategic functioning of supply chain activities. In the light of statistical analysis, the conclusion is drawn that strategic supply chain management statistically significant positively mediates the sustainable operations (environmental and social sustainability). Hence, it is confirmed that irrespective of the type of economy, the strategic SCM positively mediate the environmental and social sustainability. Furthermore, the strategic supply chain management is significant positively affected by the factors supporting SCM, practices of SCM, and determinants of SCM. From the multinational perspective, the strategic SCM is highly effective in creating positive mediations while it has been affected positively by the practices, supporting factors and determinants (all organisational components) of supply chain management. The statistical test results also confirmed that the size effect (f2) is moderate for the impact of factors supporting SCM, practices of SCM, and determinants of SCM on the strategic SCM within the Small businesses. Moreover, strategic SCM is both; a significant mediator as well as found to have a large size effect (f2) on the environmental sustainability and social sustainability in multinational perspective. Interestingly, the nature and strength of the relationship between variables of interest are more visible as well as stronger in Canada (advanced economy) in contrast to Iran (emerging economy) and Turkey (middle ranged economy).

7.2 Recommendations

It is recommended that the Small businesses should opt for using advanced technology within the strategic supply chain management process. For commencing the operations, the use of enterprise resource planning (ERP) could be useful in attaining cost-effective operations because it will save time, money, and energy while effective usage of invaluable resources would be possible. This practical approach would help in improving organisational efficiency through strategic SCM process. The use of advanced technology in the evaluation of supporting factors and on-going practices and procedures shall be considered so that operational working efficiency improve further. Through funnel approach it was found that within the SCM operations, cross-team communication is an issue reducing the accuracy within the real time production. Considering the agenda, Faizan and Haque's (2015) strategy of using polar adaptive approach for linking all the departments and sub-units are recommended so that communication is improved, which would bring accuracy through exchange of information that would lead to bring higher precision the real time production.

Small businesses are part of the societies therefore it shall take appropriate steps to reduce its negative operational impact on the environment and societies. In this regard, a recommendation for strengthening the ties between Small businesses and their stakeholder is through network, collaboration, and communication so that shared resources and knowledge lead to ensure sustainable operations for the environment and societal. For managers, the Small businesses shall make it mandatory to exercise the environmental and social responsibility practices so that the business achieve strategic perspective of environmental and social sustainability. "Through sharing stakeholder network, the good spill-over effects for wider societies could be attained through promotion of socially responsible and environmentally responsible behaviour" (Bressan, 2014; Chwistecka-Dudek, 2016; Szczepańska-Woszczyna and Kurowska-Pysz, 2016).

7.3 Contributions

From theoretical perspective, our study enhances the existing knowledge by theorizing that strategic SCM has a positive mediating effect on the sustainable operations (environmental and social sustainability). It provides the international as well as cross-cultural perspective by offering the findings from three distinctive economies, thus, offers the wider generalizability by delimiting the region-specificity. Since, the use of strategic SCM (as a common mediator), this study is pioneer in offering the theoretical framework to investigate the social and environmental sustainability as separate attributes while considering the range of differing economies whereas previously these dimensions were under research. Thus, now there is a theoretical framework to further expand the scope of studies in this direction. From practical lens, the implication of present study is that now managers have scientific evidence for ensuring strategic SCM has a positive linkage with the supporting factors, practices, and determinants of SCM while strategic supply chain management further creates positive mediation in the sustainable operations (environmental and social sustainability). Furthermore, managers are given practical recommendations to adapt sustainable approach for maintaining higher level of operational efficiency. The study is also invaluable for the governments and policymakers to ensure that Small businesses are encouraged towards use of sustainable operations, so that sustainable Small businesses' ongoing operations have a positive social impact on the communities and societies.

7.4 Research limitations and future directions

Despite our best possible efforts for carrying out comprehensive research, there is always something to improve in the future studies. We used cross-sectional design that limits the respondents' participation to only one time while future researchers shall consider the use of longitudinal panel study to have twice participation so that the variation within differing time lags could be determined. This would offer more concrete evidence with differing time lags by having more comprehensive research design. Moreover, the study is quantitative in nature while focusing on the factual truth whereas future researchers shall consider the use of qualitative methods so that there is useful truth. In other words, now the relationship is expressed in numeric so factual truth has been attained, it shall be further expanded by having useful truth to explore the in-depth phenomenon.

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Posredni učinek strateškega upravljanja dobavne verige na trajnostno poslovanje: večnacionalna perspektiva

Ozadje in namen: Namen te primerjalne presečne študije je proučiti posredni vpliv strateškega upravljanja dobavne verige (SCM) na trajnostno poslovanje z okoljsko in družbeno vzdržnostjo v podjetjih, ki delujejo v Kanadi, Iranu in Turčiji, da bi dosegli globalno perspektivo.
Zasnova / metodologija / pristop: Več kot 200 malih podjetij v vsaki navedenih držav je vključenih s kombiniranjem namenskega vzorčenja, mreženja in povezovanja. Za kvantitativno analizo podatkov je uporabljeno pametno modeliranje delnih najmanjših kvadratnih enačb (SmartPLS-SEM).
Rezultati: Študija je pokazala, da ima v vseh treh izbranih gospodarstvih strateška dobavna veriga na področju trajnostnih operacij (okoljskih in družbenih trajnostnih) pozitivno posredniško vlogo. Ugotovitve so nadalje potrdile, da imajo v večnacionalni perspektivi dejavniki SCM v Kanadi večji pozitiven vpliv v primerjavi z Iranom in Turčijo.
Zaključki: Raziskava ponuja nov teoretični prispevek z raziskovanjem posredniške vloge strateške dobavne verige z večnacionalne perspektive za izboljšanje obstoječega znanja. Poleg tega ponuja praktičen prispevek z zagotavljanjem strateškega okvira za raziskave, ki bo pomagal managerjem pri izboljšanju uspešnosti poslovanja malih in srednjih podjetij.

Ključne besede: okoljska trajnost, večnacionalna perspektiva, družbena vzdržnost, trajnostno poslovanje, strateško upravljanje dobavne verige

Appendix: List of Measurement Items

Factors supporting SCM

Concentration on end consumers

FSSCM1: »Concentration on end consumers«

Organisational structure

FSSCM2: »Organisational structure and designed to the purpose of the promotion of cooperation and coordination of activities«

Importance of IT

FSSCM3:«Information technology«

Knowledge sharing

FSSCM 4: »Readiness to share the knowledge«

Trust and openness

FSCM5: »Trust and openness amongst members of the supply chain«

Determinants of SCM

Global competitiveness

DSCM1: “Global competitiveness against our supply chain”

Customer needs

DSCM2: “End customer needs”
DSCM6: “Understanding the on-going trends in market”

Integration process

DSCM3: “Integration of processes within supply chain”
DSCM7: “Improving processes and productivity”

Cooperation

DSCM4: “Members of supply chain cooperation”
DSCM5: “Internal cross-functional cooperation”

Cost reduction

DSCM8: “reduction of cost”

Practices of SCM:

In line internal strategy with Supply chain strategy:

PSCM1: »Members of our supply chain have aligned their product strategies to supply chain strategy«

PSCM5: »Members of our supply chain have aligned their supply strategies to supply chain strategy«
PSCM7: »Members of our supply chain have aligned their distribution strategies to supply chain strategy«

Sustainability

PSCM2: »Members of our supply chain use sustainability concepts in the supply chain strategy«
PSCM6: »Members of our supply chain promote sustainable operations«

Coordination and communication

PSCM3: »Members of our supply chain jointly manage inventory and logistics«
PSCM8: »Members of our supply chain use information technologies to increase the efficiency of communication«
PSCM9: »Members of our supply chain formally exchange production information on a regular basis, eg. through sales and operations planning meetings«

Standardized guidelines

PSCM4: »Members of our supply chain have a standardized quality policy for both products and processes with established guidelines«
PSCM10: »Members of our supply chain have the clear policy related to Supply Chain Management«

Strategic supply chain management

Inter-organisational communication

SSCM1: »Our organisation has continuous inter-organisational communication for quality improvement program«

Cross-organisational team

SSCM2: »Organisation's production process modules can be rearranged so that customization can be carried out latter at distribution centers through cross-organisational team«

High-quality suppliers

SSCM3: »Our organisation strategic planning relies on few high-quality suppliers«

Long-term orientation

SSCM4: »Organisation shares a sense of fair play with its customers to have long-term orientation«
SSCM5: »Our organisation's trading partners keep us fully informed about issues that affect its business as part of long-term orientation«

Environmental Sustainability:

Environmental-friendly

ES1: "Environmentally friendly production processes"

Waste reduction

ES2: "Acting towards reduction the amount of waste"

Reduction of negative impact

ES3: "Engaging in production processes free from harmful substances emissions"
ES5: "Use of renewable sources in production"

Creating environmental awareness

ES4: "Involving workers in environment protection schemes"
ES6: "Choosing partners in the supply chain on the basis of environmental guidelines"

Social Sustainability:

Ethical Standards

SS1: "Applying ethical business and trade standards"
SS6: "Applying the code of ethical conduct to employees and contractors"

Community related operations

SS2: "Applying fair employment practices to the local community"
SS5: "Contribution in local community charitable donations"

Safety standards

SS3: "Providing health and safety equipment"

Poverty reduction

SS4: "Investments in poverty reduction programs"

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Job Satisfaction and Citizenship Behavior: A Mediating Effect of Organizational Commitment

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Background and Purpose: Recently, job satisfaction has become a center of attention among academics, behavioral scientists, and business practitioners. Drawing on the tenet of the social exchange theory (SET) perspective and extending the conceptualization of the same, the present study aims at investigating the relationships among job satisfaction, organizational commitment, and citizenship behavior and mediation mechanism to unearth the effect of job satisfaction and organizational commitment on citizenship behavior.
Design/Methodology/Approach: Building on the positivist paradigm, we used quantitative research methodology following deductive reasoning approach. Henceforth, we have collected 210 replies from employees who have been serving Ready-made garments (RMG) sector that accounts for the highest export earning industry (84% of the total export earning) in Bangladesh. We purposively selected Chittagong Export Processing Zone, the largest export processing zone in Bangladesh, for collecting our required data. Data were analyzed using the descriptive statistics, bivariate correlation, and structural equation model (SEM) using Smart PLS 2, a second-generation regression analysis, and SPSS 20.
Results: The structural model estimates that all the direct influences are significant excepting the impact of job satisfaction on citizenship behavior. Besides, the full mediation effect of organizational commitment was found in the relationships between job satisfaction and citizenship behavior.
Conclusion: The main implication is suggesting all corporate executives for creating an environment which will make employees very committed to letting them think out of the box beyond their required formal task requirement. In addition to a longitudinal study, further research on the moderating effect of demographic factors on the above variable is attested.

Keywords: *Citizenship Behavior, Job Satisfaction, Organizational Commitment, RMG*

1 Introduction

As a part of the broader strand of organizational psychology research, job satisfaction has become a center of focus among academics across discipline (Davia & Legazpe, 2018). The employee seems to be a critical asset, and therefore, a satisfied employee turns out to be imperative and a vital predictor of a competitive firm (Ćulibrk, Delić, Mitrović, & Ćulibrk, 2018). Henceforth, the study on antecedents stimulating job satisfaction at the workplace is more than essentials; however, the consequences of a satisfied employee are not adequately explored (Yousef,

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2017). Recently, employees pro-organizational activities are deemed to be virtually prerequisites for organizational surveillance, which is mostly because of the employees' job satisfaction (Uddin, Rahman, & Howladar, 2014; Yen & Teng, 2013) and inseparable emotional commitment (Uddin, Mahmood, & Fan, 2019). In this age of acute perfection, a strategic manager wants their employees to work not only within their boundary but also proactively out of their boxes (citizenship behavior) for up-bringing the organization through a cutting-edge advantage. Working beyond required duties brings devastating effect on an organization (Robinson & Bennett, 1995) and working proactively for bringing organizational competitiveness to the organization (Yen & Teng, 2013).

An organization needs positively deviant employees who contribute to the wellbeing of the organism. In this regard, it is the organizational imperative to develop supportive working environments for building a very engaged (committed) and well-performing teams. Job satisfaction, a positive emotional state about the job, is an antecedent of citizenship behavior and commitment (Lambert, Qureshi, Frank, Klahm, & Smith, 2018; Uddin et al., 2019). It is the positive evaluation of different aspects of a job by the employee (Mihaela, 2014; Yılmaz, Çelebi, & Çakmak, 2014). Studies reported that a satisfied employee tends to be committed towards the organization (Lambert et al., 2018), which leads to their engagement in the citizenship behavior (Ćulibrk et al., 2018).

Employees' job satisfaction in the Ready-Made Garment (RMG) industry seems to be a critical antecedent for building up the organizational commitment, and citizenship behavior (Belwalkar, Vohra, & Pandey, 2018). Job satisfaction in RMG is deemed to be very vital as the prodigious growth in the RMG industry of Bangladesh has been turned it into the second-largest exporting country in the world after China (Alam, Azim, & Alias, 2017; Muhammad, 2015; Wadud, Huda, & Ahmed, 2014). Notably, RMG alone earns approximately more than 84 percent of the total export (Islam, 2017; Shadat, Rahman, Rahman, & Hawlader, 2016) and employs more than 4 million employees (Ahmed, Hasanuzzaman, Chowdhury, Shaikh, & Munir, 2018; Bakht & Hossain, 2017; Rahman & Siddiqui, 2015; Wadud & Huda, 2017) along with nearly $30b export earning in FY18, from this sector (WTO, 2018).

Globally, numerous studies were documented conceiving of job satisfaction as an outcome variable of many antecedents (Lambert et al., 2018; Liu & Lo, 2018; Manish, Hemang, Ashish, & Sandeep, 2018; Smith, 2018; Stoermer, Haslberger, Froese, & Kraeh, 2018). Surprisingly, the influence of job satisfaction as a predictor variable of citizenship behavior is not adequately examined (Nguni, Sleegers, & Denessen, 2007). In an Indonesian study by Claudia (2018) attested on the essence of job satisfaction that investigates how job satisfaction turns employees commitment to citizenship behavior through their spiral effect. Since employees' citizenship behavior benefits organization's well-being through the facilitation of shared benefits and pro-organizational tasks role, following the tenet of the social exchange theory (SET), i.e., Blau (1964), a dissatisfied employee do petite pro-organizational and cognitive mode or evaluation of job satisfaction influences the frequency of citizenship behaviors (Williams & Anderson, 1991). Whereas Claudia (2018) reported that job satisfaction navigates commitment toward citizenship behavior, Ababneh and Hackett (2019) unlikely posited that both job satisfaction and employee commitment directly explain citizenship behavior. The following research questions developed:

RQ 1: Does job satisfaction influence citizenship behavior?

RQ 2: Does job satisfaction exhibit spiral effect on citizenship behavior via commitment?

The present study contributes by advancing the existing knowledge in a numerous way. First, there is a growing debate on the role of job satisfaction as it is studied both like the outcome and antecedents to organizational commitment, and citizenship behavior (Nguni et al., 2007). The present study will unearth the role of job satisfaction with organizational commitment and citizenship behavior. Second, the existing literature is loaded with the reviews on job satisfaction as an outcome variable; however, we incline to gauge its impact on an endogenous variable. Third, there are few studies noted on job satisfaction in only banking (Islam, Mohajan, & Datta, 2011; Rahaman, 2012) and educational sector (Jahangir, Akbar, & Begum, 2006). Surprisingly, no studies yet documented in ready-made garments industries. Finally, the present study tested a mediated mediation effect, which is not tested elsewhere in the world. In this vein, we investigate if there is an indirect effect of organizational commitment on job satisfaction and positive deviance relationships.

2 Literature Review

2.1 Job Satisfaction

Job satisfaction is a positive or pleasurable state of feelings of an employee's job experiences. Locke (1976, p. 1300) defined job satisfaction as "a pleasurable or positive emotional state resulting from the self-appraisal of one's job or job experiences." He also reiterated the common factors of job satisfaction that included "work, pay, promotions, recognition, benefits, working conditions, supervision, co-workers, company and management" (p. 1302). Social exchange theory assumes that an organization needs to boost up a sharing environment among employees, organization, management, and other concerns (Topa, Guglielmi, & Depolo, 2014). The higher social exchange ensures

stronger employees' contribution and commitment, which results in better individual and team performance. The stronger relationship between job satisfaction and employees' loyalty (Ćulibrk et al., 2018; Mihaela, 2014; Peng, 2014) makes the workforce happier and more productive (Edwards et al., 2008). When employees notice that their perceived organizational support gets attention, Aslan, Shaukat, Ahmed, Shah, and Mahfar (2014) found their (employees) reciprocal consequent positive outcomes in the form of commitment, satisfaction and citizenship behaviors have been improved (Ababneh & Hackett, 2019; Lambert et al., 2018).

2.2 Organizational Commitment

Organizational commitment is a kind of passion of an employee for being identified with the organization. Meyer and Allen (1991) narrated it as a psychological association between an organization and its employees in which the former is less likely to leave. It has been narrowed down into affective, continuance, and normative commitment. Affective commitment is the passionately involved with organization and employee is least likely to leave, continuance commitment is to weigh stay or leave and finally choose to stay, and ultimately normative commitment is the kind moral or ethical obligation from employees sides to stay (Veličković et al., 2014). Thus, it is a psychological connection of an employee with the organization to stay and being identified with the organization where he/she works.

2.3 Citizenship Behavior

Although deviant behavior brings untold sufferings to the organization, there are some exceptions to it. Some deviances, for example, positive deviances (Spreitzer & Sonenshein, 2004), constructive (Vadera, Pratt, & Mishra, 2013), pro-social behavior (Carlo et al., 2014), extra-role behavior (Katz & Kahn, 1978) brings positive repercussion to an organization. Citizenship behaviors like innovative behavior, whistleblowing, noncompliance with dysfunctional directives, and criticizing incompetent superiors. Organizational citizenship behavior is a kind of voluntary action by the employees to enhance and improve the organizational performance which is not required by their formal job requirements. Presently, organizations are facing enormous pressures from many corners and employees who can think proactively and contribute out of the box are critically demanded (Murphy, Athanasou, & King, 2002).

3 Development of Hypothesis

Yen and Teng (2013, p. 401) said that "in today's struggling global economy, it is not enough for employees to merely do their jobs. Many businesses expect organizational members not only to complete their required duties but also proactively assist their colleagues." The citizenship behavior is crucial to the survival of an organization, and furthermore, it leads to the active and effective functioning of an organization (Murphy et al., 2002). Previous studies found how job satisfaction contributes to the citizenship behavior (Foote & Tang, 2008; Nadiri & Tanova, 2010; Paillé, Bourdeau, & Galois, 2010; Zhang & Cun, 2012). Social exchange theory over economic exchange theory interprets that only a satisfied employee being experience with organizational support is intended to do more than what an individual is expected. So, it can be hypothesized that job satisfaction leads to citizenship behavior. The hypothesis is given below:
H1: Job satisfaction has a direct influence on organizational citizenship behavior.

Employees backed by job satisfaction likely to contribute to organizational well-being. Job satisfaction is considered as the antecedents to organizational commitment (De Gieter, Hofmans, & Pepermans, 2011; Hayati & Caniago, 2012; Namasivayam & Zhao, 2007; Yucel & Bektas, 2012). Aslan et al. (2014) report that satisfied employees are always motivated and committed to the organization. Job satisfaction influences organizational commitment. There are many studies which noted that job satisfaction and organizational commitment are reciprocally and positively correlated (Wu & Norman, 2006). Golden and Veiga (2008) opine that employees with highly committed are likely to be identified with their organization and tend to contribute to organizational performance. Positive organizational behavior produces satisfied and committed employees for achieving team as well as organizational outcomes (West, Patera, & Carsten, 2009). Yeh (2014) find that job satisfaction and organizational commitment lead an employee to be more loyal and well-performing. Some research shows that satisfied employees being committed to aligning themselves with the group and broad organizational goals. There is an anecdotal belief that job satisfaction is related to regulatory outcome (Politis John, 2006); however, job satisfaction contributes to the enhancement of commitment and ends up with improved performance. Now, a hypothesis can be formed in this regard:
H2: Job satisfaction has a substantial influence on organizational commitment.

Social exchange theory reports that committed employees undergo greater interest to serve the organization more than they are ought to (Fan, Mahmood, & Uddin, 2019). Kim and Brymer (2011) documented that a high commit-

ment of employees encourages to do a more extra-role performance that, in turns, leads to engage in pro-social behavior. There is evidence that when employees are treated well, they feel the compulsion to reciprocate by helping the organization and well-being (Van Dyne, Graham, & Dienesch, 1994). On the other hand, if the employees do not trust the organization, organizational commitment does not grow much among them which demotivates them to decline their citizenship behavior (Mamman, Kamoche, & Bakuwa, 2012). Study of Ng and Feldman (2011) also reported that committed employees like to go an extra mile and do beyond they are expected to do, such as helping their coworkers. Therefore, organizational commitment can be ended up in increased citizenship behavior (Uddin et al., 2019). The third hypothesis is designed hereafter.

H3: The is a direct influence of organizational commitment on organizational citizenship behavior.

Following the essence of the SET, it is stated that employees with the satisfaction from the job experiences more organizational commitment which obligates to serve the organization more than they are ought to (Blau, 1964; Homans, 1958). Accordingly, employees who are treated well by the organization will feel a moral obligation reciprocate for the wellbeing of the organization (Dyne & Ang, 1998). Study of Ng and Feldman (2011) also reported that committed employees, which is derived from job satisfaction like to go the extra mile and do beyond they are expected to do. Henceforth, it can be hypothesized that job satisfaction would have influenced the employees' citizenship behavior through indirectly impacting organizational commitment.

H4: OC mediates the association between organizational job satisfaction and citizenship behavior.

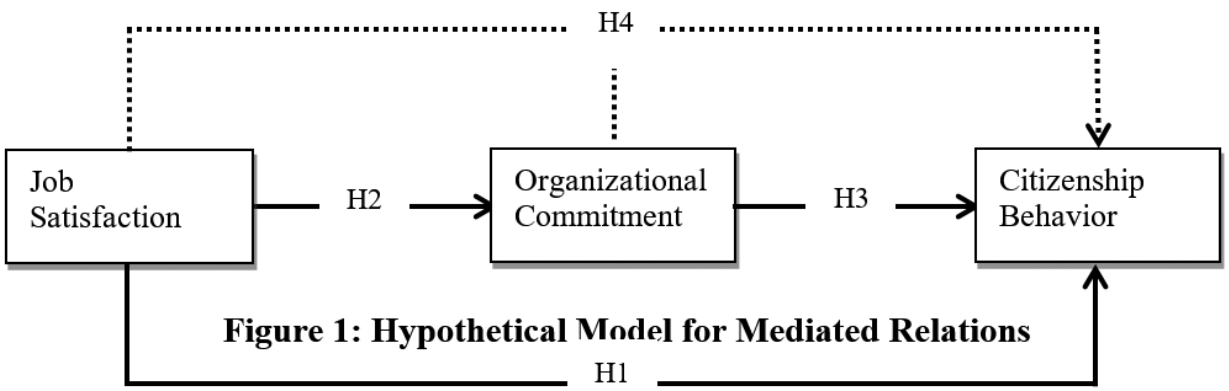

Figure 1: Hypothetical Model for Mediated Relations

4 Research Methods

4.1 Participants and Data Collection Procedure

The present study conducted among the executives of the RMG sector, which is the most significant contributor to the economy of Bangladesh. Accordingly, the population of the study is the executives working at various departments in RMG. We purposively selected RMG manufacturing firms as a sample from Chittagong Export Processing Zone, which is the largest export processing zone in the commercial capital, Chattogram-financial hub of Bangladesh (Azim, Fan, Uddin, Jilani, & Begum, 2019).

We collected 221 responses, and 205 from them have been used in this research. Around 210 (73.66%) usable responses were received out of 300 informants. Survey instruments were administered to respondents' end through a personal visit and electronic mail. Convenience sampling method has been used, and the respondents were briefed about their approaches to respond to the survey. Smart PLS-2 and IBM SPSS version-20 were used to execute the results. Table 1 exhibits the demographic profile of the respondents according to the variables of gender, marital status, age, educational records, and tenure. Table 1 displays the demographic information of the respondents.

Table 2: Items building types of innovations

Variables	Aspects	Frequencies	Percentage
Gender	Male Female	155 50	76 24
Marital Status	Married Single	132 73	65 35
Education	Bachelor Master Others	37 153 15	18 75 7
Tenure	Above 1 year Above 5 years Above 10 years Above 15 years	23 93 75 14	11 45 37 7
Age	Above 20 years Above 25 years Above 30 years Above 35 years	17 79 73 21	8 46 36 10

4.2 Measurement Tools

We have collected three measurement tools from prior studies (Appendix 1). Job satisfaction is measured by Quinn and Mangione (1973), citizenship behavior by Ritz, Giauque, Varone, and Anderfuhren-Biget (2014), and organizational commitment by Mowday, Steers, and Porter (1979).

4.2.1 Job Satisfaction

Respondents were asked to respond against each item on a 5-point Likert scale (1 = strongly agree…….. 5 = strongly disagree). A sample item for this scale was: "All in all, I am satisfied with my job."

4.2.2 Organizational Commitment

We have used 9-item to represent the organizational commitment, and each of the informants was asked to rate each item on a 5-point Likert scale (1 = strongly agree…….. 5 = strongly disagree). A sample item for this scale was: "I talk to my friends that this organization is a great place to work."

4.2.3 Organizational Citizenship Behavior

5-item OCB construct was used and each respondent was asked to select each item on a 5-point Likert scale (1 = strongly agree…….. 5 = strongly disagree). A sample item for this scale was: "I try hard to help others so they can become integrated with my organization."

5 Evaluation of the Model

The study used partial least square based structural equation modeling (PLS-SEM) in place of simple regression-based analysis. The merit of this analytic technique demonstrates an integrated model which delineates the robustness and accuracy of the estimates (Fan et al., 2019; Mahmood, Uddin, & Luo, 2019). The supremacy of the PLS-SEM lies in measuring the influence of endogenous variables on exogenous variables, and also the precise detection of measurement errors (Dediu, Leka, & Jain, 2018). SmartPLS2 is used to test both the measurement model and the structural model (Hair Jr, Hult, Ringle, & Sarstedt, 2014).

Table 2: Reliabilities and Validities of the Measurement Tools

Variables	1	2	3	CR	AVE
1. Job satisfaction	**0.795**			0.831	0.632
2. Organizational commitment	0.700	**0.773**		0.789	0.598
3. Citizenship behavior	0.534	0.572	**0.853**	0.832	0.727

CR. Composite Reliability and AVE. Average Variance Extracted.

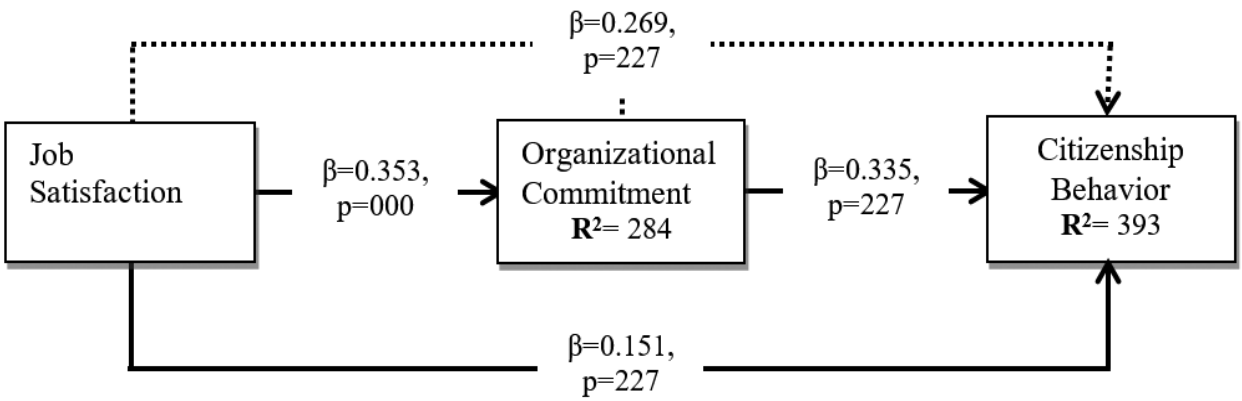

Figure 2: Path estimates in a structural model

5.1 Measurement model

We have tested both the validity and reliability measures. For reliability issue, composite reliability (CR) test has been performed (Alam & Uddin, 2019; Howladar, Rahman, & Uddin, 2018). For the authenticity of the validity issues, both the convergent and discriminant validities were advocated (Azim et al., 2019; Ringle, Wende, & Will, 2005). Table 2 demonstrated that the constructs are reliable and validity is candidly reflected that all constructs pass through both validity tests. It is observed that the minimum average variance extracted (AVE=0.598), and CR (0.789) are above the threshold value of 0.500 and 0.700 respectively (Hair Jr., Hult, Ringle, & Sarstedt, 2014; Saunders, Lewis, & Thornhill, 2009). Thus, these measurement tools' convergent validity is guaranteed. For testing the discriminant validity, we scrutinized the square root of AVE of each observed variables against their corresponding variables' correlation scores. The diagonal value, in table 2, representing the correlation between the same measures in the correlation matrix table is higher than the relationship with other variables. Hence, all the measuring tools are discriminately valid as well (Ringle, Da Silva, & Bido, 2014). Moreover, the loading of each item is checked (Appendix 1) and the minimum loading of any item is 0.712, which is above the threshold level (Das, Biswas, Jilani, & Uddin, 2019; Ringle et al., 2014; Yi, Uddin, Das, Mahmood, & Sohel, 2019).

5.2 Structural model

We tested the structured model from multiple perspectives to ensure global fitness (Fan et al., 2019; Mahmood et al., 2019; Uddin et al., 2019). Apart from just estimating path estimates (β) and their significance levels, we also assessed the coefficient of determination (R2), and the goodness of fit (GFI) which is advocated by Wetzels, Odekerken-Schröder, and Van Oppen (2009). Bootstrapping 5000 sample cases were used to generate the hypothesis estimates. Figure 2 exhibited that the minimum strength of the influence (β>0.151) and overall predictive value (R2) of the entire model are above the threshold limit (more than 0.26 effect size is substantial) (Cohen, 1977, 1988) excepting the direct path (job satisfaction citizenship behavior) fixes at 0.151 due to the mediated mediation effect of organizational commitment.

Finally, the study estimated the GoF, which is the square root of the average communality times average R2. In line with the study of Tenenhaus, Vinzi, Chatelin, and Lauro (2005), the estimates reported in Equation (1) demonstrated that the GoF value is 0.470. Cohen (1977, 1988) exhibited the GoF value above 0.36 is substantial on the condition that minimum communality must be above 0.50 (Fornell & Larcker, 1981). The present study observes that minimum communality value is 0.598 and reported GoF 0.47, which is substantial for a given study (Cohen, 1977, 1988).

6 Results

$$GoF = \sqrt{Average\ communality\ \times\ average\ R^2} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots Equation\ (1)$$

$$GoF = \sqrt{0.652 \times 0.339}$$

$$GoF = 0.470$$

The study divided the findings into unmediated and mediated analysis in a structured model. Table 3 exhibited that the direct effects of exogenous variables on endogenous variables. In H1, it is observed that the influence (β=0.151, p<0.227) of job satisfaction on citizenship behavior is insignificant. Thus H1 is not supported. The result is not consistent with the previous empirical findings globally (Paillé et al., 2010; Van Dyne et al., 1994). In H2, it is hypothesized that job satisfaction has a significant influence on organizational commitment. The result reported that the effect size (β=0.353, p<0.000) of job satisfaction on organizational commitment is substantial. Thus, H2 is supported. Studies of Yucel and Bektas (2012), Kim and Brymer (2011), and Lambert et al. (2018) also observed that job satisfaction has a marked influence on organizational commitment. Finally, in H3, we have hypothesized that organizational commitment impacts citizenship behavior. The estimates (β=0.335, p>0.000) demonstrated that organizational commitment is also significant. Hence, this hypothesis is also supported. This result is also found consistent with the prior results (Mamman et al., 2012; Ng & Feldman, 2011).

In H4, it is hypothesized that organizational commitment mediates the association between job satisfaction and organizational citizenship behavior. To estimate the mediation effect, we have measured the direct impact before mediation and after mediation. According to Hayes (2013) and Baron and Kenny (1986), to have full mediation effect, a significant direct path (c) before adding the mediator variables must be insignificant (c/) after adding the mediator variables. Table-4 highlighted that direct effect (c) before running the mediator variable was significant (β=0.532, p>0.000). However, immediate effect (c/) after adding mediator variable becomes insignificant (β=0.151, p>0.227). Thus, there is a full mediation effect of organizational commitment on the relationship between job satisfaction and citizenship behavior. The result is also found consistent with the outcome of Uddin et al. (2019).

Table 3: Estimates on direct effects in an unmediated model

Hypothesis	Path Relations	Estimate	Critical Ratio	p.Value	Result
H1	JS → CB	0.151	1.212	0.227	Not supported
H2	JS → OC	0.353	6.435	***	Supported
H3	OC → CB	0.335	4.224	***	Supported

JS. Job satisfaction, CB. Citizenship behavior, OC. Organizational Commitment.

Table 4: Mediating effect of organizational commitment

Hypothesis	Path	Mediator	Direct Effect	Indirect Effect	Total Effect	Comments	t-value (p-value)
H4	JS → CB(c)	OC	0.532		0.269	Full Mediation	7.493 (p<0.000)
	JS → OC (a)			0.353			6.435 (p<0.000)
	OC → CB (b)			0.335			4.224 (p<0.000)
	JS → CB (c/)		0.151	0.118			1.212 (p<0.227)

JS. Job satisfaction, CB. Citizenship behavior, OC. Organizational Commitment, Indirect effect. a times b, and Total effect = direct effect + indirect effect.

7 Discussion

The study aimed to examine the impact of job satisfaction on organizational commitment and citizenship behavior in the RMG industries in Bangladesh. Additionally, it also investigated the indirect influence of job satisfaction, via organizational commitment, on citizenship behavior. Henceforth, the present integrated hypothetical model test four different hypotheses basing on the conceptualization of SET. The usage of a correlation matrix, PLS-SEM, and mediation effect analyses were purported to find out the testimonies of the accurate gauging. Correlation matrix showed that all the observed variables are correlated with each other which is found consistent with the global findings at different contexts (Claudia, 2018; Jahangir et al., 2006; Kim & Brymer, 2011; Nguni et al., 2007; Williams & Anderson, 1991).

Despite the fact that job satisfaction is a pressing vaccine to engage employees' organizational commitment toward citizenship behavior, the influence of it-job satisfaction-on citizenship behavior is not significantly aligned. Thus, the H1-the impact of job satisfaction on citizenship behavior-is not supported. Unlike the previous findings of (Jahangir et al., 2006; Kim & Brymer, 2011; Nguni et al., 2007), our conclusion is also supported by the results of Claudia (2018); Williams and Anderson (1991). These findings of the present study are consistent with the prior results because of the presence of the mediator variable-organizational commitment. H2 proposed a significant direct effect of job satisfaction on organizational commitment. The studied result also demonstrated the significant positive impact signifying that the proposed hypothesis is supported. In line with the conceptualization of SET, it posits that job satisfaction facilitates employees' commitment toward their organization. The result is also found consistent with prior studies in other settings (Ćulibrk et al., 2018; Lambert et al., 2018).

Furthermore, it is hypothesized, in H3, that organizational commitment stimulates employees' participation in voluntary citizenship behavior. Empirical result invigorates the previous empirical findings to the fact that organizational commitment has a significant influence on citizenship behavior. Thus, H3 is also supported. We observed the similar results of the impact of organizational commitment on citizenship behavior since the organizational commitment of employees drives them to escalate the firm values and image through taking participation in pro-organizational activities. The findings of Afsar, Shahjehan, Cheema, and Javed (2018), Lee, Woo, and Kim (2018), Uddin et al. (2019), and Howladar (2017) showed the similar estimates on this proposed hypothesis.

Finally, the indirect of organizational commitment is postulated as such organizational commitment mediates the impact of job satisfaction on citizenship behavior. The estimates on the mediation effect accentuate that the indirect effect is significant. However, the previous considerable influence or direct impact (before using the mediating variable) turns into negative after the usage of the mediating variable (organizational commitment). It strengthens the understanding that organizational commitment fully mediates the association between job satisfaction and citizenship behavior (Claudia, 2018). The rationale behind the significant indirect influence can be reckoned in a way that job satisfaction of an employee inclines to enhance organizational commitment which results in citizenship behavior (Claudia, 2018; Jahangir et al., 2006; Nguni et al., 2007). Similarly, the underpinning SET underscores that a perceived positive, rewarding environment escalates one obligation to reciprocate to benefactors. Using the lenses of empirical investigation and theoretical significance, H4 is also supported.

8 Conclusion

8.1 Strengths and contributions of the study

The study contributes to advance knowledge in various ways. Ideally, it postulates that the organization must try its level best to lift the employees' job satisfaction level to improve their organizational commitment level, which will augment their engagement in citizenship behavior. The integrated structural model sheds light on the usage of the three observed variables in a comprehensive way rather than using solitarily. Unlike the study of Williams and Anderson (1991), our study declares premium on using the three variables, i.e., job satisfaction, organizational commitment, and citizenship behavior, in a mediated relationship where job satisfaction indirectly stimulates employees' to actively participate in citizenship behavior through improving their organizational commitment. Following the rationale drawn from the study Homans (1958) and Blau (1964) regarding SET, it is lucid enough to candidly saying that organization's positive initiative instigating employees' job satisfaction will result in driving organizational commitment toward pro-organizational proactivity. The dearth of the literature on the variables above in Bangladesh setting guarantees the novelty of the present study because the newly estimated result in other settings/contexts will validate and generalize the previous findings (Manish et al., 2018). Finally, the study also fills the vacuum of scientific observations of the cause and effect relationship among job satisfaction, organizational commitment, and citizenship behavior in a very burgeoning industry-RMG.

8.2 Managerial Implications

Several managerial implications can be framed from this empirical study. Although disastrous movements by the RMG employees is substantially frequent since the inauguration of RMG industries in Bangladesh, minimal effort has been paid to unearth the critical reasons from employees' perspective. Notably, no endeavor has been evident yet that soars up employees' commitment and job satisfaction leading toward citizenship behavior. The present study demonstrates the influence of job satisfaction and commitment, directly and indirectly, contributes to a pro-organizational attitude among the employees. Thus, the manager must expose to take more initiative to redefine the working environment that builds and develops a lasting positive impression among the employees. Unlike the findings in dissimilar contexts, (Claudia, 2018; Jahangir et al., 2006; Nguni et al., 2007; Williams & Anderson, 1991), the present finding corroborate with the prior results to the fact that organizations must display requisite assistance and persistence on employees' endeavor to foster their citizenship initiative.

8.3 Limitations and future directions

The study attempts to draw the direct effects of job satisfaction and organizational commitment on organizational citizenship behavior, and also the indirect impact (mediating) of organizational commitment on the association between job satisfaction and organizational citizenship behavior. Although all the hypotheses are supported in this study, it is subject to several limitations which indirectly demonstrate the directions for future research. The generalizability of result might be achieved if we could replace the convenience sampling with the random sampling method. The sample size poses a significant limitation. A large sample size (>205) might yield more representation findings. To facilitate the causality of the results, longitudinal data over cross-sectional data is preferred. Further research on the relationships among employee engagement, organizational commitment, and citizenship behavior moderated by demographic factors is advised. The very burgeoning constraint of this study is the ignorance of the moderating variables affecting those observed relationships. Hence, future researchers are recommended to incorporate the impact of intervening effects on the aforesaid relationships.

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Zadovoljstvo z delovnim mestom in organizacijsko vedenje državljanov: posredniški vpliv organizacijske zaveze

Ozadje in namen: V zadnjem času je zadovoljstvo z delovnim mestom pritegnilo vse več pozornosti akademikov, vedenjskih znanstvenikov in strokovnjakov za management. Cilj naše študije je ob upoštevanju načela teorije socialne izmenjave (Social Exchange Theory - SET) in razširitve konceptualizacije le-te, raziskati razmerja med zadovoljstvom z delovnim mestom, organizacijsko zavzetostjo in državljanskim vedenjem ter mehanizmom posredovanja, da bi ugotovili učinek zadovoljstva z delovnim mestom in organizacijske zavezanosti na vedenje državljanov.
Zasnova / metodologija / pristop: Na podlagi pozitivistične paradigme smo uporabili kvantitativno metodologijo raziskovanja in deduktivno sklepanje. Zbrali smo 210 odgovorov zaposlenih v sektorju konfekcijskih oblačil, ki je najmočnejša industrijska veja v Bangladešu in predstavlja kar 84% celotnega izvoza države. Namenoma smo izbrali območje Chittagong, največje območje za izvozno obdelavo v Bangladešu. Podatki so bili analizirani z uporabo opisne statistike, bivarijatne korelacije in modela strukturne enačbe (SEM) z uporabo Smart PLS 2, regresijske analize druge generacije in SPSS 20.
Rezultati: Strukturni model je pokazal, da so vsi neposredni vplivi pomembni, razen vpliva zadovoljstva s službo na vedenje državljanstva. Poleg tega je bil celoten mediacijski učinek organizacijske zavzetosti ugotovljen v razmerjih med zadovoljstvom z delom in vedenjem državljanov.
Zaključki: Predlagamo vodjem podjetij, managerjem, da ustvarijo okolje, da se bodo zaposleni čutili zavezane, da lahko razmišljajo tudi zunaj svojih potrebnih formalnih zahtev njihovega dela. Predlagamo, da se izvede longitudinalne študije in nadalje razišče vplivu demografskih dejavnikov na omenjeno spremenljivko.

Ključne besede: vedenje državljanstva, zadovoljstvo delovnih mest, organizacijska zavzetost

Appendix: Survey Measures for the Study

Sources	Measurement items	Loadings
Job satisfaction (Quinn & Mangi-one, 1973)	All in all, I am satisfied with my job	0.750
	If a good friend was interested in working in a job like mine, I would recommend that job	0.841
	Knowing what I know now about my job, if I had to do it over again, I would still have pursued that job	0.752
	In general, I would say that my job measured up to the sort of job I have wanted when I took it	0.837
Citizenship behavior Ritz et al. (2014)	I adapt my time schedule to help other co-workers	0.841
	I try hard to help others so they can become integrated into my organization	0.886
	I read and keep up actively with developments of my organization	0.883
	I attend functions that are not required but help the company image	0.857
	I make innovative suggestions on how to improve the functioning of my organization	0.796
Organizational commitment Yang and Choi (2009)	I am willing to put forth great effort to help the organization succeed	0.802
	I talk to my friends that this organization is a great place to work	0.744
	I accept almost any type of job assignment to stay with the company	0.817
	My values and the organization's values are very similar	0.755
	I am proud to tell others that I am part of this organization	0.789
	My organization inspires me to perform at high levels	0.712
	I am very glad that I chose this organization over others during my joining	0.807
	I really care about the fate of this organization	0.736
	For me, this is the best of all possible organizations for which to work	0.795

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