International Journal of Psychosocial Rehabilitation, Vol. 24, Issue 01, 2020
ISSN: 1475-7192

Assessing of Operational Capabilities Impact on Process Management in Halal Food Manufacturing Companies

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Abstract--- *Interest in operational capabilities and its influence on firm's competitive advantage and performance have generated a large research stream within the operations management strategy literature particularly in automotive and electronic industry. However, little has been done on the antecedents of operational capabilities leading to process management in food industry particularly on Halal food industry. Specifically, the present study serves as a groundwork to examine the operational capabilities dimension and its effect on process management in the Halal food manufacturing industry. Operational capabilities in this study is operationalized as a higher order construct which consists of innovation, improvement, cooperation, customization, responsiveness, and reconfiguration. A quantitative approach was adopted using self-administered questionnaire. By using field data collected from 229 Halal food manufacturing industry in Sarawak, all postulated relationships are examined using partial lease squares structural equation modeling (PLS-SEM) technique. The findings suggest that operational improvement, cooperation, customization, responsiveness, and reconfiguration have significant effect on the process management. This study highlights the importance of operational capabilities dimension as a tool to strengthen the process management of the firm. This study also provides the managerial implications to the halal food manufacturing industry as an economic engine of growth and future directions of the research also been discussed.*

Keywords--- *Resource Based-Theory, Operational Capabilities, Improvement, Innovation, Customization, Cooperation, Responsiveness, Reconfiguration, Process Management, Halal Industry.*

I. INTRODUCTION

The dynamism of business environment requires the organizations to sustain their competitive advantage through various manufacturing strategy. Operational capabilities plays an important roles to form the primary basis for competition between firms and distinguish them from the competitors (Stalk, Evans, & Schulman, 1992). Operations strategy literature has provide understanding the importance of operational capabilities on how sustainable competitive advantage arises from heterogeneous resources (Flynn & Flynn, 2004; Tan et al., 2004. Operational capabilities should be developed and nurtured to achieve long-term and sustainable competitive advantage (Roth & Miller, 1992; Hayes & Wheelwright, 1985).

Therefore, the notion that operational capability contribute towards firms competitive success is widely accepted (Hammer & Champy, 1993; Tan et al., 2004). Operational capabilities as described by Collis (1994) is the purposive

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DOI: 10.37200/IJPR/V24I1/PR200171
Received: 15 Nov 2019 | Revised: 20 Dec 2019 | Accepted: 05 Jan 2020

combinations of resources that enable an organization to perform functional operational activities, such as logistic, marketing and sales or manufacturing. Earlier operational capabilities studies by Skinner (1969) suggested that manufacturing offered an organization certain capabilities that could be used as competitive weapons.

Skinner (1974) has identified several dimensions of capability as crucial to an organizations competitive advantage and propose the concept of a 'focused factory' that would emphasize only one capability or, at most, a few compatible ones. Skinner's seminal study on 'focused factory' implied that factories that focus on a limited set of task will be more productive than similar factories with a broader array of task (Schmenner & Swink, 1998). Operational capabilities emphasize on trade-off between capabilities (cost, quality and time) due to inability of the plant to simultaneously implement multiple dimensions by (Skinner, 1969). Further study by Hayes & Wheelwright (1985) however, proposed the prioritizing between capabilities as an opposed to Skinner earlier studies that capabilities cannot be developed in tandem.

This study has attract further research that provide insight for the researcher to study the possibility of multiple capabilities adoption as a competitive manufacturing strategy (Stalk & Hout, 1990; Swink & Hegarty, 1998; Pandza et al., 2003; Peng, Schroeder, & Shah, 2008 and Ahmed, Kristal, & Pagell, 2014). However, research related to operational capabilities on process management is still have more opportunity to explore. Furthermore, existing research on relationship between operational capabilities and firm performance focusing on automotive and non-consumable product.

This purpose of this study is to explore the operational capabilities effect on process management in different context, in this case Halal food manufacturing company. Identification of operational capabilities constructs is pertinent for the firm to position themselves competitively in the challenging market environment. The understanding of thorough operational capabilities effect provides insights for the firm to translate the resources with process management practices to gain leverage from it. The research findings will contribute to the practical contribution from manufacturing strategy perspectives in operation management for the firm and formulation of policy to respective authority body to assist he development of Halal industry.

II. Literature Review

2.1 Operational Capabilities

Operational capabilities in the operation strategy literature are conceptualized as a resources that determine the firm performance. The idea that firms are a collection of their productive resources has been introduced by Penrose, (1959). Resources definition by Penrose (1959) is the physical things a firm buys, leases, or produces for its own use, the people hired on terms that make them effectively part of the firm. Barney (1991) further refine the definition of resources as an assets, capabilities, organizational processes, firm attributes, information and knowledge. This has provide the foundation for Resource-based Theory (RBT) that widely recognized as a powerful management theory for understanding and explaining organizational performance differences (Barney, Ketchen, & Wright, 2011).

According to RBT, organizations achieve sustainable competitive advantage based on capabilities that are valuable, inimitable, rare and non-substitutable (Barney, 1986,1991; Wernerfelt, 1995). Study on operational

DOI: 10.37200/IJPR/V24I1/PR200171
Received: 15 Nov 2019 | Revised: 20 Dec 2019 | Accepted: 05 Jan 2020

capabilities as a resources has a various definition, Wernerfelt (1995) operationalize resources as an anything which could be thought of as a strength or weakness of a given firm.

These loose and all-inclusive definitions of the core concept of the resources that form capabilities present a major weakness, because it does not allow for distinction between resources as inputs to the firm and the capabilities that enable a firm to deploy these inputs Kraaijenbrink, Groen, & Spender (2010). For the purpose of this paper, the definition of operational capabilities is based on Swink & Hegarty (1998) and Wu, Melnyk, & Flynn (2010) which operationalize operational capabilities specifically as an innovation, improvement, reconfiguration, responsiveness, cooperation and customization.

Anand, Ward, Tatikonda, & Schilling, (2009) defined improvement as an actively and repeated making process improvements. Whereby Oliver (2009) define improvement from different perspective by considering process management through as a measure of performance resulting from improvement. Matthews & Marzec (2015) exploring the conflict definition with continuous improvement and process management proposed the differences that is continuous improvement is an on-going nature while process management through process improvement concerned with application of particular methodologies in short-term in an effort to improve process characteristics.

However, Garvin, (1993) stating that improvement requires a commitment to learning. Through the continuous learning of individuals, the organization can overcome the culture toward ‘firefighting’, making improvement a routine (Teare & Monk, 2002). Thus capabilities related to operational improvement is a set of skills that allow an organization to achieve competitive advantage through incremental innovation.

Although the goals, perspectives and some characteristics of design are different for organizational learning and process management Hodgetts, Luthans, & M. Lee (1994). Most of researchers highlight the strong connection between the organizational learning and process management (Tan, Lin, & Hung, 2003). Some even ague that no true quality management practices occurs without organizational learning (Chiles & Choi, 2000; Ittner, Nagar, & Rajan, 2001; (Senge, Roberts, Ross, Smith, & Kleiner, 1994).

Hence, a major factor in the successful implementation of process management practices through TQM or quality programmes is the seminal contribution of an organization’s culture (Rondeau & Wagar, 2002). Many implementation efforts have not succeeded because of a corporate culture that failed to stress broader organizational learning. Enhancing competitiveness through TQM has become an increasingly important challenge for learning in organizations. Consequently organizational learning must be mentioned as a key issue, especially for organizations seeking to progress towards quality management practices (Martínez-Costa & Martínez-Lorente, 2008).

According to (Barrow, 1993) the relationship between quality management practices and organizational learning has two types of relationship. The first evidence is that there is a cause and effect relationship, that is learning is an intended outcome of TQM. The second relationship is, the presence of correlation between two powerful system-organizational learning and process improvement, which are operating in a concurrent and integrated manner.

(Kocoglu, Zeki, & Huseyin, 2011) develops a platform that through which organizational learning shapes the strategic management of the organizations through the role of innovation and quality management practices for the

DOI: 10.37200/IJPR/V24I1/PR200171
Received: 15 Nov 2019 | Revised: 20 Dec 2019 | Accepted: 05 Jan 2020

aim of achieving improved firm performance. Because of this, significant quality management practices can be obtained through the role of organizational learning from operational improvement.

Hypothesis 1a: Improvement positively related to Process Management.

Innovation capability refers to the strength or proficiency of a bundle of interrelated organizational routines for developing new products/processes (Peng et al., 2008). Innovation orientation is central to firm's survival strategy in gaining competitive advantage (Calantone, Cavusgil & Zhao, 2002). Innovation readiness is reflected by the organization's openness, acceptance, and implementation of new ideas, processes, products or services and propensity to change through adopting new technologies, resources, skills and administrative systems. Contrast with operational improvement, the focus of operational innovation is drastic process changes, large scale through implementation of new knowledge or transition from current skills to the new skills (Benner & Tushman, 2003). These require the different processes and resource configuration transition drastically to existing processes (Peng et al., 2008).

The studies have found a positive relationship between quality management practices and innovation (Flynn, Schroeder, & Sakakibara, 1994; Flynn & Flynn, 2004; Baldwin & Johnson, 1995; Terziovski & Samson, 2000). Nowak (1997) conducted a research concerning the innovation' strategies, and quality management, and found that both processes enable the organisation to gain competitive advantage. The author further states that the processes of quality and innovation are interconnected and should not be treated separately, defining the relationship between quality management practises and innovation as a platform that facilitates the sharing of knowledge and skills.

In literature, the nature of relationship shows that the causal relationship is between innovation and quality management practices, particularly TQM. There are limited research on opposite ideas that is quality management effect on innovation implementation or adoption strategy in the organization. Innovation occurs in most cases as a result of existing products and processes, or by developing ideas, methods, and techniques already used by organization. (Moliner, Cortes, Azorin, & Tarí, 2012).

However, the organization is composed by a set of processes that should seek to continually improve in order to create value for organization and for all stakeholders emerging then innovation opportunities, both technological and organizational. It is therefore, necessary to analyse whether innovation strategies will also encourage the implementation of quality management practices, since knowledge or markets and customer needs, employee's involvement, measurement of results, among other characteristic dimensions of quality management practices, must be essential for successful innovation strategies adopted by organizations (Antunes, Quirós, & Justino, 2017). Therefore, it is found that, there are some inconclusive results regarding the interdependencies between innovation and quality management practices.

Hypothesis 1b: Innovation positively related to Process Management.

Operational customization according to Hayes & Wheelwright (1985) is a differentiated sets of skills, processes, and routines for the creation of knowledge through extending and customizing operations processes and systems. The definition implied that, operational customization will determine whether a firm has a high level of operations

DOI: 10.37200/IJPR/V24I1/PR200171
Received: 15 Nov 2019 | Revised: 20 Dec 2019 | Accepted: 05 Jan 2020

and describe it as the development of proprietary processes which the firms benefited by development of equipment and processes that are difficult to copy by the competitors. In addition to that, the employee's ability to maintain and improve equipment and processes also positively affected and this will contribute the organization competitive advantage (Hayes & Wheelwright, 1985).

Similarly, as suggest by Schroeder, Bates, & Junttila (2002) the development of proprietary processes will benefit the firms competitive advantage operational capabilities by inherent in firm-specific, path-dependent. The development of proprietary processes has many different practices and each of the practices shows an underlying ability to customize process to comply the unique needs of firm's products and markets.

It is almost certain that product design and supply chain initiatives that support mass customization will impact manufacturing. For example, designing and outsourcing large-scale, modular, integrated components will have a profound effect on fabrication, sub-assembly and final assembly processes. Some solutions proposed to mitigate any negative impact that customization may have on manufacturing relates to production process. Thus, mass customisation can produce unnecessary cost and complexity, thus the implementation requires other supporting approaches such us change over improvement and jigless manufacture in production process (Matthews, Mcintosh, & Mullineux, 2011). Chandra & Grabis (2004), argue that lean manufacturing which focusing on process management can be an effective strategy for customized products with stable demand. A number of lean principles support mass customization. Minimizing set-up times and reducing lot size increased the opportunity for continuous flow.

Blecker, Friedrich, Kaluza, Abdelkafi, & Kreutler, (2006), highlighted that mass customization brings huge advantage over competitors to producers by offering special, additional product features. The biggest success of the mass customisation and of mass customized productions is in their ability to achieve flexibility of the specific product or product group while avoiding cost rise for the mass producing facility and in the supply chain due to variety and complexity. Therefore, mass customization affects in almost all aspects of the company production and business processes. Customization obviously involving variety management strategy which applied in the level of process namely; component families/cell manufacturing, process modularity, process commonality and delayed differentiation (Blecker et al., 2006; Ulrich & Eppinger, 2011; Pine, 1993; Yayla-Küllü, Parlaktürk, & Swaminathan, 2013). It has also been proofed by empirical study that variety in customisation strategy had a significant impact on process management especially in automotive vehicle production, including assembly and parts supply (Webbink & Hu, 2005; Marcora, Staiano, & Manning, 2009) .

Hypothesis 1c: Customization positively related to Process Management.

Operational cooperation is the ability to bring involved parties together to share information, converging on a shared interpretation of what needs to be done (Wu et al., 2010). As uncertainty increases, the need for operational cooperation capability increases, to help firms cope with the fuzziness of their environments and enact a shared vision, in order to acquire information, share views, interpret the task environment, resolve cross-functional or inter organizational conflicts, and reach a mutual understanding of a task. Swink & Hegarty (1998) described "integration" as the ability to coordinate between manufacturing and the product-process design function in operational cooperation capabilities. This is part of broader operational capabilities which includes the ability to create and sustain healthy relationship with supply chain members, related to sourcing products (Kim, 2006). An antecedent of dynamic trust and cooperation intention in supply chain is information sharing (Yin & Zhao, 2008). Information sharing within the firm is defines as the sharing of critical information between operations and other departments such as sales/marketing, purchasing/supply management, logistics and engineering (Carr & Kaynak, 2007).

Companies that want to move forward in adopting process management through lean production must therefore manage variable supply, processing time and demand (Hopp & Spearman, 2004; De Treville & Antonakis, 2006), and also manage relationships in the value chain (Shah & Ward, 2007). Simpson & Power, (2005) found that relational supplier-customer links have positive influence on lean production adoption by supplier, and proposed a line for future research regarding the fact that these links would also have a positive influence on the implementation of process management through lean production. There are empirical study by (Da Silveira & Arkader, 2007) regarding the influence of coordination mechanism for suppliers and customers in terms of the improvement of manufacturing lead time and delivery speed and reliability.

Jayaram, Vickery, & Droge (2008) emphasize that a company's commitment in lean production should be preceded by the building of close relationships with supply chain agents. Their results show that building these relationships with suppliers and customers drives lean strategy. In relation to information sharing, Stank, Goldsby, & Vickery, (1999) and Gunasekaran & Ngai (2004) point out that efficient and effective information sharing between chain agents is essential in order to achieve supply chain integration, and the improved results that arise from this. In fact, Devaraj, Krajewski, & Wei (2007) indicate the importance of information flows in relation to demand-oriented production information exchange, which are underpinned by collaboration efforts that result in the increased accuracy of information about production.

Lean production through process management aims to integrate all the activities that affect goods and services delivered to customers, including those delivered by both the company itself and external suppliers (Womack & Jones, 1996). Lean production practices have come to be very important aspects of effective supply chain management in terms of cost saving and responding to customer's needs (Jones & Towill, 1999; Handfield & Nichols, 1999). Adopting lean production practices has sparked a change in companies purchasing philosophies and policies, and these are now based on a greater degree of confidence in supplier relationships Sako & Helper, (1998).

In short, to move forward in lean production adoption, companies have to establish relationships with suppliers and customers based on confidence and a high level of motivation to learn, and which allow knowledge to be shared freely (MacDuffie & Helper, 1997). Studies related to impact of different information-sharing strategies on process and product quality by (Tsung, 2000) suggest that real-time information sharing may lead to dramatic quality improvement for an assembly process. It was found that controlling the process based on information sharing will lead to better assembly matching, even though the capability and dimensional quality of an individual process may be adversely affected. The relationship between operational cooperation and process management is postulated as follows:

DOI: 10.37200/IJPR/V24I1/PR200171
Received: 15 Nov 2019 | Revised: 20 Dec 2019 | Accepted: 05 Jan 2020

Hypothesis 1d: Operational Cooperation positively related to Process Management.

There are considerable ambiguity in the existing literature with regards to the definition of responsiveness. The responsiveness term are often used to describe features of manufacturing system (Gindy, Saad, & Yue, 1999) and entire supply chains (Handfield & Bechtel, 2001). Naylor, Naim, & Berry (1999) introduce new term 'leagility' (lean and agility) and postulate that responsiveness in manufacturing operations, organisations and supply chains as a key tenet of a firm's competitiveness. Stalk and Hout, (1990) state that companies are obtaining remarkable results by focusing their organisations on responsiveness.

Underlying operational responsiveness capabilities is the ability of the organization to manage production resources in light of uncertainty such as machine, labour, materials handling and production flow. This capability are associated with technological and production expertise in the existing operations system (Zhang, Vonderembse, & Lim, 2003) that provide the basis for flexibility performance. Swink, Narasimhan, & Kim, (2005) defined operational responsiveness as the differentiated skills, processes and procedure for fast response and easy changes in input and output requirements in order to comply with customer requirements efficiently.

Responsiveness associated with firms flexibility in dealing with changes, process management is related to how efficient the firms react with the changes occurs in challenging business environment. As defined by Upton (1994), flexibility is the ability of a system respond or react to a change with little penalty in time, effort or cost. Therefore, while firms need to be strategically flexible to adapt to unanticipated situations and rapidly changing environments, they also need to optimize their business processes to achieve operational efficiency (Eisenhardt, Furr, & Bingham, 2010).

Strategic flexibility supports the adaptive use of resources the reconfiguration of processes (Sanchez, 2005; Zhou & Wu 2010) and thus, the ability to quickly respond to dynamically changing environments (Nadkarni & Narayanan, 2007; Schreyögg & Sydow, 2010). Prior literature suggests that balancing strategic flexibility and operational efficiency supports sustainable competitive advantage through reconciling long-and short-term objectives (Adler, Goldoftas, & Levine, 1999; Eisenhardt et al., 2010).

The business environment change may be internal or external and require organization to response accordingly to remain competitive in the competition. Labour and machines are among the major resources of manufacturing industry which can significantly contribute to process management. Success with lean implementation can be limited unless the behaviour of employee that changes the business process is recognized (Gatchalian, 1997; Emiliani, 1998). The use of a multi-skilled workforce allows the firm to respond quickly to unexpected and unbalanced demands that may arise in the concern.

Such flexibility helps the firm to reduce manufacturing flow time and work-in-process inventories, and improves their customer service while providing an efficient use of both labour and equipment and also enhances system performance (Treleven, 1989; Polakoff, 1991; Bobrowski & Park, 1993; Hung, 1993; Koste & Malhotra, 1999). The firms where the labor flexibility is higher are generating less amount of waste of resources and are closer to implementation of lean manufacturing (Singh, 2008).

DOI: 10.37200/IJPR/V24I1/PR200171
Received: 15 Nov 2019 | Revised: 20 Dec 2019 | Accepted: 05 Jan 2020

Highly automated but flexible machines can produce complex product mix with short set-up times, lesser inventories and practically minimum machine breakdowns. In other words, a high degree of flexibility is needed in machinery and equipment to accomplish lean principles of just in time production and minimization of non-value added activities (Chauhan & Singh, 2011). Thus labour and machine flexibility to response with customer demand and market changes is an essential requirement for process management practices.

Hypothesis 1e: Responsiveness positively related to Process Management.

Operational reconfiguration is associated with dynamic capabilities (Teece, Pisano, & Shuen, 1997), it can be seen as an emerging and potentially integrative approach to understanding the newer sources of competitive advantage. Dynamic capabilities according to Teece et al. (1997) emphasizes the development of management capabilities, and difficult to-imitate combinations of organizational, functional and technological skills, it integrates and draws upon research in area of management of R&D, product and process development, technology transfer, intellectual property, manufacturing, human resource and organizational learning. The ability to invest in physical and intangible resources that provide the firms with alternatives in uncertain environment so the firms can alter the action in relation of new information is an operational reconfiguration (Pandza et al., 2003).

Its evolves from procedure that sense changes, maintain flexible responses and implement synchronized operations. It is shows by the firms ability to adapt manufacturing strategy in response to changes in market demand, global fragmentation, competition, technological advancement, product life cycle and corporate strategy (Cagliano, Acur, & Boer, 2005). Operational reconfiguration is the differentiated sets of skills, processes and routines to ensure the necessary transformation are mutually fit between operations strategy and the market environment which is useful when a firm faced with rapid changing environment (Teece et al., 1997; Swafford, Ghosh, & Murthy, 2006).

Reconfiguration of resources requires organization to be aware with the business environment change in order to remain competitive. Change is costly and so firms must develop processes to minimize low pay-off change. The ability to calibrate the requirements for change and to effectuate the necessary adjustments would appear to depend on the ability to scan the environment, to evaluate markets and competitors, and to quickly accomplish reconfiguration and transformation ahead of competition (Teece et al., 1997). Technology transfer and adoption by firm is inevitable particularly Information Technology (IT). The adoption of IT is no longer a source of competitive advantage because it can be easily duplicated by other firms (T.C Powell & Micallef, 1997). Therefore in order to transform IT as a source of competitive advantage, firms need to reconfigure IT in the organization together with other resources and capability.

The important factor for the success implementation of business process change is that the organization possesses the necessary capabilities to select, deploy, and organize the resources. Process change initiatives is a complex efforts and require many different sets of capabilities from the organization for example IT, change management, project management capabilities (Jurisch, Palka, Wolf, & Krcmar, 2014).

The study by Jurisch et al., (2014) found that there are positive relationship between IT capabilities and business process change in the organization. The relationship between IT and process management through TQM practices also can be found in the resource-based view of the firm (Peteraf, 1993; Barney, 1991,1986) and the notion of

DOI: 10.37200/IJPR/V24I1/PR200171
Received: 15 Nov 2019 | Revised: 20 Dec 2019 | Accepted: 05 Jan 2020

resource complementarity. In this situation, complementarity represents an enhancement of resource value, and arises when a resource produces greater returns in the presence of another resource that it does alone.

Thus the IT capabilities and quality management practices are reconfigured complimentary resources that makes IT capabilities have a positive effect on process management practices adoption. From the perspective of organizations, learning systems for process automation should focus on knowledge integration (Kim, 1994). Process automation needs additional procedural expertise in practice and individual must undergo new types of learning to develop the social skills for teamwork (Adler, 1986). The use of computer networks that utilize groupware automates workflows rapidly in an organization; however, organizational learning via groupware is a long-term process that is expected from mature implementations (Riggs, Bellinger, & Krieger, 1996).

Hypothesis 1f: Reconfiguration positively related to Process Management.

2.2 Process Management

Process management (PM) is essential to the organization and as proposed by Quality gurus such as Deming, (1986) and Juran, (1986) nowadays PM is implemented almost at every organization as a concerted efforts to map, improve and comply with organization processes. From Quality Management perspective, Process Management are one of components in prestigious award such as Malcom Baldridge National Quality Award (MBNQA). Many researchers such as Choi and Eboch (1998); Saraph, Benson, & Schroeder (1989); Powell (1995); Wilson and Collier (2000) define PM as one of the key components in QM empirical framework responsible for transmitting the effects of its antecedents onto organizations. As a result, PM helps the removal of non-value added activities and the achievement of results in cost reduction and efficiency improvement.

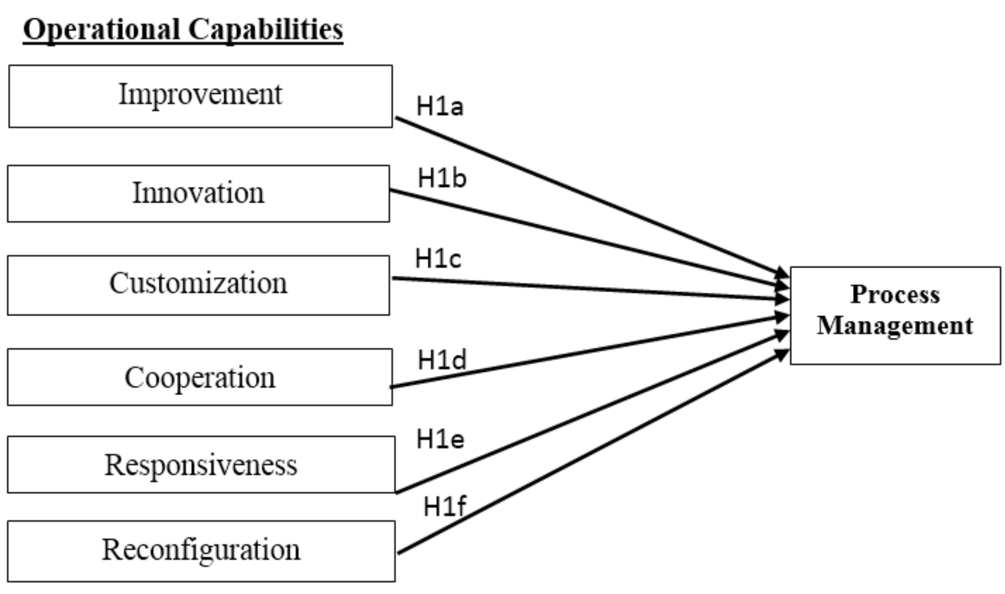

Figure 1: Conceptual Framework for the Relationship of Operational Capabilities and Process Management

Impact of PM which is consist of design, control and improve moderated by competitive intensity to efficiency and innovation are differs (Evans & Lindsay, 2005). In addition to Evans & Lindsay (2005), other literature also suggest that process management involving trade-off between efficiency and innovation outcomes. Process

DOI: 10.37200/IJPR/V24I1/PR200171
Received: 15 Nov 2019 | Revised: 20 Dec 2019 | Accepted: 05 Jan 2020

management emphasize too much attention on improving efficiency and this could hinder the firm's ability to improve on innovation (Benner & Tushman, 2003). They argued the process management stabilize organizational process and establish the situation that concentrate on looking for easy ways to gain efficiency.

III. METHODOLOGY

As explained in previous section, this study attempts to determine the underlying items for the dimension of operational capabilities in the Halal firm industry from the literature and incorporate them into a Likert Scales-type instrument, as well as administering the instrument to a sample population consisting of Halal food manufacturing SME's. The population of this study is defined as the Halal food manufacturing companies in Sarawak that certified by JAKIM.

Justification of Halal food manufacturing terminology is based on Guideline for new SME Definition by SMECorp. Malaysia, Secretariat to National SME Development Council, 2013. Production of food product (including meat) and beverages based on the guideline is categorized as a Manufacture of Food Products and Manufacture of Beverages. The populations list was acquired from JAKIM and HDC whereby unit of analysis is a firms. The question addressed was whether there is a relationship between operational capabilities and process management?

During the data collection period between January 2018 and April 2018, a total of 302 questionnaires were distributed to the companies and 229 useable questionnaires received from the respondent, giving the response rate 75 percent. Higher response rate achieved through assistance from government agencies such as JAIS, MATRADE and Smebank that provide support in relation to platform for questionnaire distribution and collection. The response rate of over 70 percent indicates non-response error was not a concern (Nulty, 2008).

Constructs have been operationalised using Likert scales which is the common approach used to measure a wide variety of latent constructs (Kent, 2001). In this research, five-point Likert scale, ranging from (1) strongly disagree to (5) strongly agree were applied. According to (Revilla, Saris, & Krosnick, 2014), Likert, (1996) proposed that these AD scales should offer five points. Revilla et al. (2014) studies on comparison between number of likert scale categories (1-5,1-7,1-11) effect on quality coefficient shows that quality decreases as the number of categories increases, so that the best AD scale is a 5-point scales.

The operational capabilities dimensions will be measured using multi-item and adapted from in prior literature. Operational capabilities construct will be gauged by using six sub dimensions based on (Wu et al., 2010) adapted from relevant literature (Teece et al., 1997; Swink & Hegarty, 1998; Sen & Egelhoff, 2000; Schroeder et al., 2002; Subramaniam and Youndt (2005) and supported by focus group discussion output.

Owner and representatives from supervisory level of Halal food manufacturing company will be asked to indicate in a five-point Likert scale the degree to which the particular subdimensions of operational capabilities were present in their firms (1= strongly disagree to 5=strongly agree). The study has used the Statistical Package for Social Sciences (SPSS) Version 22 and SmartPLS Version 3 Software to perform statistical analysis from data surveys.

DOI: 10.37200/IJPR/V24I1/PR200171
Received: 15 Nov 2019 | Revised: 20 Dec 2019 | Accepted: 05 Jan 2020

IV. RESULT AND FINDINGS

Table 4.0 shows the respondents structure according to their job titles. The majority of the respondents were Chief Executive Officer or General Manager or owner of the company (32.3 percent). This was followed by Operation Manager/Quality Manager/Manager (29 percent). Managerial position/supervisor (26.2 percent) and others position such as Food Technologist or Halal Executive (12.2 percent).

Total frequency of managerial level and above involve in this survey is 201 or 87.8 percent from total respondent. The remaining 28 or 12.2 percent were involved directly in the operation such as Food Technologist and Halal Executives. This study require involvement of managerial position and above in order to acquire relevant and accurate feedback on operational capabilities and process management practices in the companies.

Table 4.0: Respondent Profile Based on Job Title

Job Title/Position	*Frequency*	*Percentage*
Chief Executive Officer/General Manager/Owner	74	32.3
Operation Manager/Quality Manager/Manager	67	29.3
Managerial Position/Supervisory	60	26.2
Others	28	12.2
Total	229	100

4.1 Assessment of Reflective Measurement Model

The measurement models were tested for indicator reliability (loadings), construct reliability (composite reliability), convergent validity (average variance extracted and discriminant validity (square root of AVE and loadings and cross loadings analysis), by applying generally accepted decision rules (Hair, Hult, Ringle, & Sarstedt, 2017).

The result of these validity and reliability tests, which will provide a level of assurance that the survey items are measuring the constructs they are designed to measure, are shown in the following sections. Indicator reliability explains the extent to which a measure or a set of measure is consistent in relation of what it intends to measure.

All measures except the demographic information were initially included in the research models and the reliability of individual indicators or measures were evaluated by examining the loading of each measure. A commonly accepted threshold is to accept items with loading of 0.707 or higher, which implies that there is more shared variance between the constructs and its measure than error variance (Chin, 1998; Hulland, 1999; Barroso et al., 2010: and Gotz, Liehr-Gobbers, & Karfft, (2010).

Hair et al., (2017) recommend that all loading that exceeded value of 0.708 should be retained. Item proc1, proc7, proc8, proc9, proc10 and proc11 were deleted due to low loading composite reliability below threshold value as suggested that is 0.708.

All seven composite reliability were above the minimum threshold of 0.7 and all AVE's were greater than 0.5 after the process of item deletion. Therefore, the constructs met reliability and convergent validity requirement as in Table 4.1.

DOI: 10.37200/IJPR/V24I1/PR200171
Received: 15 Nov 2019 | Revised: 20 Dec 2019 | Accepted: 05 Jan 2020

Table 4.1: Reflective Measurement Model

Construct	*Item*	*Loadings*	*CR*	*AVE*	*Convergent Validity (AVE>0.5)*
Improvement	imp1	0.702			
	imp2	0.619			
	imp3	0.852	0.855	0.544	Yes
	imp4	0.764			
	imp5	0.730			
Innovation	inn1	0.825			
	inn2	0.781			
	inn3	0.870	0.922	0.703	Yes
	inn4	0.867			
	inn5	0.847			
Customization	cus1	0.718			
	cus2	0.769			
	cus3	0.725	0.859	0.551	Yes
	cus4	0.742			
	cus5	0.754			
Cooperation	coo1	0.810			
	coo2	0.790			
	coo3	0.726	0.884	0.605	Yes
	coo4	0.821			
	coo5	0.737			
Responsiveness	res1	0.731			
	res2	0.786			
	res3	0.799	0.877	0.589	Yes
	res4	0.816			
	res5	0.695			
Reconfiguration	rec1	0.735			
	rec2	0.708			
	rec3	0.842	0.883	0.602	Yes
	rec4	0.845			
	rec5	0.736			
Process Management	proc2	0.761			
	proc3	0.744			
	proc4	0.678	0.846	0.524	Yes
	proc5	0.749			
	proc6	0.681			

*proc1, proc7, proc8, proc9, proc10, proc11 items were deleted due to loading composite reliability <0.708 (Hair et al., 2017).

4.2 Assessment of Discriminant Validity

Table 4.3 indicates that all constructs exhibited sufficient or satisfactory discriminant validity (Fornell & Larcker, 1981), where square root of AVE (diagonal is larger than correlations (off-diagnonal) for all reflective constructs. To confirm the discriminant validity result from the use of Fornell & Larker's techniques, (Henseler, Ringle, & Sarstedt, 2014) HTMT technique was conducted. As shown in Table 4.2, all the values passed the HTMT.90 (Gold, Malhotra, & Segars, 2001) and the HTMT.85. (Kline, 2011) thus indicating that discriminant validity has been ascertained. In other words none of the value exceed the conservative threshold 0.85 which indicate that the path model are conceptually more distinct.

DOI: 10.37200/IJPR/V24I1/PR200171
Received: 15 Nov 2019 | Revised: 20 Dec 2019 | Accepted: 05 Jan 2020

Table 4.2: Discriminant Validity using Heterotrait-Monotrait Ratio (HTMT) Criterion

	1.	*2.*	*3.*	*4.*	*5.*	*6.*	*7.*
1. Cooperation	**0.778**	-					
2.Customization	0.602	**0.742**	-				
3. Improvement	0.533	0.531	**0.737**	-			
4. Innovation	0.493	0.603	0.602	**0.839**	-		
5. Process Management	0.543	0.597	0.572	0.531	**0.724**	-	
6. Reconfiguration	0.532	0.604	0.454	0.628	0.564	**0.776**	-
7. Responsiveness	0.438	0.425	0.309	0.400	0.429	0.555	**0.767**

Criteria: Discriminant validity is established at HTMT0.85 (Kline, 2011)/HTMT0.90 (Gold 2001).

Prior to evaluating the structural model, it is crucial to ensure that there are no lateral collinearity issues in the structural model. According to Kock & Lynn (2012), even if the criteria of discriminant validity (i.e., vertical collinearity) are met, issues of lateral collinearity (i.e., predictor-criterion collinearity) can still mislead the findings, as it can mask the strong causal effect in the model. This is typically occurs when two variable that are hypothesized to be causally related measure the same construct. Table 4.3 presents the outcome of the lateral collinearity test. The VIF score for each individual construct is below the threshold value of 5 (Hair et al., 2017) or 3.3 (Diamantopoulos & Siguaw, 2006) thus suggesting that there were no lateral collinearity issues.

Table 4.3: Lateral Collinearity Assessment

Construct	*VIF*
Cooperation -> Process Management	1.890
Customization ->Process Management	2.052
Improvement ->Process Management	1.806
Innovation ->Process Management	2.301
Reconfiguration ->Process Management	2.207
Responsiveness ->Process Management	1.505

Lateral Collinearity: VIF 3.3 or higher (Diamantopoulos & Siguaw, 2006).

4.3 Assessment of Path Coefficient

Path-coefficient is assessed to evaluate the significance of hypothesized relationship between the constructs. Based on the model, they are 6 direct relationship by dimension under operational capabilities and Process Management. In order to test the level of significance, t-statistics for all paths were generated using the SmartPLS bootstrapping. Running the t-statistic on sample size of 229 repondents and 6 direct hypothesis as shows in Table 4.4, five main direct hypotheses brought a result of $\geq$ 1.645, and indicated significance at 0.05 level.

The relationship of cooperation capabilities on process management were assessed and show that the relationship between cooperation and process management has positive relationship (β=0.137, t=2.024, p=0.022). Cooperation capabilities is the ability to bring involved parties together, converging on a shared interpretation of what needs to be done (Wu et al., 2010).

Therefore the definition of cooperation capabilities requires sharing of information and knowledge among involved parties in the organization. This finding is consistent with Law and Ngai (2008) that empirically found that the knowledge sharing behaviors would lead to better performance in business process improvement of a firm.

DOI: 10.37200/IJPR/V24I1/PR200171
Received: 15 Nov 2019 | Revised: 20 Dec 2019 | Accepted: 05 Jan 2020

The influence of operational customization and process management were assessed and show positive relationship (β=0.249, t=3.845, p=0.000). Operational customization as explained by Hayes and Wheelwright (1985) will determine whether a firm has a high level of operations and describe it as the proprietary processes. Halal certified companies in this study are related to food manufacturing and their process are customize to meet their target market. The personalization of products tailored to the individual needs and preferences of consumers gives a good platform to mass customization in food industry particularly for Halal consumers Therefore, customization affects in almost ass aspect of the company production and business process (Ulrich & Eppinger, 2011).

The influence of operational improvement and process management were assessed and show positive relationship (β=0.261, t=3.983, p=0.000). This outcome is consistent with literature discussed in previous section where the scholar relates operational improvement with organizational learning and positively affect the process management adoption or implementation in the organization. As a Halal certified company, they are guided with Malaysian Standard (MS 1500:2009), Halal Food-Production, Preparation, Handling and Storage-General Guidelines and Halal Malaysia Certification Procedure Manual (3rd Revision 2014). Both requirements emphasize the importance of organizational learning and employee involvement to ensure the product and process comply with the certification requirements.

The result of path coefficient assessment for operational innovation towards process management shows that the result are not significant. The results shows that, the β value for innovation towards process management is -0.001, t=0.022 and p=0.491. As defined earlier in previous section, operational innovation refer to the strength or proficiency of a bundle of interrelated organizational routines for developing new products/processes (Peng et al., 2008). Contrast with operational improvement, the focus of operational innovation is drastic process changes and large scales. Consistent with Antunes et al. (2017), highlight that it is necessary to analyze whether innovation strategy will encourage the implementation of quality management practices. It is found that, there are inconclusive results regarding the relationship between innovation and quality management practices.

The path coefficient for operational reconfiguration and process management were assessed and shows significant positive relationship (β0.17, t=2.254, p=0.012). Pandza et al. (2003) highlight that, the operational reconfiguration is the ability to invest in physical and intangible resources that provide the firms with alternatives in uncertain environment so the firms can alter the action in relation of new information is an operational reconfiguration. In relation to this, operational reconfiguration is related the firm capabilities to reconfigure resources including technology transfer such as through Information Technology (IT). In line with study by Jurisch et al. (2014), there are positive relationship between IT capabilities and business process change in the organization.

The result of patch coefficient assessment for operational responsiveness shows that, the β value for responsiveness and process management is 0.127, t=2.387 and p=0.009 which implied that the hypothesis for H1e is supported. Responsiveness associated with firms flexibility in dealing with changes, process management is related to how efficient the firms react with the changes occurs in challenging business environment (Upton, 1994). In line with (Chauhan & Singh, 2011), the implementation of process management through lean principles in the organization requires higher labour flexibility.

DOI: 10.37200/IJPR/V24I1/PR200171
Received: 15 Nov 2019 | Revised: 20 Dec 2019 | Accepted: 05 Jan 2020

Table 4.1: Path Co-efficient Assessment (N=229)

Hypothesis	***Relationship***	***Std β***	***Std Error***	***t-value***	***p-value***	***Result***
H1a	Improvement->Process Management	0.261	0.065	3.983**	0.000	Supported
H1b	Innovation->Process Management	-0.001	0.066	0.022	0.491	Not supported
H1c	Customization->Process Management	0.249	0.065	3.845**	0.000	Supported
H1d	Cooperation->Process Management	0.137	0.068	2.024*	0.022	Supported
H1e	Responsiveness-> Process Management	0.127	0.053	2.387**	0.009	Supported
H1f	Reconfiguration-> Process Management	0.175	0.076	2.254**	0.012	Supported

Note: *p< 0.05; ** p< 0.01

The researchers can evaluate the effect size of the predictor constructs using Cohen's f^2 (Cohen, 1988). The f^2 assess the relative impact of a predictor construct on an endogenous construct (Cohen, 1988). Specifically, it assesses how strongly one exogenous construct contributes to explaining a certain endogenous construct in terms of R^2. Initially, R^2 value is estimated with particular predecessor construct and if one of predecessor constructs is excluded, the result for R^2 value will be lower. Hence, the difference of the R^2 values for estimating the model with and without the predecessor construct is known as the effect size. According to Cohen (1988), f^2 values of 0.35, 0.15 and 0.02 are considered large, medium, and small effect sizes respectively. If an exogenous construct strongly contributes to explaining and endogenous construct, the difference between R^2 included and R^2 excluded will be high f^2.

In this study, the effect size of six exogenous construct of operational capabilities sub dimensions towards process management were investigated The f^2 result to assess the effect size shows that all the sub dimensions of operational capabilities have the small effect size on process management (Improvement-Process Management; Cooperation-Process Management; Customization-Process Management; Reconfiguration-Process Management and Responsiveness-Process Management) as shown in Table 4.5.

Table 4.5: Operational Capabilities-Process Management Effect Size

Operational capabilities sub construct	***f*2 value**	**Effect Size**
Improvement -> Process Management	0.081	Small
Customization -> Process Management	0.065	Small
Reconfiguration -> Process Management	0.028	Small
Responsiveness -> Process Management	0.023	Small
Cooperation -> Process Management	0.022	Small

V. CONCLUSION

The research objectives of this study which is to examine the relationship between operational capabilities and process management among Halal food manufacturing companies in Sarawak has been achieved. The achievement of research objectives were further explained by the evaluation of the effect size of the predictor constructs using Cohen's f^2 (Cohen, 1988). The result from Table 4.5 shows that the effect size of operational capabilities as a predictor to process management is ranging from 0.022 to 0.081, thus indicate that small effect size. Even though the effect size is small but the *f*2 value the sub construct of operational capabilities shows that operational improvement have the highest effect size on process management followed by customization, reconfiguration, responsiveness and cooperation.

DOI: 10.37200/IJPR/V24I1/PR200171
Received: 15 Nov 2019 | Revised: 20 Dec 2019 | Accepted: 05 Jan 2020

In this research, the relationship between operational innovation and process management is found not significant, on the other hand there is no relationship between innovation and process management adoption or implementation in the organization. As in the definition, operational innovation is on large scale and radical process change through new knowledge. This will required capital acquire this capabilities and for small or medium size firm, investment in the technology and innovation is not their priority since the focus in mainly on basic requirement operation that is on material or input for the processing activities. Consistence with Antunes et al. (2017) there are some inconclusive results regarding the interdependencies between innovation and quality management practices which is an essence of process management.

ACKNOWLEDGEMENTS

The authors would like to thank the Malaysia Productivity Corporation (MPC) in providing the venue for the Focus Group Discussion. Halal Development Division, Jabatan Agama Islam Sarawak (JAIS), Ministry of Industrial and Entrepreneur Development (MIED) Sarawak for providing the participants database and information on Halal industry development in Sarawak. The participants from industry that contribute their ideas and sharing experience related to operational capabilities in their companies.

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DOI: 10.37200/IJPR/V24I1/PR200171
Received: 15 Nov 2019 | Revised: 20 Dec 2019 | Accepted: 05 Jan 2020

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DOI: 10.37200/IJPR/V24I1/PR200171
Received: 15 Nov 2019 | Revised: 20 Dec 2019 | Accepted: 05 Jan 2020