

RELATIONSHIP BETWEEN PRODUCT TECHNOLOGICAL CAPABILITY AND PRODUCT ACCEPTANCE WITH MODERATING EFFECT OF QUALITY CONFORMANCE AMONG MALAYSIAN CUSTOMERS

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Abstract: *Technological Capabilities studies of firms in developing countries accept that technology developments occur primarily at the firm level and are translated in new product/service development, equipment, installations, productive processes norms and procedures as well as in the development of the technical knowledge of the labor force. Technological capabilities as the resources needed to generate and manage technological change, including skills, knowledge and experience, and institutional structures and linkages. More operational perspective when they defined technological capability as the ability to develop and design products and processes, and to operate facilities effectively. Technological capability as breadth and depth of technology, with breadth referring to the diverse technological fields in which the firm is active and the depth dimension dealing with two different levels of component design (context being engine control systems in aircraft industry. Conformance is defined as the compliance to some specified standard. Conformance defined as the extent to which a product's design and operating characteristics meet predetermined standards. Furthermore, quality conformance define as specifications is the ability to manufacture a product acceptance whose operating characteristics meet established performance standards. They further mentioned that quality control workers check and test components and products for conformance to specifications toward product acceptance. In the context of this study, researcher use random Sampling in choosing the respondents. However, for the purpose of the study, 500 questionnaires will be distributed because of possibility the questionnaires will be rejected because of not fully completed by the respondents. Therefore, the sample size used in this study is more than 384. Relationship between Product Acceptance, technology capability and moderating effect of quality performance being tested, and hypothesis developed and indicated positive relationship among variables.*

Keyword: *Quality Conformance, Product Acceptance, technology capability, customer acceptance*

Introduction

The acceptance of products/services by consumers is affected by how closely the product's concept conforms to the customs, values, and behavioral patterns based on the physical or mechanical attributes of products (Kardes, Posavac, Cronley & Herr, 2008). Companies aware that, customers are satisfied only when they are offered with new products that have high degree of quality and reliability (Murthy et al., 2009). World market today led by new products that have high quality and reliability (Chung and Hsu, 2010). Product Development Management Association Best Practices Study (Barczak, Griffin, and Kahn, 2009) found that firms deemed only about 59% of new products commercialized to be "successful" (in general terms), while 54% of commercialized new products were considered successful specifically in terms of a profit perspective. Meta-analyses (e.g. van der Panne, van Beers, and Kleinknecht, 2003) have found strong support for many firm-level antecedents such as extent to which product is perceived as satisfying customer needs, superiority over competitive offerings and focused commitment of personnel and R&D resources to the new product development initiative. In this study researcher would like to explore relationship between technology capability and quality performance towards customer product acceptance.

Product Technology Capability

Technological capability has been explained in various ways depending on the interest of the researchers. Garcia-Muina&Navas-Lopez (2007) conceptualized technological capability as a tool for implementing competitive strategy and creating value in any given environment. They further defined it as the ability to jointly mobilize different scientific and technical resources which enables a firm to successfully develop its innovative products or productive processes. Similarly, Caniels and Romijn (2004) described technological capability as the ability to make the right investment choices; increase production capacity; and engage in continuous upgrading of product quality. They further argued that technological capability are efforts geared towards investment in time and resources aimed at assimilating, adapting and improving existing technologies and creating new technologies through reverse engineering. Technological Capabilities (TC) studies of firms in developing countries accept that technology developments occur primarily at the firm level and are translated in new product/service development, equipment, installations, productive processes norms and procedures as well as in the development of the technical knowledge of the labor force (Figueiredo, 2001).

Organizational learning is a vital facilitator of technological capability (Primo et al., 2012). Figueiredo (2001) assumes the organizational learning process as a vital component of technological capability directions. Nonaka and Takeuchi (1995) argue that implied knowledge from people should be changed over into explicit knowledge and that firm learning processes rely on learning obtaining sources (external or internal) and firm knowledge transformation systems. Transformation systems are represented by the socialization process among company workers and the systematization processes of applying that learning into products, services, routines, procedures, manuals, (Brown and Duguid, 2000).

Similarly, Jin and Von Zedtwitz (2008) observed that technological capability in developing countries could be used interchangeably with "absorptive capacity" which means absorbing

existing knowledge from the developed economy, assimilating it, and in turn generating new knowledge. Sobanke, Ilori and Adegbite (2012) further defined technological capability as the effective use of technical knowledge and skills required to improve and develop products and processes; improve existing technology; and also to generate new knowledge and skills in response to the competitive business environment.

Bell and Pavitt (1993) define technological capabilities as the resources needed to generate and manage technological change, including skills, knowledge and experience, and institutional structures and linkages. Dosi and Teece (1993) added a more operational perspective when they defined technological capability as the ability to develop and design products and processes, and to operate facilities effectively. Prencipe (2000) has operationalized technological capability as breadth and depth of technology, with breadth referring to the diverse technological fields in which the firm is active and the depth dimension dealing with two different levels of component design (context being engine control systems in aircraft industry). On similar lines, Patel and Pavitt (1997) conclude that technological capabilities among large firms are multi-field, highly differentiated and stable, and rate of search is influenced by principal product and home country. Technology capability helps in commercialization in a technology based start-up and therefore is a source of competitive advantage (Aeron & Jain, 2015).

Technological capability is composed of two broad elements, namely embodied and disembodied (Sobanke et al., 2012). They stated that the embodied elements of technological capability are those that involve the human aspect which includes the skills, knowledge, attitude and aptitude whereby the non-embodied/disembodied elements are the part of technological capabilities that are codified and can easily be transferred among users. These include equipment and software (Marcelle, 2004).

Relationship between Technological Capability and Product Acceptance

Primo et al. (2012) stated that Brazilian shipyards face the typical problems of new large industrial enterprises in emerging economies that are mandated to become national champions where local sourcing may not only be required by local content rules but may also serve as a mechanism to reduce the risks associated with delivery delays and the lack of on-site assistance by global suppliers. They further stated that local suppliers may have limited technological capabilities to comply with the enterprise demands related to product and production processes, and those suppliers may not even be located in organized clusters in order benefit from externalities in developing local firm technological capabilities.

Technological capabilities refer to a firm's ability to make effective use of technological knowledge in engineering/production, and innovation in order to be competitive in price and quality (Kim, 2001). The technology development capability of the firm indicates to technical change that permits successful innovation process (Zawislak et al., 2012). The definition of firms' technological capabilities used here is understood along the parameters put forward by Bell and Pavitt (1995) and relates to firms' capacity to effectively create and manage technical change. Malerba's (1992) categorization of the types of learning processes and their corresponding directions of incremental change have been adapted specifically to product innovation activities. The first types of learning processes adapted to this study are learning by doing (Silverberg et al., 1988) and learning by using (Rosenberg, 1982) which are internal to the firm and involve

production activities and the mastering of product designs. The second type is learning by interacting (Lundvall, 1988) which regroups external upstream and downstream sources of knowledge essential for product improvement. Finally, the third type of learning process is learning by searching (Sahal, 1981) which involves the internal efforts of the firm in the form of R&D to create new products.

Patel and Pavitt (1997) describe that technology is one of the main sources of competitive advantage for a company. Within the same industry, companies with a technological edge tend to have better profitability as well as being faster in developing new product lines or other technological innovation (Azubuike, 2013). Lall (1992) stressed the power of technological capability as the way firms absorb, process, create, change and generate feasible technical applications (new technology, new process, new products, new routines) within the knowledge frontier. Even though a firm has created technological capability, it does not mean the firm will subsequently have innovation capability (Zawislak et. al, 2012).

Moderating Effect of Quality Conformance

Quality is fitness for use where quality is meeting or exceeding customer expectations (Juran, 1974). Eiklenborg, Ioannou, King and Vilcheck (2011) stated that quality is the whole characteristics and features of goods or service that can satisfy requirements and needs. According to Kianpour, Jusoh and Asghari (2014) quality mainly measures the levels of compliance to standards and specifications where deviating from predetermined specifications and standards will lead to poor product quality and lower reliability. They added that the goal in quality improvement is to eliminate the defects, rework for conflicts and finally to reduce the production costs.

Conformance is defined as the compliance to some specified standard (Juran, 1974). Garvin (1984, 1987) defined conformance as the extent to which a product's design and operating characteristics meet predetermined standards. Furthermore, Forker, Vickery and Droge (1996) define quality conformance to specifications is the ability to manufacture a product whose operating characteristics meet established performance standards. They further mentioned that quality control workers check and test components and products for conformance to specifications. Foster (1996) stated that different types of conformance exist such as conformance to design, standard, specification, procedure, or requirements. They further mentioned that conformance to specification indicates that critical specifications are made, measures are taken, and the product is compared to specification to assess quality. For this study, conformance to standard and specification was adopted.

Kianpour, Jusoh and Asghari (2014) stated that conformance is a grade in which the design of the products and process features should meet the pre-determined standards. They further added the measures for the failures of conformance normally are the incidence of service calls and defecting rate in the industrial unit or once the product is in the client's hands. These measures neglect other deviations from the standard, such as misspelled tags or bad structure that do not lead to service or repair (Garvin, 1987). Kianpouret. al (2014) stated that some research has been done about conformance as one of the product quality dimensions. For example, for the measuring and classification of product quality for a specific product, conformance is categorized as the second dimension of product quality from the consumer's perspective (Karnes, 1995). Quality planning

is establishing production process conformance to design specification procedures; and designing test procedures and test equipment (Carson, 1986).

Foster (1996) stated that in comparing conformance from firm-to-firm, caution should be given as dissimilarities can occur in specifications and sampling procedures where firm can improve outgoing conformance by employing more stringent inspection. Forkeret. al (1996) mentioned that the user-based approach classifies that a high-quality product is the main thing in satisfying customer needs or wants. They also stated that manufacturing-based approach equates quality with conformance to specifications and the value-based approach describes quality as a measure of product's conformance to specifications or performance at an intended level and conformance/performance at an acceptable cost or price. Garvin (1984) recommends that to be successful, companies do not necessarily outstanding on all quality dimensions but by adopting a quality niche firm performance would be better, especially if the dimension being chosen is one that other firms have not concentrated.

or specification, or lack of safety are the reasons for product recalls (Beamish & Bapuji, 2008; Lyles, Flynn, & Frohlich, 2008). The products recalls are either hazardous or defective, are not according to specification, or do Forkeret. al (1996) stated that quality is extreme vital in the furniture industry where three greatest vital items are company reputation, quality conformance to specifications and customer service. They added that manufacturing (MFG) has the highest responsibility for quality conformance to specifications, product reliability and product durability. They further stated that researchers found a strong positive relationship between quality and market share and to strengthen conformance to specifications company has to improve quality control. Non-conformance to quality, not maintaining some specific standard not comply with government compliances (Kamrul& Indra, 2014). Primo et al. (2012) mentioned that local firms often are not in compliance with international standards for products, processes (quality and environment), and labor skills. They added that inability to meet these standards is an indication of limitations to the technological capabilities of the local firms that will lead firms develop relationships with global supply sources or will vertically integrate processes to manufacture products that might normally be outsourced from other companies.

According to Ulrich (2012), production of new products requires advanced engineering process, strict quality requirements and has a tendency for such products remain on the market. Compliance with different product standards such the ones established by IMO (International Maritime Organization) and process quality standards (ISO 9001) has heightened the competitive challenge faced by suppliers in the shipbuilding industry (Primo et. al, 2012). Birg et al. (2015) stated that European Union firms' investments in product quality are not only driven by consumer preferences, but also by mandatory minimum quality standards that are applied in order to limit external effects such as harmful emissions or risks to consumers. They further mentioned that consumers may distinguish products of a higher quality level from products of a lower quality level, but cannot observe whether the standard is fulfilled.

PRODUCT ACCEPTANCE

Acceptance is adoption and continuing use of the product, service or idea (Mansor, Ahmad, Bakar and Ismail, 2014). According to Rogers and Shoemaker (1971), consumers go through "a process

of knowledge, persuasion, decision and confirmation” before they are ready to accept a product or service. Any attempt for drawing a conclusion from the perspective of customer as well as the service institution should always considered a clear operational definition of customer acceptance (Naylor & Greco, 2002). Understanding the motivations, expectations and desires of both provide a foundation on how to provide best services to the customer by most businesses (Mansor et al., 2014). Customer acceptance, as defined by behavioral intention (BI), has widely been explained by the Technology Acceptance Model (TAM) (e.g. Wang, 2005). This model and its extensions have identified various factors that directly or indirectly impact customer acceptance of technology (Agha& Saeed, 2015). Venkatesh (2000) proposed that the user acceptance of the technology is directly influenced by the ease with which it can be used, which also makes it most useful for the customer. Customer acceptance or user acceptance has been defined by Dillon & Morris (1996) as the noticeable willingness within a user group to utilize information technology for the tasks it is intended to support. Customer acceptance currently the most vital phenomena for any technology, or product or service (Agha and Saeed, 2015). Any technology that is bought into the market is only successful if the customers accept it, and eventually use it (Agha and Saeed, 2015). Therefore, are seldom a case whereby assumption of customer acceptance is challenged (Herbig& Day, 1992).

The acceptance of the customer could also be seen when they are willing to participate in anything that is related to the product or services offered (Mansor, Hamid, & Muda, 2011), where increasing overall satisfaction it will leads to greater repurchase intentions (Anderson & Sullivan, 1993) as well as actual repurchase behavior. As such, the understanding customer acceptance is vital because it act as a motivational drive for repeated selection (Holetzky, 2008) and will be positively reflected by the satisfaction indicated by the customers (Mansor, Daud, Zakaria, & Daud, 2011). According to Boulding, Kalra, Staelin&Zeithaml (1993), high customer satisfaction may lead to greater customer loyalty which in turn leads to future revenue to the business operators.

In many cases, innovative products/services have been rejected by the market because consumers feel the products/services are against their traditions and their cultural norms (Mansori et al., 2015). The acceptance of products/services by consumers is affected by how closely the product’s concept conforms to the customs, values, and behavioral patterns based on the physical or mechanical attributes of products/services (Kardes et al., 2008). Among the companies in UK and USA, 40 to 50 percent of revenue and profit are generated by new products launched in the market within the previous five years (Hultink et al., 2004). However, even though novel (innovative and unique) products/services play a vital role in a company’s success, the failure rate of new products is very high (ranging from 33 percent to over 60 percent) (Sivadas et al., 2000). In the shipbuilding industry, product failures can possibly bring substantial financial loss, endanger human lives and contribute to ecological disaster (Primo et al., 2012). Therefore, it is important to assess the chances of success of a new product while it is still at the design stage (Tsafarakis, Grigoroudis and Matsatsinis, 2011). In this research, the terms novel product and new product are used interchangeably. Novel (new) product or service refers to a product or service that is new to the market and that differs significantly from the existing products or services in terms of innovativeness and uniqueness (Stanton and Miller, 1985).

Result

Table 1.0 *Summary of Cronbach's Alphas, rho_A, Composite Reliability and Average Variance Extracted (AVE) in the main survey of relationship between variables*

Measurement Items	Item	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Product Technological Capability	8	0.907	0.908	0.925	0.605
Quality conformance	8	0.901	0.908	0.921	0.595
Product Acceptance	8	0.914	0.917	0.93	0.626

Table 2.0
Bootstrapping Result: Hypothesis Testing

Relationship	Standard Beta	Standard Deviation (STDEV)	Decision
PRODUCT TECHNOLOGICAL CAPABILITY -> Product Acceptance	0.113	0.062	Supported
Quality Conformance > Product Acceptance	0.211	0.051	Supported

Note: *p < 0.05

Conclusion

In general, based from analyze result above show that that two important variables; Technology Capability, product acceptance and moderating effect of quality conformance, which influence users' intention to use product in Malaysia study context. Findings revealed that Technology Capability and quality conformance has a strong positive correlation with product acceptance. These findings are in accordance with (Chen & Yen, 2004),. However, result from multiple regression analysis claimed that these two variables should be in a combination in order to gain a significant effect on product acceptance. Although taken in combination the continuance factors are together significant in the regression explanation of continuance intention, but on individual basis, only Interactivity could bring about significant changes when referred to the outcomes of analysis Hence, this has providing the initial proved and supported to the previous study by other researchers. The outcome of this study will benefit to policy making in formulating future strategies in enhancing firm performance, as a result, it will make the organization more competitive in meeting the future challenge

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