Enablers of Target Cost Management Implementation: Evidence from Malaysia

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1. Introduction

Many Japanese companies use target cost management (TCM) as an important competitive tool to increase their competitiveness and improve their long-term profitability (Ansari et al., 2006; Cooper & Slagmulder, 1999). For example, about 80% to 100% of Japanese manufacturing companies were already implementing TCM in the 1990s (Kato et al., 1995). The TCM
implementation outside Japan is still low but it gradually increases over the years.

Studies show that TCM is used by 40% of US companies (Pierce, 2002), 60% of Dutch companies (Dekker & Smidt, 2003), 31% of New Zealand companies (Rattray et al., 2007), 38% of Australian companies (Chenhall & Langfield-Smith, 1998), 41% of Malaysian companies (Tho et al., 1998), 35% of Indian companies (Joshi, 2001), and 62% of Bahraini companies (Juhmani, 2010). Interestingly, an in-depth case study on a Malaysian car manufacturer reveals that the key TCM practices were quite similar to those Japanese practices, but the detailed implementation process were different due to certain modifications being made to adapt to the Malaysian contextual environment (Baharuddin & Jusoh, 2019).

According to contingency theory, the contingent factors or enablers influence the management accounting system of an organization (Otley, 1980). Therefore, factors such as strategy, organization structure, and environment that are specific to the industry may influence the nature of TCM being implemented (Feil et al., 2004; Tani et al., 1994). As rule of thumb, TCM implementation requires involvement from the whole value chain to achieve the target cost by eliminating the non-value added cost, excess and unevenness (Helms et al., 2005).

Accordingly, the ideal condition for TCM requires a full integration with the other activities in the value chain such as value engineering and supply chain (Ellram, 2000; R. K. Kaplan & Atkinson, 1998). However, not many organizations have the resources and company wide support to create such condition (Ellram, 2000). Thus, based on contingency theory, it is expected that TCM practices between Japanese and non-Japanese environment may vary due to contingent factors. In fact, there is a dearth of comprehensive framework that highlights the most critical factors that support the TCM implementation in non-Japanese environment from the users’ perspective (Hamood et al., 2011; Sulaiman et al., 2004; Tho et al., 1998). Thus, studies focusing on users’ perspective are warranted and provide the motivation of this study.

Using a single case study approach, this study examines the TCM implementation in a Malaysian automotive company known as Company A. The study selects automotive industry because it is one of the main contributors to the development of the Malaysian manufacturing industry (Mahidin & Kanageswary, 2004).

This paper aims to examine whether these nine enablers - advanced manufacturing technology (AMT), confrontational strategy, customer orientation, information-sharing network, lean manufacturing, supplier relationship, teamwork oriented organizational culture, top management support and commitment as well as training - have positive relationships with the successful implementation of TCM in Company A.

The remainder of the paper is structured in five sections. Next section covers literature review on TCM and the factors influencing its implementation as well as the research framework and propositions development. Research methodology and results and discussion are presented in section three and section four, respectively. Section five presents the conclusions and recommendations for further studies.

2. Literature review

Target cost management (TCM)

Based on Japan Accounting System, TCM refers to “… an overall profit management process by which quality, price, reliability, delivery term and other targets are set at the time of the product planning and development at the levels that meet the perceived customer needs. Achievement of these targets is simultaneously attempted in all areas from the upstream to downstream processes” (Huh et al., 2008: 91).
As TCM is related to product planning and development, some studies agree that TCM is a part of new product development (NPD) (Ansari et al., 2007; Everaert et al., 2006; Helms et al., 2005).

Basically, TCM is based on price-driven costing or market-driven concept (Ansari et al., 2007; Gagne & Discenza, 1995). According to Japanese TCM theoretical model, the target-selling price is determined by the market thorough comparison of competitive products before the product is being designed (Helms et al., 2005). Then, the target cost is calculated by deducting the target profit from the target-selling price (Ellram, 2000). Companies are forced to produce the new product at this target cost. Hence, the companies must adjust their costs to meet the target-selling price by reducing the production costs or other related costs (Ellram, 2000; Howard & Herbig, 1996).

This helps companies to determine the right price and right cost as well as reduce the risk of not making sufficient profit (Helms et al., 2005; Tani et al., 1994). Additionally, since TCM starts in the upper stream of production stage (Monden & Hamada, 1991; Sakurai, 1989), any design changes are less costly (Kato, 1993). This helps to avoid time and resources lost in design changes due to over engineering countermeasures to fit the market requirements after the product is introduced to the market (Helms et al., 2005; Kato, 1993).

Recently, more studies have started looking at (1) factors influencing the TCM adoption (e.g. Yazdifar & Askarany, 2012; Ax, Greve & Nillson, 2008), (2) the relationships between TCM success factors and performance (e.g. Huh et al., 2008), (3) the influence of Quality Functional Deployment (QFD) and Value Engineering (VE) on TCM (e.g. Gandhinathan et al., 2004), (4) the association between competitive environment and strategy of TCM companies (e.g. Hibbets et al., 2003), and (5) supply chain management and TCM (e.g. Ellram, 2006). The contingent factors such as intense competition and high environmental uncertainty have driven the adoption of these practices. Ellram (2006) found that the TCM implementation process in US companies is similar to the Japanese TCM theoretical model, except that the US companies emphasize on the role of supply management to improve the product cost as soon as the product has been launched into the market.

Factors influencing TCM implementation

Some literature concludes that the Japanese social and cultural factors contribute to the successful implementation of Japanese management accounting techniques (e.g. (Feil et al., 2004; Nishimura, 1995; Stainer, 1995). However, claims that Japanese social and cultural factors influence the success of TCM implementation are rather misleading and superficial Okano & Suzuki (2007) because social and cultural factors are unmanageable and external factors in which it is very difficult for companies outside Japan to implement Japanese management accounting techniques given different social and cultural factors. Eventually, this will lead to the end of the TCM research and practice (Okano & Suzuki, 2007).

Several authors and researchers have started looking at different enabling factors which are present inside the organization and that can influence the successful implementation of TCM (e.g. (Ansari et al., 2006; Cooper & Slagmulder, 1999; Ellram, 2006; Feil et al., 2004; Helms et al., 2005; Huh et al., 2008; Kato, 1993; Lee & Monden, 1996; Sakurai, 1989; Tani et al., 1994). A review of some conceptual papers reveals that enabling factors such as team work, supplier involvement, strategic information network, top management support, training, advanced manufacturing technologies (AMT), lean manufacturing, value engineering (VE), strategy, company culture, performance measurement and reward system may influence TCM implementation (Ansari et al., 2006; Feil et al.,

Meanwhile, empirical studies through survey and case studies by Tani et al., (1994); Swenson et al., (2003); Huh et al., (2008) Ellram (2000) and Cooper & Slagmulder (1999) found that teamwork, supply chain involvement, information network, top management support, training, lean manufacturing, customer orientation are the common factors found in the companies implementing TCM. In this study, nine enablers were selected from this literature review and they were labelled as: AMT implementation, confrontational strategy, customer orientation, an information-sharing network, lean manufacturing implementation, supplier relationships, teamwork oriented organizational culture, top management support and commitment, and training.

The research framework

In the context of TCM, Tani (1995) posits that TCM was formulated from the information processing model of contingency theory in which the TCM design and activities are contingent upon environmental uncertainty relating to frequency of technology innovation, diversification of customer’s need, and intensity of market competition. Therefore, based on the theory of contingency, a theoretical framework was developed to explain how the nine enablers are associated with the successful implementation of TCM in one of the Malaysian automotive companies (Company A). These nine enablers, as shown in Figure 1, were identified based on the literature review and confirmed by the data from the interviews as well as the internal documents of Company A.

The following sub-sections explain the development of proposition for each of these nine enablers. These propositions were tested using the data obtained from the questionnaire survey conducted on the Company A’s employees. This is in line with Yin (2003:15) argument that the case study method should not limit to direct and detailed observations as a source of evidence, instead a case study “can be based on any mix of quantitative and qualitative evidence”.

Advanced manufacturing technologies (AMTs)

AMTs implementation is referred to as the application of technologies and computerized systems to improve products or processes of the organization (R. K. Kaplan & Atkinson, 1998; Sakurai, 1990). The AMTs implementation allows efficient information flow, integrated, and automated activities across the value chain. As a result, companies are able to increase reliability, manufacturing flexibility, learning phase as well
as quality, and to reduce the stock, space, setup lead-time, as well as labor cost (Isa & Foong, 2005; Sakurai, 1989).

Eventually, companies manage to achieve manufacturing excellence and produce the best products at the lowest price through the implementation of AMTs (McNair & Mosconi, 1987). Sakurai (1989) noted that the use of AMTs, such as industrial robots and numerical control devices, assists the Japanese companies to produce various products at low cost. From a case study on Daihatsu Japan, it was found that the use of technology serves as the greatest potential cost reduction tool that aids to produce the product with high quality and low cost (Kato et al., 1995). Therefore, a proposition was developed as follows:

Proposition 1: AMT is positively associated with the successful implementation of TCM.

Confrontational strategy

Confrontational strategy is a strategy that emphasizes both differentiation and low cost strategies simultaneously in order to achieve competitiveness in terms of cost, functionality, and quality (Cooper, 1996). In a highly competitive market, companies must establish a unique position against its competitors to achieve a competitive advantage by doing activities differently or doing different activities from its competitors (Hitt et al., 2007). As a result, many leading Japanese companies that adopt TCM follow both cost leadership and product differentiation strategies at the same time (Kato, 1993).

Kato (1993) further argued that no company manages to be a major player in the market by merely relying on the differentiation strategy without being cost competitive. Further, Cooper (1996) asserted that TCM is likely to be adopted by lean enterprises following a confrontational strategy. Therefore, companies must pursue both cost leadership and differentiation strategies simultaneously to compete in terms of cost, quality and functionality. This leads to the following proposition:

Proposition 2: Confrontational strategy is positively associated with the successful implementation of TCM.

Customer orientation

Narver & Slater (1990) customer orientation as the sufficient understanding of one’s target customers that enable to create superior customer value continuously. Under the highly competitive market, many products have similar functions or with better functions. Besides, customers are usually not particularly loyal to any company and switch brands easily if the companies do not sell the product they want or do not sell it at the best price they want (Cooper, 1996).

This indicates that customers have the final power to determine the best price of a product with designated functions in the market (R. K. Kaplan & Atkinson, 1998). As such, the price led concept of TCM makes the TCM companies more adaptable to the market and customer needs since the starting point for determining the target cost is the anticipated selling price of the product, which is determined by market analysis. Based on market analysis, the company defines their target customers, the features or attributes that these customers want in the product and the price that these customers are willing to pay for each feature or attribute, and the product as a whole. All the customer requirements like quality, cost, and timely delivery are considered in parallel with the product features and used as a basis for guiding the cost (Swenson et al., 2003). Hence, the following proposition was developed

Proposition 3: Customer orientation is positively associated with the successful implementation of TCM.
Information-sharing network

An information-sharing network is about information sharing between the company and its value chain partners such as suppliers and business partners where the information is sufficiently frequent, detailed, and timely to meet the company’s requirements (Yigibasioglu, 2010). Generally, an information-sharing network assists the companies to speed up the information flow, increase the effectiveness and efficiency, respond to the customer quickly (Li & Lin, 2006), decrease the behavioral uncertainty, and increase the level of trust among business partners (Kwon & Suh, 2004). A study shows that information sharing among Finnish and Swedish companies improves the buyer’s performance in terms of output, resource usage, and flexibility (Yigibasioglu, 2010).

DhaifAllah et al., (2019) found that that both product complexity and communication quality have a positive influence on interorganizational cost management and open book accounting practices in buyer–supplier relationships. Moreover, Yoo et al., (2019) argued that the buyer motivates both the internal operators and external supplier to reduce the supply chain's overall production cost by reducing the waste and energy consumption. Being a cost management tool, TCM aims to reduce the overall cost of a product over its entire life cycle involving all business aspects (Kato et al., 1995; Sakurai, 1990). Therefore, it requires comprehensive internal and external information for setting a realistic target-sellling price, target profit, as well as target cost (Cooper & Slagmulder, 1999; Kato et al., 1995; Monden & Hamada, 1991) (Huh et al., 2008). Besides, communicating the targets to related members is important to ensure the achievement of target cost and target profit Everaert et al., (2006) is simultaneously attempted in all areas. This leads to the following proposition:

**Proposition 4:** The information-sharing network is positively associated with the successful implementation of TCM.

Lean manufacturing

Lean manufacturing refers to a production system that eliminates or reduces waste in all activities that do not create value added (Albright & Lam, 2006). The implementation of lean manufacturing methods, such as just-in-time (JIT), total quality management (TQM), and value engineering (VE) enables companies to exploit temporary advantages through the elimination of waste and be better than their competitors (Hibbets et al., 2003). The implementation of lean manufacturing helps the Japanese companies to successfully implement cost reduction and quality improvement programs (Wickramasinghe, D Alawattage, 2007).

Cooper (1996) argued that lean manufacturerers tend to use TCM because they can exert huge pressure on all cost elements through the overlapping system for cost, quality, design and production (Ansari et al., 2006). Companies that are likely to gain benefit from TCM are companies that implement lean manufacturing methods and that have a cost reduction effort during the planning, design and development stages (Gagne & Discenza, 1995).

During the TCM planning stage, it is not easy to visualize and reflect accurate conditions. After the product is launched, there is a possibility that the actual results may not reflect the target cost. Therefore, continuous improvement by using lean manufacturing tools helps to bring back the cost as per plan (Helms et al., 2005). Further, Nishimura (1995) that the combination of TCM and JIT allows a product to be produced at low cost and of high quality. In fact, Sakurai (1989) found that many Japanese companies that implement JIT also implement TCM because the small lot production concept in JIT increases the effectiveness of TCM. In addition, TCM cannot be implemented successfully without cost engineering tools (Sakurai, 1989).

VE, being one of lean manufacturing methods, is an essential tool in achieving the target cost during the design stage (Gandhinathan et al.,
2004; Lee & Monden, 1996). Therefore, it can be argued that lean manufacturing, such as VE, JIT, and Kanban are important enablers for the successful implementation of TCM as shown in the following proposition:

Proposition 5: The implementation of lean manufacturing is positively associated with the successful implementation of TCM.

Supplier relationship

Supplier relationship refers to as the supplier involvement or cooperation in achieving the buyer’s target (Helms et al., 2005). According to Kato (1993:35) suppliers are “a treasure island for cost reduction activities”. Cooperation with the supplier is one of the major success factors of TCM Tani et al., (1994) because almost 75 percent of the total product cost usually comes from purchased material and components. Therefore, achieving TCM goals is unlikely without relying on the suppliers (Swenson et al., 2003).

Carr & Pearson (1999) study on 739 American companies found that strategically managed long-term relationships with suppliers have a positive impact on the financial performance of the companies. In the TCM system, the target-selling price of the suppliers comes from the buyer’s target cost for each purchased part. The whole supply chain will more efficient in achieving the cost reduction when the competitive pressure is transmitted from the buyer down to its supply chain (R. S. Kaplan & Cooper, 1998). From a case study, Japanese companies were found to transmit the cost pressure to their suppliers which encouraged the Japanese suppliers to proactively find ways by themselves to design and manufacture the product so that they could make an adequate return (Cooper & Slagmulder, 1999). This cooperation helps the Japanese companies to achieve the target cost for the product at the given level of quality and functionality (Monden & Hamada, 1991). Accordingly, Feil et al., (2004) and Huh et al., (2008) argued that teamwork orientation is one of the critical success factors for the successful implementation of TCM. In Japanese companies, through cross-functional management, members from different functions and knowledge backgrounds cooperate with one another to create unique strategies (Tani, 1995).

This cooperation helps the Japanese companies to achieve the target cost for the product at the given level of quality and functionality (Monden & Hamada, 1991). Thus, a proposition was formulated as follows:

Proposition 7: A teamwork orientation organization culture is positively associated with the successful implementation of TCM.

Top management support

Top management support and commitment is defined as top management willingness to provide the necessary power, authority, and resources for TCM success (Pinto & Selvin, 1989). Since an effective TCM requires a highly disciplined process (Cooper & Slagmulder, 1999), top
management plays a role in creating TCM awareness, cultivating a cross-functional team environment, aligning the employees’ mindset, and providing resources to achieve the TCM targets (Feil et al., 2004).

Several studies Kuen & Zailani (2012); Mokhtar & Yusof (2010); Islam et al., (2009) found that top management support and commitment is essential for project success in Malaysia. Their studies reveal that top management support and commitment is positively related to the project success Kuen & Zailani (2012) and new product performance Mokhtar & Yusof (2010), as well as serves as a moderator in the relationship between team learning and new product development process (Islam et al., 2009). As such, the following proposition was put forth:

Proposition 8: Top management support and commitment is positively associated with the successful implementation of TCM.

Training

Training refers to as a process of employees acquiring capabilities to support the achievement of the organizational goals (Mathis & Jackson, 2004). Competent employees with updated knowledge, fresh ideas, abilities and skills who can deliver results are essential in the globally competitive environment. Therefore, employees should be trained continuously to update and maintain their capabilities (Mathis & Jackson, 2004). In addition, developing and empowering the employees helps to cultivate a culture of continuous improvement Yamashina, (2000) \ and promotes the organization’s competitiveness (Mathis & Jackson, 2004). Without adequate training and no in-depth knowledge, the employees are likely to focus on short-term thinking and quick results Albright & Lam (2006) which can lead to system implementation problems (Leong & Jarmoszko, 2010).

In relation to this, Pinto and Slevin (1989) argued that selecting, recruiting and training people with the right administrative and technical skills have a positive impact on the success of the project implementation. With regard to TCM practices, as the achievement of targets needs to be attempted simultaneously in all areas, well trained and broad experienced employees are needed so that they are capable of spotting and implementing cost reduction activities effectively (Cooper & Slagmulder, 1999; Helms et al., 2005). Hence, the following proposition was formulated:

Proposition 9: Training is positively associated with the successful implementation of TCM.

3. Research method

The case study approach was chosen to investigate the TCM implementation in one Malaysian automotive company, known as Company A. The case study method is considered the best method to support the research objective of this study as more relevant data can be gathered to provide a better understanding of TCM implementation. In fact, the case study method should not constraint to direct and detailed observations as a source of evidence, but it can also “be based on any mix of quantitative and qualitative evidence” (Yin, 2003). These arguments provide the reason for the use of survey method as well as in-depth interviews in this study.

The instrument for the survey was developed after some preliminary data were obtained from the interviews, review of internal documents, and direct observation conducted at Company A at the end of year 2014. Generally, the questions for the survey were adapted from previous studies. The questionnaire was pre-tested by six academicians and three TCM practitioners to ensure the contents are clear, relevant, and easy to understand before the actual survey was conducted.

A total of 100 questionnaires were distributed in the year 2015 to Company A’s employees who
were directly and indirectly involved with the TCM implementation. It was expected that the respondents were likely to recognize the necessary enablers that contribute to the TCM implementation in Company A. A total of 87 completed questionnaires were returned and used for the data analysis. The survey data were used to test all the nine propositions discussed in the previous section.

The study was conducted in Company A, an automotive company in Malaysia. As TCM adoption in Malaysia is still low, particularly in automotive industry, the use of single case study is justifiable. Company A was established in the 1990s through a joint venture between Malaysian and Japanese companies. It has more than 10,000 employees. Since its establishment, it has sold more than 2 million units of vehicles of various models and has become a leader in the Malaysia automotive market for several consecutive years.

All the items used to operationalize the variables were adapted from previous studies as shown in Table 3. All the items were measured using seven-point Likert scales with “1” representing either “strongly disagree” or “not at all” to “7” representing either “strongly agree” or “to a great extent”.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Items</th>
<th>Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confrontational strategy</td>
<td>Eight items: level of capacity utilization, level of operating efficiency, low overhead cost, focus on finding ways to reduce cost, uniqueness of its products, targeting the identified segments, offering products that are suitable with its price segments, and offering quality product.</td>
<td>Zahay &amp; Griffin (2010)</td>
</tr>
<tr>
<td>Customer orientation</td>
<td>Six items: customer commitments, create customer value, understand customer needs, customer satisfaction objectives, measure customer satisfaction, and after sales services.</td>
<td>Narver &amp; Slater, (1990)</td>
</tr>
<tr>
<td>Information-sharing network</td>
<td>Seven items: case company shares exclusive information with its business partners, case company exchanges information with its business partners for business planning purpose, case company shares business knowledge of core business processes with its business partners, both case company and its business partners keep each other informed about events or changes that may affect the other partners, case company shares common information technology to facilitate communication with its business partners, information sharing on important issues is a critical element to maintain the business partnerships, and case company and its business partners share cost information that helps TCM performance.</td>
<td>Chen et al., (2010)</td>
</tr>
<tr>
<td>Lean manufacturing</td>
<td>Seven items: programmes to improve the suppliers’ quality and delivery, programmes to reduce waste or non-value added activities, programmes to reduce time delays in manufacturing and designing products, involvement of employees in quality improvement programmes, involvement of departments’ personnel in company’s strategic planning, developing close contact between manufacturing and customer, and quality improvements programmes between departments.</td>
<td>Chenhall (1997)</td>
</tr>
<tr>
<td>Supplier relationship</td>
<td>Six items: case company enters into special agreements with suppliers who have improved performance, case company has very frequent face-to-face planning or communication with its key suppliers, high corporate level communication on important issues with key suppliers, Purchasing Department capability to influence supplier’s responsiveness to the case company’s requirements, case company supports its suppliers in production related matters, and case company works with its suppliers starting from the product development stage.</td>
<td>Carr &amp; Pearson (1999)</td>
</tr>
<tr>
<td>Teamwork orientation</td>
<td>Eleven items: TCM related members acknowledge conflict and work together to resolve issues, TCM related members help one another by sharing knowledge and information, TCM related members encourage diverse perspectives and different points of view from team members, TCM related members demonstrate interest</td>
<td>Lynn &amp; Akgun (2003)</td>
</tr>
</tbody>
</table>
and enthusiasm during team activities, TCM related members acknowledge the contributions made by team members, TCM related members are working together towards a unified goal, TCM related members freely share information with team members, respondent feels the TCM related members are trustworthy, respondent feels that the TCM related members are usually considerate of each other’s feelings, respondent feels that the TCM related members are friendly, and respondent feels the TCM related members are reliable.

Top management support and commitment
Six items: TCM receives strong and active support from the top management, upper management provides adequate resources to the TCM implementation, TCM is closely tied to case company’s competitive strategies, management has provided visible support for the TCM initiatives, TCM practices receives support from manufacturing operations and support groups and TCM practices received company wide support.

(Krumweide, 1998); Anderson & Young (1999)

Training
Seven items: specific work-skill training (technical and vocational) is given throughout company, team building and group dynamics training is given to employees, top management’s commitment to employee training, resources are available for employees training, adequate training is provided for designing TCM, adequate training is provided for implementing TCM, adequate training is provided for using TCM.


Successful implementation of TCM
Three dimensions: efficiency improvement, product marketability improvement, and cost reduction improvement.

Efficiency improvement was measured by five items: assessed the TCM performance on efficiency improvement in terms of: “design to cost”, strengthening the design or development process, cost reduction efforts by the engineers, improving design or development technology, and the benefits of TCM outweigh the cost of installing a new method or system.

Product marketability improvement was measured by four items: assessed the TCM performance on marketability improvement in terms of: quality, product features that suit the needs of the customer, reduction in development lead time, and timely introduction of new products.

Cost reduction improvement was measured by four items: assessed the TCM performance on cost reduction improvement in terms of: product, upstream processes, purchased materials and raw materials, and waste on the factory floor.

Huh et al., (2008)

This research used Partial least squares (PLS), a soft modelling technique of a structural equation modeling, to perform the data analysis. PLS is used to predict the proposed theoretical model by analysing the relationship between the latent variables. Nevertheless, PLS does not explain the causal relationships between variables. The basic concept of PLS is to try to extract the latent factors or measurement items that explain most of the variation in the response to predict the model.

There are several reasons why PLS is ideal for analyzing the data of this study. First, PLS is appropriate for exploring a large number of variables to find a set of variables that can predict the outcome variables. Second, PLS is able to estimate the path models with a small sample size.

Third, good characteristic measurement, i.e. strict requirement of data distribution, is not critical requirement for PLS to produce its result (W W Chin & Newsted, 1999). Since this study involves many variables and uses a rather small sample size, PLS seems the best technique to perform the data analysis.

4. Results and discussion

Profile of the respondents
The profile of the respondents is shown in Table 4. The respondents are represented by 82.8% male and 17.2% female. The majority of the respondents (59.8%) are in the age range between 31 and 39 years old. Most of them (86.2%) hold a bachelor degree. The majority of them (43.7%) are from the Research and Development Department. Forty seven percent of the respondents are technical staff, while almost 90% of the respondents have been working for at least 3 years.
Table 2: Profile of the respondents

<table>
<thead>
<tr>
<th>Type</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
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<td></td>
</tr>
<tr>
<td>Male</td>
<td>72</td>
<td>82.8</td>
</tr>
<tr>
<td>Female</td>
<td>15</td>
<td>17.2</td>
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<tr>
<td>Total</td>
<td>87</td>
<td>100</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 30</td>
<td>24</td>
<td>27.6</td>
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<tr>
<td>Between 31 and 39</td>
<td>52</td>
<td>59.8</td>
</tr>
<tr>
<td>Between 40 and 49</td>
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<td>11.5</td>
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<tr>
<td>More than 50</td>
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<td>1.1</td>
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<tr>
<td>Total</td>
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<td>100</td>
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<tr>
<td><strong>Qualification</strong></td>
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<td>High school and below</td>
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<tr>
<td>Certificate</td>
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<tr>
<td>Diploma</td>
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<tr>
<td>Bachelor degree</td>
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<td>Master degree</td>
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<tr>
<td>PhD</td>
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<td>0.0</td>
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<tr>
<td>Total</td>
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<td>100</td>
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<tr>
<td><strong>Department</strong></td>
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<tr>
<td>Cost planning</td>
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<td>9.2</td>
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<tr>
<td>Product marketing</td>
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<td>6.9</td>
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<tr>
<td>Research and development (R&amp;D)</td>
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<td>43.7</td>
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<tr>
<td>Purchasing</td>
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<td>Product planning</td>
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<td>8.0</td>
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<tr>
<td>Vendor improvement</td>
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<td>11.5</td>
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<tr>
<td>Total</td>
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<td>100</td>
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<tr>
<td><strong>Present job position</strong></td>
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<tr>
<td>Top management</td>
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<tr>
<td>Middle management</td>
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<td>Lower management</td>
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<tr>
<td>Technical staff</td>
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<tr>
<td>Total</td>
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<tr>
<td><strong>Experience</strong></td>
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</tr>
<tr>
<td>Less than 1 year</td>
<td>2</td>
<td>2.3</td>
</tr>
<tr>
<td>Between 1 and 2 year</td>
<td>7</td>
<td>8.0</td>
</tr>
<tr>
<td>Between 3 and 5 years</td>
<td>23</td>
<td>26.4</td>
</tr>
<tr>
<td>Between 6 to 10 years</td>
<td>23</td>
<td>26.4</td>
</tr>
<tr>
<td>Between 11 to 20 years</td>
<td>32</td>
<td>36.8</td>
</tr>
<tr>
<td>Total</td>
<td>87</td>
<td>100</td>
</tr>
</tbody>
</table>

**Results of data analysis**

Table 5 provides descriptive analysis for all variables in terms of means and standard deviations as well as correlations amongst these variables. Table 5 also shows the results for composite reliability, convergent and discriminate validity. Composite reliability is used to assess the reliability of the reflective construct. The construct is considered reliable if the composite reliability is above 0.7. Compared to the Cronbach’s alpha, composite reliability is more rigorous in estimating the reliability (W W Chin & Newsted, 1999). This is because composite reliability considers the different indicator loading, which is consistent with the PLS algorithm (Henseler et al., 2009). As shown in Table 5, the composite reliability (CR) values lie between 0.87 and 0.96. Thus, the measurement for each construct was reliable.

Convergent validity indicates the extent to which the blocks of indicators strongly converge in their representation of the underlying construct they were created to measure (Chin & Newsted, 1999). Convergent validity can be accessed by the estimation of standardized loadings and average variance extracted (AVE). The ideal factor loading
should be 0.7 or higher. However, 0.5 or higher is still acceptable (Hair, 2006).

The average variance extracted (AVE) is the average squared of the factor loading. It is a summary indicator of the convergent validity among a set of items that represent the construct. An AVE of 0.5 indicates adequate convergent validity (Hair, 2006). This means that a construct is able to explain half of the variance of its indicators on average (Henseler et al., 2009). Table 5 shows the loadings range for all indicators exceed 0.60 and all constructs have AVE above 0.5. Thus, all the constructs have adequate convergent validity.

Discriminant validity is the degree to which a construct is distinct from other constructs. High discriminant validity proves that the construct is unique and captures some phenomena that are not captured by other constructs (Hair, 2006). The discriminant validity can be confirmed if the squared root of the AVE of each construct is higher than its inter-construct correlation (Imam, 2006). As illustrated in Table 5, the diagonal elements represented in bold are the square roots of the AVE of the all constructs. The result indicates that the construct explains its item measures better than it explains another construct. Thus, the discriminant validity of the measurement model was confirmed.

The full structural model with path coefficients is shown in Figure 2. The T-values of the following enablers: AMT, confrontational strategy, customer orientation, information-sharing network, lean manufacturing, and supplier relationship, were less than 1.96. The paths are insignificant which indicate that these enablers do not have positive influence on the successful implementation of TCM. Thus, the results do not support H1 to H6. On the other hand, only three enablers – training (β=0.20, p<0.05), top management support and commitment (β=0.31, p< 0.05) and teamwork (β=0.31, P< 0.01) – have significant positive influences on the successful implementation of TCM. Thus, the results support H7 to H9. Table 6 summarizes the propositions results.

The quality of structural measurement model can be assessed by the coefficients of determination (R²) which represent the amount of the explained variance in the endogenous construct. Generally, the target of R² should be high but its high level depends on the specific research (Hair, 2006). Chin (1998) classifies R² values of 0.67 as substantial, 0.33 as moderate and 0.19 as weak. Figure 2 shows the R² is 0.49, which is between substantial and moderate. This indicates TCM successful implementation construct can be explained by the Advanced Manufacturing Technology (AMT) implementation, confrontational strategy, a customer orientation, an information-sharing network, lean manufacturing implementation, supplier relationships, a teamwork oriented organizational culture, top management support and commitment and training by 49 per cent.

Table 3: Descriptive analysis and correlation

<table>
<thead>
<tr>
<th>NO</th>
<th>M</th>
<th>SD</th>
<th>Loading range</th>
<th>CR</th>
<th>AVE</th>
<th>AMT</th>
<th>CS</th>
<th>CO</th>
<th>ISN</th>
<th>LM</th>
<th>TCMS</th>
<th>SR</th>
<th>TM</th>
<th>TSC</th>
<th>TRG</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMT</td>
<td>7.25</td>
<td>1.31</td>
<td>0.70-0.87</td>
<td>0.93</td>
<td>0.66</td>
<td>0.81</td>
<td>CS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CS</td>
<td>8.07</td>
<td>1.12</td>
<td>0.61-0.82</td>
<td>0.89</td>
<td>0.51</td>
<td>0.71</td>
<td>CO</td>
<td>0.96</td>
<td>0.78</td>
<td>0.30</td>
<td>0.61</td>
<td>0.69</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CO</td>
<td>6.49</td>
<td>1.10</td>
<td>0.79-0.92</td>
<td>0.96</td>
<td>0.78</td>
<td>0.89</td>
<td>ISN</td>
<td>0.55</td>
<td>0.16</td>
<td>0.32</td>
<td>0.34</td>
<td>0.74</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ISN</td>
<td>7.49</td>
<td>1.78</td>
<td>0.61-0.82</td>
<td>0.89</td>
<td>0.51</td>
<td>0.71</td>
<td>LM</td>
<td>0.60</td>
<td>0.42</td>
<td>0.67</td>
<td>0.42</td>
<td>0.40</td>
<td>0.78</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LM</td>
<td>7.12</td>
<td>1.17</td>
<td>0.65-0.83</td>
<td>0.91</td>
<td>0.60</td>
<td>0.72</td>
<td>TCM</td>
<td>0.52</td>
<td>0.20</td>
<td>0.45</td>
<td>0.22</td>
<td>0.34</td>
<td>0.35</td>
<td>0.72</td>
<td></td>
</tr>
<tr>
<td>TCM</td>
<td>5.53</td>
<td>0.95</td>
<td>0.66-0.84</td>
<td>0.87</td>
<td>0.54</td>
<td>0.72</td>
<td>SR</td>
<td>0.57</td>
<td>0.26</td>
<td>0.43</td>
<td>0.54</td>
<td>0.46</td>
<td>0.73</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SR</td>
<td>6.51</td>
<td>1.04</td>
<td>0.75-0.87</td>
<td>0.95</td>
<td>0.63</td>
<td>0.80</td>
<td>TM</td>
<td>0.47</td>
<td>0.24</td>
<td>0.33</td>
<td>0.32</td>
<td>0.58</td>
<td>0.49</td>
<td>0.81</td>
<td></td>
</tr>
<tr>
<td>TM</td>
<td>6.49</td>
<td>1.15</td>
<td>0.74-0.86</td>
<td>0.92</td>
<td>0.65</td>
<td>0.81</td>
<td>TSC</td>
<td>0.47</td>
<td>0.40</td>
<td>0.58</td>
<td>0.45</td>
<td>0.54</td>
<td>0.36</td>
<td>0.48</td>
<td>0.81</td>
</tr>
<tr>
<td>TSC</td>
<td>4.74</td>
<td>1.25</td>
<td>0.62-0.88</td>
<td>0.91</td>
<td>0.58</td>
<td>0.76</td>
<td>TRG</td>
<td>0.31</td>
<td>0.19</td>
<td>0.27</td>
<td>0.29</td>
<td>0.42</td>
<td>0.39</td>
<td>0.27</td>
<td>0.31</td>
</tr>
</tbody>
</table>

Notes:
NO: No of items; M: Mean; SD: Standard deviation; Loadings range: Standardized loading range of all items; CR: Composite Reliability; AVE: Average variance Extracted; AMT: AMT implementation; CS: Confrontational strategy; CO: Customer orientation; ISN: Information sharing network; LM: Lean manufacturing; SR: Supplier relationship; TM: Teamwork; TSC: Top management support & commitment; TRG: Training; TCMS: TCM successful implementation.
The diagonal elements (value in bold) are the square root of the average variance extracted (AVE) between the measures and their constructs.
Figure 2: Full structural model with path coefficients

Table 4: Summary of proposition results

<table>
<thead>
<tr>
<th>Proposition</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>AMT is positively associated with the successful implementation of TCM.</td>
</tr>
<tr>
<td>P2</td>
<td>Confrontational strategy is positively associated with the successful implementation of TCM.</td>
</tr>
<tr>
<td>P3</td>
<td>Customer orientation is positively associated with the successful implementation of TCM.</td>
</tr>
<tr>
<td>P4</td>
<td>The information-sharing network is positively associated with the successful implementation of TCM.</td>
</tr>
<tr>
<td>P5</td>
<td>The implementation of lean manufacturing is positively associated with the successful implementation of TCM.</td>
</tr>
<tr>
<td>P6</td>
<td>The supplier relationship is positively associated with the successful implementation of TCM.</td>
</tr>
<tr>
<td>P7</td>
<td>A teamwork orientation organization culture is positively associated with the successful implementation of TCM.</td>
</tr>
<tr>
<td>P8</td>
<td>Top management support and commitment is positively associated with the successful implementation of TCM.</td>
</tr>
<tr>
<td>P9</td>
<td>Training is positively associated with the successful implementation of TCM.</td>
</tr>
</tbody>
</table>

Discussions

Contingency theory argues that the contingent factors influence the design of the management accounting system Otley (1980) and the performance outcome can be enhanced by matching the contingent variables with the management accounting information system design (Drury, 2004). The results reveal that three enablers - teamwork, top management support and commitment and training - are important for the successful implementation of TCM in Company A. Among these enablers, teamwork was perceived as the most valued enabler. This is consistent with Feil et al., (2004) and Huh et al., (2008) who argued that teamwork is a critical factor for the successful implementation of TCM. Since
the TCM implementation requires team effort, teamwork helped the TCM members to share knowledge, expertise and available information with one another to achieve the product’s target cost. The findings indicate that TCM implementation in Company A requires a strong teamwork across various functions and activities. It seems that various departments and activities such as Purchasing and Vendor Development (PVD), R&D, Cost Planning, Product Marketing, Product Planning, Vendor Improvement, Production Planning, Product Engineering, Cost Control, and Account Department were involved directly and indirectly in supporting the TCM implementation process.

The importance of top management support and commitment as well as training in the TCM implementation has been shown by previous studies (Kuen & Zailani, 2012; Mokhtar & Yusof, 2010; Pinto & Selvin, 1989; Zucker, 1977). The members of the team are well trained as they receive a rather strong support and commitment from the top management.

Furthermore, this study did not find the implementation of AMT, confrontational strategy, customer orientation, an information-sharing network, lean manufacturing, and supplier relationship are important enablers for TCM implementation. Even though these enablers were observed during the field visits and through review of documentations, the employees did not perceive these enablers important in supporting TCM implementation. Considering that TCM is only applicable in certain departments of Company A, this may indicate that the TCM implementation in Company A is still in the process of adaptation with the company context, and it is not yet integrated with other organizational tools and processes as well as the supply chain (Ansari et al., 2007) (Ellram, 2000). In the case of supplier relationship, for example, Hasan & Jomo (2007) noted that the incompetent local suppliers are among the major issues faced by the Malaysian automotive industry. Thus, this issue might cause a weak supplier relationship between Company A and its suppliers. However, in the context of Japan, it is common that Japanese companies have a good relationship with their suppliers (Kato et al., 1995; Okano, 2005). But such scenario may not be the same in non-Japanese environment. For example, a study by Rattray et al., (2007) in New Zealand reveals that there is a weak supplier involvement in the TCM implementation among New Zealand manufacturing companies.

Regarding AMT implementation, even though Company A uses robotic in its production system, but its use is rather limited to certain processes only. Considering that 70 per cent of its manpower is involved with direct operation, it can be concluded that Company A is still a labor intensive company. In relation to this, Smith et al., (2008) in their study of management accounting innovation and diffusion technology in Malaysian manufacturing companies, found that Malaysian manufacturing companies are more labor oriented production focus and as a result, their production cost structures are different from Europe and US companies.

This is because, according to Felker & Jomo (2007), poor industry policy design in Malaysia causes most companies to entirely depend on foreign partners for technology inputs, tools, and key machineries. Even though there is a policy of joint government-foreign ownership of local companies which encourages participation of local members in the management, the main technologies used are not understood or accessible to the locals. Furthermore, the insignificant association of lean manufacturing with the successful implementation of TCM could be due to lack of management accounting information in Company A because from the review of documents, it shows that Company A tends to rely on the traditional management accounting system with allocation of overhead costs is done based on direct labor hours. As a result, product cost information tends to be inaccurate when Company A uses AMT, such as robotics in its production system. Besides, cost reduction resulted from any lean manufacturing
activities for a particular product at the shop floor is unclear as there is no specific document kept to record and track such information.

Results also show that confrontational strategy adopted by Company A is not significantly associated with the successful implementation of TCM. This may reflect that the emphasis in cost, quality, and functionality simultaneously does not guarantee that TCM can be implemented successfully if there is lack of integrated effort with other manufacturing practices as well as no effective suppliers’ relationship in place in Company A. As a result, the benefits of having an information sharing network cannot be fully accomplished if TCM implementation still does not reach the full integration stage.

5. Conclusions

Although there are many TCM enablers suggested by various researchers, there are still lack of empirical studies concerning the enablers that influence the successful implementation of TCM, particularly in the non-Japanese context. The current study examines the association between these nine enablers - AMT implementation, confrontational strategy, customer orientation, an information-sharing network, lean manufacturing implementation, supplier relationships, teamwork oriented organizational culture, top management support and commitment, and training – and the successful implementation of TCM.

Using a single case study approach, both qualitative and quantitative data were obtained from Company A, a Malaysian automotive manufacturer. Following Yin (2003), data were gathered from personal interviews, document reviews, and a questionnaire survey. The presence of the nine enablers in Company A was confirmed by the personal interviews and document reviews. Then, a questionnaire survey was conducted on Company A’s employees to obtain quantitative data for statistically testing all the nine propositions. The results show that among the nine proposed enablers, only teamwork oriented organizational culture, top management support and commitment, and training were perceived as the key enablers that are positively associated with the successful implementation of TCM in Company A. The findings provide an initial understanding of the importance of particular enablers in the implementation of TCM in the Malaysian automotive companies. It shows that TCM can be successfully implemented if companies promote more top management support and commitment, encourage teamwork, and provide more trainings for their employees. As the findings are based on a single case study, statistical generalization may be less appropriate or relevance.

However, the findings are of more relevance when the intention is one of particularization. Therefore, those enablers - confrontational strategy, customer orientation, AMT, lean manufacturing, supplier relationship, and information sharing network - which do not contribute significantly to the successful implementation of TCM in Company A, may play different roles in the TCM implementation of other companies in the same industry. In the case of Company A, the insignificant results provide some signal to the company to enhance its long-term supplier relationship which could create more trust, cooperation, and an open information exchange with the suppliers, which in turn help the company achieving target cost, reducing car price, and increasing competitive advantage.

This study is not free from limitations. The first limitation concerns the issue of a single case study. The level of TCM adoption in Malaysia is still low where currently not many companies are adopting it. Besides, TCM involves information related to cost management which is rather private and confidential. Thus, it is not easy to get companies to participate in this study and share such information with others. More importantly, single case study aims to understand the practice in-depth and not determine what is generally true for many (Meriam, 1998). Accordingly, the findings can only be replicated to the organizations that have a similar
situation in terms of the nature of the problem and problem definition (Cavana et al., 2001). The second limitation relates to the generalizability issue as explained in the preceding paragraph. However, the study overcomes this limitation by having a mixed method of data collection that involves both qualitative and quantitative data. Besides, generalizability of the single case is increased when Company A was strategically selected based on its richest insight about the subject of the study.

References


Management, 36(12), 39–51.


