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The Adoption of Leadership in Managing the Skilled Blue Collar Workers in the Automotive Industry in Malaysia
In Parallel to the Industry 4.0

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***Abstract*—** *There are four stages of industrial revolution (Industrial 1.0 to Industrial 4.0) which trigger a technological transformation that will gradually alter our living and working styles. One of the significant industrial revolutions, Industry 4.0 Transformation Drivers is concerned about the knowledge and skill for the future in retaining talent and producing future workforce by taking advantage of the opportunities of this transformation. The research aims to explore the adoption of leadership in managing the skilled workers in the automotive industry in Malaysia in parallel to the Industry 4.0. The adoption of effective leadership is able to contribute positively to the talent retention among the skilled blue collar workers in the automotive industry in Malaysia.*

***Keywords*—** *Industry 4.0; automotive industry; leadership; talent retention; skilled blue collar workers.*

I INTRODUCTION

The research aims to investigate the leadership methods among the middle management to manage and retain the skilled blue collar workers during the era of Industry 4.0 in the high technology manufacturing industry in Malaysia. The researchers propose a conceptual framework of skills management to manage and retain the skilled blue collar workers in the automotive industry in Malaysia.

The researchers perform the data collection (research interviews and document analysis) on an established automotive firm in Malaysia (Company X) to validate the proposed conceptual framework (skills management framework). The actual identity of the company under study is kept as private and confidential due to the privacy concerns of the company. The findings upon the research provide a further insight to the manufacturers in the automotive industry in Malaysia to improve their leadership methods among the middle management in order to better manage and retain the skilled blue collar workers.

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II LITERATURE REVIEW

This section provides the readers an overview about literature review of the research which discusses about the blue collar workers, skilled blue collar workers, management levels, leadership, the emerging techology, skills, skills management, derivation of Skills Management Framework, derivation of skills management process.

II.I. Blue Collar Workers

Blue collar workers are defined by their physical labor component and generally are characterised by stationary hierarchical level (typically in low ranked positions) and management by supervisors or mechanical controls (Ansberry, 2003; Gibson and Papa, 2000). Blue collar workers are not tied to an ascending staircase or ladder of career development, blue collar workers are often considered to have jobs instead of careers. Nevertheless, blue collar workers have meaningful work experiences and accumulated skills over time (Thomas, 1989). Blue collar workers in this context refer to workers who perform manual jobs with particular mastered skills in the automotive industry in Malaysia.

II.II. Skilled Blue Collar Workers

In contrast to normal blue collar workers, skilled blue collar workers are not necessary in low ranked positions. In addition, skilled blue collar workers stand the chances of career development and advancement. Therefore, they are considered to have jobs as well as careers. Skilled blue collar workers can be formally educated, skilled and highly paid at present. Skilled blue collar refers to highly skilled personnel who are formally trained and certified (Hearst Newspapers, 2014). Skilled blue collar workers in this context refer to blue collar workers who are highly skilled in the work area of automotive and they accumulated skills through long duration of working experience at the workplace.

II.III. Management Levels

There are three levels of management in an organisation: first-line management, middle management and top management (Morse and Babcock, 2014). The research only focuses on middle management for the purpose of the study. Middle managers hold titles such as plant manager, division head, chief engineer or operation managers. Middle managers plans at the intermediate range to achieve the long-range goals set by top management; establish departmental policies and evaluate the performance of subordinate work units and their managers. In addition, middle managers integrate and coordinate the short-range decisions and activities of first-line supervisory groups to achieve the long-range goals of the enterprise (Morse and Babcock, 2014).

The middle management will be mainly studied in the research in managing the skilled blue collar workers at the high technology manufacturing company in Malaysia. In addition, middle management is the one who decides on employment and training management including the use of future manufacturing technology used by an organisation (Durai, 2010). For example, production manager (who is the middle management) predicts on the future usage of

manufacturing technology by an organisation. In other words, it aims to device accurate methodology involving method study of manufacturing, along with the other engineering economic principles (Singh, 2010).

II.IV. Leadership

Leadership is the ability to influence a group toward the achievement of a vision or set of goals. The research is adopting the path-goal theory in which it is the responsibility of the leaders to assist the followers to achieve their goals and to provide the direction and support to make sure that their goals re compatible with the overall objectives of the organisation. In addition, the research is also adopting the supporting leadership in which it results in high employee performance and satisfaction when employees are performing structured tasks (Robbins and Judge, 2019).

II.V. The Emerging Technology

According to the Malaysia Automotive Institute (2014), the National Automotive Policy (NAP) 2014 was launched with a vision to transform the competitiveness of the Malaysian automotive industry to face the global challenges. One of the 6 roadmaps (Malaysia Automotive Technology Roadmap - MATR) has been developed under the supervision of Ministry of International Trade and Industry (MITI) and the Malaysia Automotive Institute (MAI) to complement the execution of the National Automotive Policy 2014 to achieve the transformation objective of the local automotive industry.

According to the Malaysia Automotive Institute (2014), the MATR entails the latest green technology development that is in line with the development of the global automotive industry. The roadmap includes guidelines towards the rationalization of the industry towards achieving an environmental friendly supply value chain, enhancing competitiveness and ensuring the sustainability of the local automotive industry. The development of MATR aims to reduce carbon emission, improve fuel consumption and enhance safety and security.

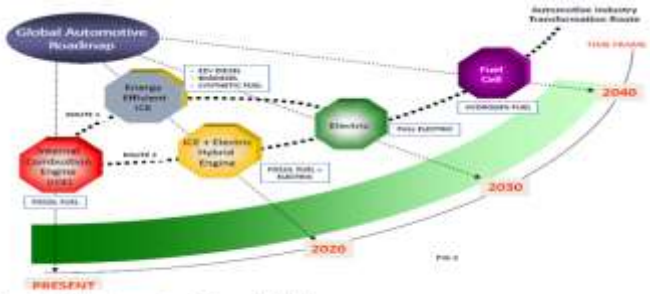

Figure 1.1: Malaysia Automotive Roadmap - Highlight
Source: MalaysiaAutomotiveInstitute (2014)

Figure 1.1 indicates the global automotive roadmap from 2014 to 2040. Since 2014, the automotive industry is applying internal combustion engine (ICE). It is estimated to apply technology of Energy Efficient ICE and ICE + Electric Hybrid Engine in 2020. Next, the automotive industry is expected to apply Electric technology in 2030 and Fuel Cell technology in 2040.

II.VI. Skills

Wright, McMahan, McCormick and Sherman (1998) point that an organisation must incorporate the necessary human skills to implement the strategy defined in order to increase an organisation's competitiveness. Skills refer to psychomotor activities that reflect the ability of people to effectively use their knowledge to perform physical tasks (Phillips and Gully, 2009). Skills refer to the application of knowledge with mental process render to action taken in a practical way for problem solving or to achieve individual and organisational goals. It is beyond knowledge and could be classified under tacit knowledge, a hands-on capability for action taken which builds through experiences, learning curve and trial-and-errors (Chew, 2014).

II.VI.I Skills Management

"Skills management is a robust and systematic approach in forecasting, identifying, classifying, evaluating and analysing the work force skills, competencies and gaps that enterprises face" (Younker, 1998). The primary purpose of Skills Management is to allocate the appropriate skills at the correct place, at the right time, at optimal costs (Kreitmeier et al., 2000). A person with knowledge does not guarantee he or she has the ultimate skills required (Chew, 2014).

II.VI.II Derivation of Skills Management Framework

There are three major fields of concepts studied to derive the skills management framework. First, human resource management is concerned about a defined set of distinct, interrelated activities, functions and processes that aim to attract, develop and maintain a firm's human resources (Lin et al, 2008).

The attract aims to identify the potential candidates and creates their interest to work for an organisation. The develop aims to provides training to further enhance the skills, knowledge and ability of the employed candidates. The maintain aims to retain the employed candidates so that they stay loyal to work for an organisation (Lin et al, 2008).

Second, Behera (2016) suggests that talent management is the process of identification, attraction, selection, engagement, deployment, development and retention of the employees in the organisation. The main components of the talent management framework in an organisation are such as attract, select, develop, engage and retain the employees (talented employees). The first most component of talent management is to attract the talent with the required skill to join the organisations. The second component of talent management is to select the right talent for the job through psychological test, behavioral interviews, personality tests and knowledge tests.

The third component of talent management is to develop the talented people. The employees will stay in the organisations where there is scope of career growth and opportunities for personal and professional development. The fourth component in talent management is to engage the talented employees. Engaged employees can shows various qualities like innovation and creativity and take personally interest to take more responsibility to make the things

happen (Behera, 2016). The fifth component in talent management is to retain the talented employees. A performance management system is used to retain the talented employees in an organisation because it helps to identify how the different employees perceived the feedback and drivers of retention (Behera, 2016).

Third, Robinson et al. (2001) and Kululanga and McCaffer (2001) develop the four main knowledge management processes which have incorporated the notions of knowledge obsolescence and validation: capture, share, reuse and maintain. Knowledge capture comprises three sub-processes: identify and locating knowledge, representing and storing knowledge and validating knowledge (Kamara et al., 2003). Share is about the provision of the right knowledge to the right person at the right time (Robinson et al., 2002; Mertins et al., 2001) or within the shortest time possible.

Reuse is to adapt and apply knowledge: reuse of knowledge through the re-application of knowledge, such as the re-application of best practice as mentioned by Szulanski (2000), and the reuse of knowledge for innovation with necessary adaptation or integration (Majchrzak et al., 2004; Egbu et al., 2001). Maintain refers to archiving and retirement of knowledge. Knowledge may become obsolete over time (Pakes and Schankerman, 1979; Rich and Duchessi, 2001) due to the development of a discipline, and the employment new information, rules and theories (Bhatt, 2001).

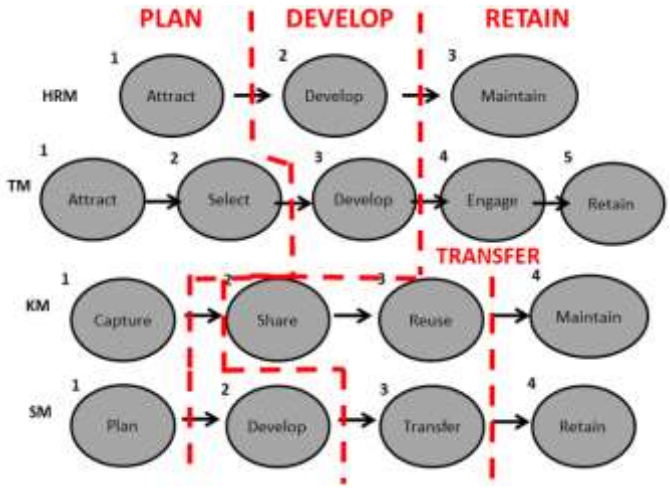

Figure 2.1 Mapping of the different frameworks to derive Skills Management Framework

The Figure 2.1 shows the mapping of the different frameworks in human resource management, talent management and knowledge management to derive the skills management framework.

The literatures show that the four stages of skills management framework can be defined as the following.

- Skills Forecasting and Planning: This process involves predicting what competences will be needed one to five years, instead of forecasting the future supply of and demand for employees (Taylor, 2013).
- Skills Development: It is important to hire people who are willing and able to learn the job and accept training when companies are unable to pay competitive wages (Phillips & Gully, 2009). On-the-job training (OJT), workshops and seminars are methods to develop skills of skilled workers (Blanchard and Thacker, 2010).

- Skills Transfer: Skills transfer can be defined as the process by which the skills developed by a creator is practiced and utilised by an applier (Khalil, 2000).
- Skills Retention: Retaining skilled workers is able to produce a more loyal and committed workforce with a better understanding of the company's products, services and processes and decreased staffing costs (Phillips and Gully, 2009).

II.VI.IIIDerivation of Skills Management Process

The skills management framework is designed based on the concept of Deming cycle. The Deming Cycle starts with the PLAN step to identify a goal and to put a plan into action. Next, is DO step to carry out the components of the plan. Next is STUDY step to monitor the outcomes for further improvement. Last is ACT step to integrate the learning generated by the entire process. These four steps are repeated endlessly for continual improvement (Deming, 2016).

The skills management framework is particularly designed to manage the skilled blue collar workers for continual improvement. The derived skills management framework as shown in the Figure 2.2 is based on the concept of Deming Cycle; therefore it is a continuous cycle. The cycle begins with the stage of skills forecasting and planning, in which the organisation predicts and plans on the needed skills among the skilled blue collar workers in the manufacturing processes. Then, the cycle continues with the stage of skills development, in which the organisation develops the needed skills among the skilled blue collar workers in the manufacturing processes. Next, the cycle continues with the stage of skills transfer, in which the senior workers teach and transfer skills to the junior workers in the organisation. Lastly, the cycle closes with the stage of skills retention, in which the organisation retains the skills of the employees by retaining the skilled blue collar workers within the organisation.

These four stages of activities are repeated endless as part of a never-ending cycle for continual improvement. The cycle is in a looping process because the stage of skills retention will proceed with the stage of skills forecasting and planning. This is because the organisation needs to predict and plan on the needed skills among the new batch of blue collar workers after the organisation has retained the senior skilled blue collar workers. Then, the cycle will continue over and over again endlessly. The Figure 2.2 shows the skills management framework in a looping process as discussed above.

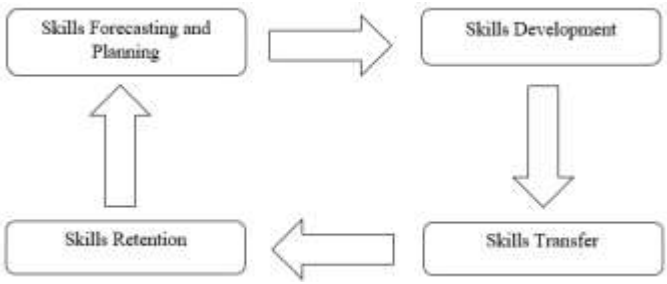

Figure 2.2 Conceptual framework of skills management process
Source: Developed by the researchers with reference to the (Deming, 2016).

III METHODOLOGY

III.I Research Philosophy (Interpretivism)

The research philosophy adopted by the researchers in this research is interpretivism, because the researchers need to make sense of the subjective and socially constructed meanings expressed by the participants participate in the research interviews (Saunders et al., 2012). Depth of understanding in qualitative research is based on a detailed knowledge of the particular, and its nuances in each context (Stake, 1994). Even a single case, if studied in sufficient depth and with sufficient insight, may provide the basis for a theoretical explanation of a general phenomenon (Hyde, 2000).

III.II. Research Approach (Deductive Approach)

Deductive reasoning is a theory testing process which commences with an established theory or generalisation, and seeks to see if the theory applies to specific instances (Hyde, 2000). Guba and Lincoln (1994) argue that both qualitative and quantitative methods may be used appropriately with any research paradigm. Patton (1991, p. 194) argues that the qualitative researchers can adopt both inductive and deductive processes. This research starts by deriving a conceptual framework from the literature review (skills management framework), then the research verify the practicability of the developed skills management framework by conducting semi-structured interviews and document analysis (deductive approach).

III.III. Research Design (Exploratory study)

The research is an exploratory study because it is conducted to discover the real facts and to study in deep about skills management. There is a lack of published research and a lack of knowledge about the skills management from the perspective of management science (Saunders et al, 2012). The researchers need to conduct extensive interviews with a number of people to cope with the situations and to understand the phenomenon in deep (Saunders et al, 2012). In this case, the researchers conduct individual interviews (in the preliminary study) to verify the developed four-stages of skills management process to be implemented in the automotive industry in Malaysia.

III.IV. Methodological Choice (Qualitative Research)

Qualitative methodologies, seek to explain the particular. The qualitative study must provide conclusions which account for the particulars of every case rather than seeking to reach a general profile regarding the study population. Qualitative methods allow the researchers to study issues in depth; data collection is not limited to predetermined categories. Qualitative methods produce a wealth of detailed data on a small number of individuals (Patton, 1991).

III.V. Research Strategy (Case Study)

A case study explores a research topic or phenomenon within its context, or within a number of real-life contexts (Saunders et al., 2012). The researchers wish to gain a rich understanding of the context of the research and the processes being enacted, therefore the case study strategy is relevant (Eisenhardt and Graebner, 2007). Yin (2009) highlights case study strategy is used for exploratory study because it generates answers to the questions ‘why’, ‘what’, and ‘how’. The case study inquiry requires prior development of theoretical propositions to guide data collection and analysis. For case studies, theory development as part of the design phase is essential, whether the ensuing case study’s purpose is to develop or test theory.

III.VI. Research Techniques for Data Collection (Interviews and Document Analysis)

The research technique used to collect data from 49 participants (21 middle managers and 28 skilled blue collar workers) in this research include the research interviews and document analysis. Research interviews adopted is semi-structured interviews. The researchers have a list of themes and some key questions to be covered in the semi-structured interviews, although their use is different from interview to interview (Saunders et al., 2012).

In addition, document review is used to collect the secondary data for the research. Documents enable the researchers to get the language and words of participants, because they can be accessed at a time convenient to the researchers as an unobtrusive source of information (Creswell, 2003).

III.VII. Unit of Analysis (Company X)

The unit of analysis is Company X in the automotive industry, because Company X is the major entity that is being analysed in the research. It is the source to obtain the data from the research interviews for subsequent data analysis.

Research Technique to Analyse On the Research Interviews Content

The researchers perform the data analysis according to the categories of the participants: middle management and skilled blue collar workers. The research applies the Five-Phased Cycle for data analysis (Yin, 2011) for each transcript of the participants in the research interviews. The Five-Phased Cycle is (1) Compiling (2) Disassembling (3) Reassembling (4) Interpreting (5) Concluding.

IV FINDINGS AND DISCUSSION

The middle management conducts trend extrapolation for skills planning among the blue collar workers using the historical data to select the potential leaders for the company. The middle management is able to explore the current technology trend to predict for the future technology trend through the trend analysis. The middle management analyses the historical data to predict on how to improve the current status of four M (manpower, materials, methods and machines).

The middle management uses the skills chart to monitor the working performance of the workers at the production line based on their job scopes, job performance and their technical know-how to determine which workers need training or coaching. The middle management plays the role as the intermediate to report the monitoring results to the top management for further actions or suggestions or further development.

The skilled employees will become the internal experts to provide technical consultation to the management when they have gained expertise and experiences through the different production projects at the company. It is a continuous process. The company is keeping up with the latest technology by engaging with technology expert, while they need to ensure that the products are affordable for their consumers. The middle management tends to attach the talented employees to work with the expertise in order to gain additional skills and knowledge through on-the-job training.

The middle management sends the employees to attend the international conferences to gain the real know-how and technology from overseas (Japan, Germany and United States). Then, the company performs gap analysis for further skills improvement.

A challenge at Company X is how to attract the employees to develop along the technical path, rather than management path due to the higher pay in management path. The company needs to compete at both the local market share and international market share. The company needs to differentiate its cars in terms of design, price and comfort in order to compete with its competitors. The company needs to identify what technology that its competitors are applying in order to predict what skills need to be developed among the skilled blue collar workers.

The middle management is able to conduct skills planning among the skilled blue collar workers when the company has identified the technology suitable to be adopted by the company. The market examination will indicate what product to be introduced in the future, and then it will indicate what skills need to be developed among the skilled blue collar workers. The middle management conducts market survey to predict on the market share and the skills needed to manufacture a new car model. This is very essential for skills planning among the skilled blue collar workers at the production floor.

The middle management performs the skills planning among the skilled blue collar workers based on the technology roadmap (which indicate the skills level that need to be pursued by the employees) of the company. The middle management is using a pie chart (which indicates the skills level for each employee) to assess the skills and competencies of the employees. The middle management conducts competency assessment to determine whether the workers have achieved satisfied skills level relevant to their job scopes.

The middle management involves the employees to develop the company mission by empowerment, giving them the decision making power to perform their daily jobs. The middle management develops the tracking mechanism to ensure that the employees are able to deliver the projects according to the tracking mechanism. The middle management assesses the skilled blue collar workers based on their performance rating. If the workers need guidance and improvement, the management will arrange the workers for coaching or to attend training to improve skills level.

Skills assessment can be done after the recruitment of a staff and during the probation period. A buddy will be attached to the newly recruited workers to accelerate their learning terms. The Key Performance Index (KPI) is used to perform skills assessment to determine whether the skilled blue collar workers are qualified for their jobs. When the employees are found poor in the KPI through skills assessment, the middle management needs to identify the shortage of skill among the employees and to develop the necessary skills among the workers.

It is important that the company prioritises the internal vacancies to the internal employees because this shows the company’s appreciation towards the contribution of the internal employees to the company. Technical ladder is a career

path where the employees develop themselves in term of skills level, whereas management ladder is a career path where the employees develop themselves by getting promotion to hold management position in the company. Talent pool is used at Company X for career path advancement; to discover the talented employees, so that they are able to be retained at the company for further skills development.

The company cannot work alone; they need to work together with other technical partners for knowledge sharing and technology sharing due to the high competition in the automotive industry. The middle management develops the skills of a worker to ensure that he is capable to perform five processes in the manufacturing job within a time limit. The researchers point that to achieve the purpose of job function for skills exploitation; the experienced senior workers are appointed as trainer to facilitate skills transfer among the skilled blue collar workers.

The experienced employees will have the required experience to handle critical situation in production because they have the first-hand information about the production line. Buddy system in pair is good for skills transfer because the senior worker is able to focus and concentrate to teach the junior worker in details about a particular skill in the manufacturing process.

The middle management triggers the intra-firm skills transfer when they transfer the senior skilled blue collar workers from a plant to teach the junior workers at another plant. The external skills transfer occurs at Company X when the company provides external support to their suppliers who are facing technical problems. The middle management performs skills audit to appoint the internal employees for internal vacancies. Empowerment is useful to cultivate self-confidence among the employees when they are been granted with decision making power.

The management aims to develop and grow the skills of the employees through the interfirm skills transfer. The company engaged with several car manufacturers to facilitate the mass production of a compact model. The international skills transfer is taken place when Company X sent the employees to learn skills from the Japanese experts at Japan. The international skills transfer enables Company X to plan for what sort of (engine, capacity, production volume) they want for particular models. The joint venture in skills between Company X with the Chinese and Japanese firms enables the company to gain external skills transfer for the benefits of the company.

Skills audit enables the company to appoint the internal employees for internal vacancies. This is important to provide the internal employees a sense of appreciation for their contribution to the company. The management will do skills audit to detect whether the employees have hidden skills or success in certain project. Subsequently, the middle management will promote them in job.

Job satisfaction is a factor which is more important than wage level for retention of skilled blue collar workers. If the hard work of the new workers does not get recent appreciation from the company, the workers tend to quit from their jobs. Empowerment is useful to cultivate self-confidence among the employees when they are been granted with

decision making power. Recent promotion plays a role in employees' retention because it motivates the workers to work at high momentum and they will be passionate in the work; the employees will feel appreciated by the company.

Job enrichment is good for employees if they are motivated. The workers will improve their discipline, their accountability and their responsibility to perform the assignment or work through job enrichment. Job enrichment enables the employees to feel that they are valuable asset to the company and thus are willing to work longer for the company. Team building is a good practice to achieve retention among the skilled blue collar workers because it can build the rapport among the employees to ease the process of skills transfer among the employees. Peer support plays essential role in motivating the employees to work longer for the company.

V CONCLUSION & RECOMMENDATIONS

The management should provide intense training to the research and development team to further develop their skills. In addition, the management should further invest to employ more external technical experts to learn and absorb latest technology from the automotive market. The management should conduct market survey to collect information from the customers to determine market demands of the customers. This can helps to predict the skills required to be developed among the skilled blue collar workers in the future.

The company should introduce a series of steps to cultivate the employee loyalty at the workplace. Firstly, the company needs to cultivate the employee engagement at the workplace. Engaged employees are enthusiatic about their work and less likely to leave which helps to save cost for the organization in terms of recruitment and training. Secondly, the management should increase confidence in leadership, the management teams need to ensure that they play the role to excel as good management teams. Thirdly, the management should improve company culture by forming employees with good attitudes and behaviours. Fourthly, the management should provide sufficient education assistance and training to the employees to upgrade themselves in terms of technical skills. Fifthly, the management should reward the employees with good performance appropriately. The employees will stay motivated and enthusiastic if they are been rewarded accordingly to their work performance.

The workers feel insecure at work when there are sudden direction changes in conducting projects from the management. Therefore, the management should make firm decisions before delegating the instructions to the subordinates to be executed. The management should invest more efforts for employee recruitment. The management should conduct careful screening and personality test to select the right candidates with the right skills for recruitment. This can help to facilitate the procedures of skills assessment, because only the best candidates with the right skills are selected to work at the company.

The management should organise a series of programme and provide intensive training and financial assistance to those employees in the talent pool to further develop their skills and expertise. Company X might consider in forming collaboration with TalentCorp, which established in 2011 under the Prime Minister's Department that attracts, nurture

and retains the best and the right talent. In addition, Company X might consider in sponsoring the employees to participate in one of the many programme such as The Malaysian Meister Program (MMP), which is a major breakthrough in Technical and Education Vocational and Traning (TEVT) in Malaysia.

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