Business Report

Networking and Knowledge Transfer in Malaysian SMEs through University-Industry Engagement and the State

CHIN YEE WHAH AND LIM KA TIEK

Abstract

This report[1] demonstrates the application of a model that treats the state, society and economy in a concrete case study of small and medium enterprises (SMEs). It approaches the transformation of Malaysian SMEs by using a triangular model. The model focuses on university–industry engagement within the context of the state's educational policies and programmes that encourage the transfer of knowledge. Within this context, the report explores and pilots a new approach, which aims to transform Malaysian SMEs, especially contract manufacturers of multinational corporations. The model provides a least-cost, timely, competent and sustainable solution to the needs of all stakeholders.

Keywords: *SME Assist model, networking, knowledge transfer, university–industry engagement, state, sustainability*

Introduction

Small and medium enterprises (SMEs) have been acknowledged as an important driving force of the economy in many countries. Previous research (Chee 1987; Harvie & Lee 2002; Normah 2006) and the 2005 Census of Establishments and Enterprises show that SMEs contributed significantly to the present economy of Malaysia. The Census indicates that 99.2 per cent of 518,996 business establishments in Malaysia are SMEs. Total employment by SMEs accounted for more than 3 million workers and generated RM154 billion of value added in 2003 (Normah 2006: 5). Data provided by the Economic Planning Unit show that SMEs contributed 31.4 per cent of Malaysia's gross domestic product (GDP) in 2008 (Malaysia 2010: 94).

Acknowledging the importance of the contribution of SMEs to the national economy, the government has made efforts to help improve and transform SMEs to be competitive in the fast-changing global economy

(see Chin, in this volume). In Malaysia, different models or approaches have been adopted and implemented by various government agencies to help SMEs. SME competitiveness remains an issue of concern, however, especially for those engaging in global supply chains, which are highly competitive. Recognizing that the global economic landscape continues to evolve rapidly and that they face fierce competition globally, the local SMEs that engage in the global market are meeting the challenge and adapting to keep pace with the demand for transformation and continuous improvement to sustain their survival and growth.

Under such a scenario, several academics and a retired industrial expert from a multinational corporation (MNC) began to work together to explore a new model that could raise SMEs' competitiveness to a higher level and at the same time transfer knowledge to students. A new cluster termed 'SME Assist' was set up in August 2009 under the umbrella of the Industry and Community Network established in 2007, headed by a deputy vice-chancellor, and aiming to foster closer, effective, meaningful and sustainable linkages and partnerships with the industry and the community. These two entities were the outcome of Universiti Sains Malaysia's (USM) new paradigm focusing on sustainability, reaching the 'bottom billions' of people by engaging society and industry. These institutional efforts began to synergize various resources by attracting individual (experts) and institutional (USM) talents, industry and, soon after, research grants from the Ministry of Higher Education, in a process of development and establishment of a centre of excellence that would create value for all stakeholders.

SME Assist focuses on matching the knowledge/expertise, facilities and resources of USM with the needs, aspirations and expectations of industry and aims to achieve a sustainable win–win situation. Under SME Assist, researchers have begun to look into the above-mentioned issues and experiment with a model to help accelerate the transformation of local SMEs. The model is presently in the evolutionary stage of actual application and concurrent research to strengthen the competitive capability of local SMEs in three different phases. The model is based on the research finding that the sustainable growth of SMEs is constrained by weaknesses in four major areas (skill and knowledge; information and communication technology and automation; marketing; and finance) as identified and outlined in a study by Chin (2010). The concept of the model is to develop a least-cost engagement application research team that will continue to engage with industry to strengthen these four major weaknesses through strategic prioritization and through

leveraging and structuring the motivation, strengths and weaknesses of various stakeholders. In the process of engagement, the short- and long-term needs of industry will be addressed. The knowledge gained so far from the process of engagement has been extracted, re-used and improved. The idea of knowledge transfer, knowledge sharing and reuse of knowledge in MNCs' international manufacturing networks has been explored by Chai (2000). In our SME Assist model, the first phase of the model involved the development of the culture of basic Kaizen capability of SMEs. It involves the mindset and the competency transformation of continuous waste and variation reduction. Five case studies are described in this report to provide a glimpse of how the SME Assist model leverages the strengths, weaknesses and motivations of different stakeholders to achieve both short-term and long-term needs and transformation. The case studies demonstrate how mutual goals and benefits can be quickly achieved through the instant strengthening of weaknesses. The stakeholders include retired and currently serving industry experts, academics and graduate students from various disciplines from USM. Phase 2 of the model involved the extraction of the phase 1 experience into a cluster of knowledge using knowledge management methodology to enable the cloning and sustaining of the success of the piloted approach. Phase 3 of the model should extend the approach to other areas to meet the changing global challenges.

SME Assist Model Formulation

The main stakeholders at the initial stage of the model consist of three main groups: the SMEs, MNCs and USM. At the conceptualization stage of the SME Assist framework, we deliberated on how to create value that includes as many stakeholders as possible and avoids duplication of the previous and existing efforts of different agencies that were set up to help the SMEs. As the model developed, we discovered that the state has an important indirect role that could contribute to the sustainability of the model in terms of financing research projects that engage SMEs, academics, students and industry experts. Approaching the SME Assist model from a triangular perspective that involves the state, economy and society, we began to see the model from a more holistic perspective and at a concrete level. In line with the triangular model as proposed by Jakobsen (2011) and Chin (2010) in the study of SMEs, we grouped all the stakeholders in the SME Assist model into three parts for analytical purposes: university, industry and the state. The

university comprises researchers, students and retired industry experts who work as contract project staff to network with the industry. On the one hand, the industry consists of SMEs and MNCs, which are major components of the economy. On the other hand, the state plays a critical role in formulating higher education policies that shape the curriculum and direction of universities that eventually determine the supply and quality of human capital for industry. The university–industry and state relationship is dynamic, as demand for talented human capital by the industry for competitiveness will reshape higher education policy. We argue that the elements in the SME Assist model are inseparable from each other in terms of shifting local SMEs to the next stage of competitiveness in the fast-changing global economy. The model is based on the concept of university–industry engagement that emphasizes industry-based participatory-type research (projects). The characteristics of these stakeholders are further evaluated in the following sections.

University: Universiti Sains Malaysia

Broadly defined, a society may be described as an economic, social or industrial infrastructure, made up of a varied collection of individuals. From the social perspective, a university forms part of the societal structure and represents society in the triangular model. Researchers, students and ex-MNC professionals employed by the university are three important sub-groups of a university community. The continuous supply of human resources from the university is critical to the success and sustainability of the SME Assist model. USM has had 40 years of experience collaborating with industry in terms of research programmes, sabbatical placements, internship programmes, and curriculum advisory and other activities mainly coordinated through the Industrial Advisory Panel in every faculty (Lim 2009). The collaborative relationship has brought benefits to both the MNCs and USM.

USM as a training and knowledge institution could leverage its strength to close the gap in terms of the needs of the SMEs. The strengths of USM are its assets in terms of people and knowledge and its role as a knowledge-producing institution. These assets include thousands of academic staff and students, and knowledge transfer through training modules, laboratory work, research projects, internship programmes, technical publications, etc.

The challenge is how to leverage the assets of USM to respond to the real needs of industry. By itself, USM does not have the complete competency needed to close the gap for the SMEs. USM has to look at

its strengths and weaknesses with the objective of identifying collaborative partners to complement and strengthen its abilities and overcome its weaknesses. USM has in fact identified its own weaknesses. USM is facing the challenges of producing relevant and employable graduates. Industries are seeking research collaboration with USM that can meet their expectations in terms of relevance and timing. USM has to transform itself into a world-class institution with the mission of engaging with and sustaining the growth of industry, the community and the 'bottom billion' of the world's population. The mindset of the university's staff and students is going through turbulent adaptation to the new challenge.

Industry: Small and Medium Enterprises and Multinational Corporations

SMEs are an important component of the economy of Malaysia. They also form an important part of MNCs' supply chains. Their capability is one of the important factors to attract and retain MNCs' operations in Malaysia. Their ability to meet the expectation of MNCs is critical to the competitive advantage of MNCs. MNCs are also dependent on the ability of SMEs to provide them with world-class support. The ability of SMEs to meet changing demands, however, has become an issue. During the initial stage of the project, USM has drawn on its experts in the study of SMEs from the School of Social Sciences. The constraints and challenges identified include four major areas of weakness that need to be improved: skill and knowledge; information and communication technology and automation; marketing; and finance.

To close the gap, SME Assist has taken steps to find a possible solution through benchmarking best practices and successes of different organizations by leveraging the strengths of USM and MNCs. The rationale is that MNCs are superior to markets and alliances in transferring knowledge (Kogut & Zander 1993). For many years, various companies in Japan, the USA and Europe have adopted and created many best practices and have become highly competitive MNCs. These best practices could be benchmarked and adopted by SMEs. Indeed, many MNCs set up their operations in Malaysia in the early 1970s (Chin 2006) and have imported those best practices. Many of their operations in Malaysia are superior to those elsewhere and are highly competitive. The strengths that the MNCs have built up during the past 40 years include laying the foundation with back-to-basics, customer focus, continuous improvement, innovation, technology roadmaps, teamwork, knowledge sharing, talent development and strategic planning (Lim et al. 2006).

There are many insights to be gained through the strategic change interventions that many MNCs have gone through. It is important to understand how MNCs have developed their skills and knowledge, information and communication technology, automation systems, and how they transfer this knowledge within their corporation worldwide. How do they manage transformation change and continuous change? How did they go from a labour-intensive operation with low technology to highly automated and advanced technology? How did they move up the value chain to an integrated supply chain, design, sales, marketing and service centre?

These experiences are in fact national assets that were underused in the past. SME Assist is taking the opportunity to identify the basic elements of operations that enabled the transformation and continuous improvement of the MNCs. In view of the serious 'brain drain' that Malaysia is facing (2Khoo 2011), it is essential for SME Assist to tap into the knowledge of ex-MNC professionals who have experienced the transformation of MNCs in Malaysia. SME Assist has developed a simplified operational structure based on the experiences of MNCs. It has been developing an expert panel that is multi-disciplinary and multi-level and draws from the university (academics and students), industry (current practitioners) and community (ex-MNC professionals) to develop and execute the transformation of SMEs.

Despite their strengths, MNCs are facing some challenges. Since the mid-1990s, industries in Malaysia have been under fierce pressure from the external environment. Globalization, as well as increased raw material costs, complex products, shorter life cycles, high technology and customer expectations are forcing businesses to realign and redesign their organizations (Chin 2006). This also puts the onus on many MNCs to retain and seek talented and relevant pools of expertise. Many MNCs have outsourced their operations. The success of MNCs is increasingly dependent on the competency of contract manufacturers (CMs) and SMEs.

The State: Knowledge Transfer Programme with the Ministry of Higher Education

There are 15 government ministries and 38 agencies involved in supporting the development of SMEs and there are some 30 government programmes to help SMEs (NEAC 2010: 122). The concept of SME Assist differs from all the existing programmes and models and fits well with the knowledge transformation programme recently introduced by the Ministry of Higher Education's MyMaster and MyPhD programmes,

created under the Tenth Malaysia Plan via the MyBrain15 programme for the sponsorship of postgraduate study at the Master and PhD level. The Ministry's Student Knowledge Transfer Programme (SKTP) also integrates well with the SME Assist model. SME Assist has secured two SKTP grants (in May 2011) that involve two SMEs, five academics, a retiree and 30 students. These two projects started in September 2011.

Engaging Industry, Society and the State to Elevate the Competitive Level of SMEs

The three elements of industry, society and state are engaged and integrated in the SME Assist model. Following the concept of engagement adopted by USM in 2007, the SME Assist Cluster, since its inception, has fostered closer and deeper collaboration with MNCs to create sustainable value by including more stakeholders to create value-innovative collaboration between USM and MNCs to assist SMEs. This was achieved by recruiting an ex-MNC expert from senior management with 30 years of experience and pairing him with an academic from the School of Social Science to jointly develop a holistic framework for SME Assist. Pairing has the benefit of cross-learning from the behaviour and experience of industry and university, in other words, a cross-disciplinary approach. It extends the strength of a learning institution with the practicality of industry. These two senior leaders collaborated to review the current research on SMEs and to benchmark the MNCs' successful experience in their transformation journey. The formulation of the strategy for transforming local SMEs was based on their study.

The objectives of benchmarking are to: (1) understand how MNCs in Malaysia have grown from a cheap-labour operation to a highly competitive knowledge operation; (2) identify their success factors and practices gained through years of operation in Malaysia; (3) study how those best practices are created and transferred; and (4) formulate methodology to accelerate the knowledge transfer of the successful transformation experiences of MNCs to SMEs. The overall objective of the benchmarking was to extract the above-mentioned experiences and adapt them to meet the needs of local SMEs in an accelerated time frame. What are the phases of experience of MNCs that are relevant to SMEs? What are the most important factors that will enable the continuous change of phases of transformation?

The lessons learnt from the benchmarking were formulated into an engagement model of interrelated elements of operation to be used by

SME Assist. The interrelated elements of operation are broadly broken down into six categories to support the implementation of the model. The six categories are: customer focus; functional integration; competency layers/phases; skill and knowledge; team-work; and time frames.

In the past, the MNCs were very internally focused. They have now focused on the voice of the customer and customer satisfaction. They are very results oriented in terms of cost, quality and timely delivery of products and services. Their functions across the regions, which include finance, human resources, engineering, manufacturing and design, used to be sub-optimized in their respective activities and performance. They are now better managed, with end-to-end solutions and collaborative knowledge transfer. They continuously improve their best practices, which include total quality management (TQM), LEAN manufacturing, Six Sigma, knowledge management and strategic planning. They invest in skill and knowledge development of their human resources as well as organizational development. Many MNCs have adopted these practices in the past and many of them are now adopting these practices as key initiatives to face turbulent and changing global competition. MNCs have different levels of resources focusing on different priorities in terms of short-term, day-to-day operations, engineering management support, medium-term best practices, innovation and long-term research. MNCs have made significant efforts to promote collaborative team-work to deliver their products and services within a customer-defined time frame and quality (Lim et al. 2006). These critical elements of operation formed the basis of the model during the pilot engagement stage to assess the strengths, weaknesses and needs of the various stakeholders. The results of this assessment guided the focus of implementation of continuous improvement and transformation.

When we looked at the scope of the SMEs to be strengthened, we concluded that it was too wide and a strategic prioritization had to be made. It would drain too much energy to concentrate on all areas of weakness. The chances were that there would be duplication of effort by other agencies. To minimize such duplication and to accelerate progress, the strategy adopted during the conceptualization specialized in fundamentals, to focus on and to leverage the surrounding resources but to draw on the strengths and resources of the MNCs and the university.

The lessons learnt from the MNCs are their focus on back-to-basics in terms of continuous improvement in waste and variation reduction. Within this foundation of fundamental competency, MNCs continued to grow in their complexity, technology and value migration (Gogan,

Schuck & Zuboff 1994). Thus, the strategy of the model is to lay a foundation for SMEs in terms of their capability in relation to LEAN and Six Sigma-related mindsets and competencies. With this intervention, our hypothesis was that SMEs would achieve a better financial position with minimum waste and variation. They would have the ability to continue to improve their operation to achieve better quality products and processes. With this strengthening of product quality and processes and a better financial position, SMEs would be in a better position to market their products and services to compete globally.

Framework of the SME Assist Model

The principal objective of SME Assist is to strengthen the competitive capability of local SMEs in the global arena. The framework can be implemented in three phases. Phase 1 pilots the development of the culture of basic Kaizen capability of SMEs. Phase 2 is intended to clone and sustain the success of the piloted approach; and finally, phase 3 is meant to establish a centre of excellence that creates value with core competencies in processes and products.

This report focuses on the implementation of phase 1 of the framework. The strategy for phase 1 is: (1) to set up SME Assist units; (2) to identify the real needs of SMEs and to provide timely solutions; (3) to provide a least-cost, high-impact implementation-supporting vehicle; (4) to provide a sustainable source of under/postgraduates; (5) to develop the capability of quick project implementation for low-hanging fruits; and (6) to create multi-level active engagement for SMEs, MNCs, USM, employees, students, retirees, consultants and other institutions through essential training, mentoring, research and hands-on support to SMEs.

The framework of SME Assist is centred on a knowledge transfer intervention that consists of two intervention mechanisms. SME Assist adopts the concept of continuous change intervention as its first intervention mechanism. The first phase of its strategy is to transform the culture and mindset of SMEs and their capacity for continuous improvement ('Kaizen') of their operation. With this capability, SMEs would be able to move into phase 2, to sustain their operations through continuous improvement, and finally, to self-design transformation to meet changing needs and the highly competitive environment. The strategy of transformation also takes into consideration the importance of the new trend of economic development of the service industry. The skills and knowledge of phase 1 are designed to be applicable to both manu-

facturing and service industries. The second intervention mechanism is a least-cost knowledge transfer mechanism. Since a large number of SMEs have insufficient resources and finances, it is important to lower the barrier of transformation with a least-cost engagement mechanism to jump-start the short-term and medium-term needs of SMEs.

To provide the first phase of transformation, USM would assemble a least-cost consultancy team with end-to-end solution capability. It is a framework for creating mutual value through innovative engagement of SMEs, MNCs, USM, students, academic staff, ex-MNC professionals and current MNC professionals. It involves the understanding of the mutual needs, strengths and weaknesses and the innovative collaboration required to fill the gaps. It leverages the strengths of USM as a learning organization with excellent facilities and a vast pool of multidisciplinary academics. It provides a golden opportunity to increase students' competency and employability through active engagement with concurrent and contemporary challenges from industry. The team would provide the essential training, mentoring, research and hands-on support to the SMEs.

Piloting the Model and the Experiences Learnt

We have implemented and completed phase 1 of the SME Assist model, which is the pilot for the model. This includes a framework concept, identification of industries, implementation to test and refine the concept, the deployment process and products/knowledge gained. Five industries were identified, which led to 14 projects, now in various stages of progress.

Selection criteria for the five industries of the pilot studies were based on different challenges encountered by the companies, different levels of capability, and contract and non-contract manufacturers for MNCs. The university and its staff provided free support during the initial stages of engagement. The SMEs involved are expected to provide platforms for interns to engage in research projects involving SMEs, academics and MNC retirees at the SME's premises. SMEs are encouraged to work with academics to secure SKTP grants to enhance research collaboration among the parties involved. Based on the above concept, the five case studies discussed below have problems including operation profit loss, cost reduction pressure, process and technology upgrading and succession issues. These companies have work-forces ranging from 20 to more than 1,000 people (one case study is an MNC). Annual revenue

ranges from less than RM1 million to RM3 billion (the latter from the MNC's Penang operations). The industries involved include non-key MNC suppliers and key MNC suppliers in various industries including pharmaceuticals, packaging, special material labelling, semiconductor contract manufacturing and plastic moulding and assembly contract manufacturing. A total of 53 third- and fourth-year students from the School of Mechanical Engineering did their ten weeks of internship and final-year projects as part of the SME Assist programme.

The aim of the pilot project was to experience and understand (1)the motivation and problems of all stakeholders; (2) how to complement the weakness of a stakeholder with the strength of another stakeholder; (3) the disconnection of the deployment process and products; (4) the basic and common needs of the industry: (5) and to develop least-cost and sustainable human capital, finance and knowledge resources.

We put together a team of ten ex-MNC professionals, three current MNC professionals, academic staff from six schools and 53 third- and fourth-year students from the School of Mechanical Engineering who completed their internships and final-year projects as part of the SME Assist pilot programme. Case studies of five industries of different sizes and levels of technology are discussed in the following sections.

Case Study of Company A

Company A is a profitable SME supplying special label material to the electronics industry. The company is run by an entrepreneur and his partner. They employ about 30 workers and achieved revenue of RM6 million in 2009. The strength of the company is its attention to detail in terms of cost, quality and service. The weakness of the company is that its operations are dependent on only a few people with very limited engineering resources. It has difficulty employing trustworthy personnel. The entrepreneur has a high degree of concern related to confidentiality and trustworthiness of employees. He is faced with the challenging need to sustain effort and the difficulty of handing over the business to the next generation. This form of management culture is embedded in the company and is not easy to change. If we compare this company with a large MNC such as Hewlett-Packard, we see that the latter's founders have strong personal beliefs in terms of trusting the employees, commitment to innovation, and sharing responsibilities and rewards (Packard 1995). The task of Company A is to structure and automate their key processes. With the intervention of SME Assist, a student and an ex-MNC professional with experience in process improvement

and automation were matched to support the transformation. There is a barrier to trust, however, and a lack of customer-defined goals. This resulted in frequent changes in requirements based on consideration of trust and the entrepreneur's priorities. The difficulty in alignment of needs slowed down the process of engagement for continuous improvement. Lessons learnt are the importance of need alignment, trust and customer-defined requirements.

Case Study of Company B

Company B employs about 20 workers and achieved revenue of RM1 million in 2009. It produces contact lens care products. The company has suffered monthly financial losses. Products were not delivered in time to the customers. This problem started with the resignation of the factory manager who left the factory without handing over the knowledge in running the operation and marketing.

Faced with this business burning platform of financial losses and delivery issues, the management is in critical need of support to stop the financial loss and the loss of market share. A team of three third-year students conducting their ten-week internship, six ex-MNC professionals and two academics were appointed at different stages of engagement to transform the organization between February and July 2010. The phase 1 transformation for the company was successfully completed.

Knowledge of USM academic staff and ex-MNC professionals was applied to transform the organization and at the same time transferred to the students and the employees through intensive on-the-job training. Significant value was created for the company with 88.4 per cent output improvement based on performance from October 2009 to June 2010. The backlog was cleared within nine weeks, thanks to support by the students. Wastage from the ultrasonic welding process was reduced by 91 percentage points according to sample data taken from March to June 2010. Resin wastage was reduced by 30 percentage points according to data taken from April to June 2010. Overtime was reduced by 77 per cent according to data from January to June 2010. Cost avoidance totalled RM 50,000 through restoration and modification of the old problematic machinery.

To sustain engagement and continue with value creation, the same three students identified three areas of opportunity whereby they could support the same company in their final-year projects. A group of 30 students was deployed in May 2011 to design a future computer integrated manufacturing (CIM) system for the company as part of their course work.

As a point for discussion, the business burning platform provides a good motivation for the owners to collaborate with SME Assist on the first phase of continuous improvement intervention. The immediate objective was to stop the monthly financial bleeding. This objective enabled the SME Assist team to implement the improvement strategy with the fewest barriers. The success of this case study enables us to understand the importance of owners' motivations, the ability to provide timely low-cost interventions, the capability of the students under proper mentorship and the diversity of expertise of ex-MNC professionals. We were able to improve the performance of the organization and enable the experience and accumulation of knowledge related to continuous improvement for all stakeholders. We have not, however, succeeded in enabling the company to stand on its own two feet yet.

Case Study of Company C

Company C is a contract manufacturer in the semiconductor industry. It employs around 1,000 employees and had revenue of around RM120 million in 2009. It has no urgency to make any transformation of its organization processes because it is one of the lowest cost suppliers to the MNC. However, due to the average selling price erosion faced by the MNC, the MNC required the CM to reduce the cost annually. Since the CM supplies more than 50 per cent of its business to the MNC, it has to comply with this customer-driven expectation. Without this customer-driven expectation, the CM would not speed up the focus on its waste and variation reduction to improve cost.

To transform Company C, a group of six retired ex-MNC professionals was assembled to identify improvement opportunities. The first challenge was building initial trust with Company C. The second challenge was identifying opportunities, since Company C is performing well with good cost management. Through the diverse experience of retired ex-MNC professionals, transformation initiatives with potential savings of RM 700,000 were identified after three visits to the company. More than six months were invested, however, in building trust and relationships, motivating and recruiting retirees to intervene in the company. Once the trust had built up and the retirees were recruited, the improvement initiatives with the 10 projects identified quickly progressed through the stages of definition, measurement and analysis. Given this progress, the senior vice-president of the MNC wanted to provide the team with opportunities to work with its other downstream CMs. Throughout the six months, work was provided free of charge to the company, being

conducted in the leisure time of the retirees, so the company could move forward. A profit sharing reward mechanism is under development by all interested parties.

As a point for discussion, though this pilot project is in various stages of progress, we have gained a number of insights. The MNC is determined to trigger a mindset change of its CM. Fundamental continuous improvement methodology is applicable to Company C, though it has achieved an excellent performance level in terms of cost and quality. The ex-MNC professionals have the expertise to add further value to the higher performance level of the company.

Case Study of Company D

Company D is a contract manufacturer of an MNC (Company E). It specializes in plastic moulding and sub-assembly. The company hires about 350 people and achieved RM30 million in revenue for 2009. It has a skill gap and no motivation to transform the current assembly operation of more than 100 operators. Though the sub-assembly is supplied to a high-technology MNC for a high-technology product, the assembly operations are highly manual.

When we approached the company, it was under pressure to clear a huge backlog. Despite the problem, the company lacks the mindset to collaborate with SME Assist to implement continuous improvement in waste reduction. Company D supplied more than 50 per cent of its business to an MNC. The MNC has identified LEAN Transformation as one of its key initiatives. The MNC had signed a memorandum of understanding (MOU) with USM to collaborate in LEAN Transformation research and implementation in the MNC'S operation in Penang as well as to support the LEAN Transformation of its CMs in Penang. The MNC helped to trigger the mindset change of company D.

To transform Company D, we assembled a least-cost transformation team and mechanism. A pilot study was carried out by a student undertaking his final-year project. Based on this pilot study, a practical workshop was conducted with about a dozen students to simulate the solutions before their 10 weeks of internship assignment to Company D, to carry out further study and improvement.

As a point for discussion, this is another case study showing the key role played by an MNC in changing the mindset of its CM regarding the importance of sustainable growth through transformation. Without this mindset change, it is difficult to start the process of transformation to sustainable growth. There is a lack of continuous improvement

capability of the CM in terms of waste reduction. Many processes and operations of sub-assemblies are still highly manual though they are used for high-technology products. From observation of Company D and through feedback gathered, it seems that many CMs lack resources and competency in terms of reducing waste and variation. It indicates that basic competency in waste and variation reduction using LEAN Six Sigma methodology is still relevant and very important to many industries for the present and for the foreseeable future.

Case Study of Company E (an MNC)

Company E is an MNC of more than RM3 billion net sales from its Penang branch in 2008. Its operation in Penang employs more than 1,000 employees. Due to the tradition of a good relationship of USM, the MNC's operation in Penang facilitated the participation of USM in the LEAN Transformation initiative for the MNC's Penang operation and its downstream CMs and SMEs.

Three types of opportunities were provided by the MNC for the multi-disciplinary researchers from six schools of USM to participate in the LEAN Transformation. The first type was the challenge of a 30 per cent productivity improvement for an area of operation that has more than 150 operators. The second type was the challenge of improving some key processes, which include a material replenishment system and LEAN e-training for the operators. The third type was the research and improvement of the culture and system of LEAN Transformation. This pilot engagement was restricted to MNC staff and USM staff and students.

A point for discussion is that the MNC has the mindset for continuous improvement and transformation. With awareness of corporate social responsibility and the fast-changing global competition, the MNC was more open to collaboration in end-to-end solutions as well as providing opportunities to transfer and share knowledge with CMs, SMEs, researchers and students. There was a learning curve, however, while USM grabbed this opportunity. It took three to six months to align the key performance indices (KPI) of the stakeholders and the signing of the MOU for the identified research projects. Weaknesses in timing and relevance of research area were highlighted during the collaboration. The opportunity for USM researchers to participate directly in actual business productivity improvement is still in the formative stage.

Matching Mutual Needs of Various Stakeholders: Value Creation

With such a diversity of resources from different backgrounds and organizations, the needs of the stakeholders have to be understood and appropriately matched. The matching of the needs of stakeholders is an important factor for the success of the model, as shown by the case studies. The needs of MNCs in terms of talent supply can be fulfilled by USM, provided that the needs of USM in terms of employability of the students, the relevance of the curriculum and research, and the effectiveness of internship programmes can be addressed. In fact, the needs of USM can be fulfilled and supported by the strength of the MNCs. It is theorized that the needs of all stakeholders, if innovatively matched with mindset change, would be satisfied. The implementation of the model is intended to exercise and refine the process of innovative matching of needs and to catalyze the mindset change of each stakeholder to provide a least-cost solution through mutually sustainable engagement. Through our engagement with various stakeholders, we learnt three principal sets of characteristics of these stakeholders that are important for better synergy and mobilization of each stakeholder to further develop the SME Assist model.

First are the characteristics of ex-MNC professionals. Many individuals who have accumulated 20 or 30 years of working experience in MNCs have retired. These people are searching for and adjusting to another dimension in their life. They have a high degree of competency and time but they want quality time and life balance. Through the engagement process with ex-MNC professionals, the value, role, mindset and characteristics of ex-MNC professionals are analyzed to form part of the SME Assist model. The ex-MNC professionals have contributed significantly to the value creation and least-cost support for the industries that participated in this pilot project.

During the pilot period, ten ex-MNC professionals were recruited at different stages. The ex-MNC professionals were from five different MNCs that manufacture and design communication products, semiconductor products, pharmaceutical products and computer products. The ex-MNC professionals represent finance, logistics, operation, information technology, engineering and production competencies.

We can characterize the ex-MNC professionals who participated in three groups. The first are ex-MNC professionals who are still actively looking for a job but are willing to contribute during the interim period.

The second is ex-MNC professionals who are not actively looking for a full-time job. They are willing to spend flexible time in contributing. The third group consists of ex-MNC professionals who have been retired for a number of years. They are not looking for a job but they are willing to give some of their time to industry. The ten ex-MNC professionals came from all three groups—actively looking for work, not actively looking and retired. Three of the first group helped out for a period of time and returned to full-time work in MNCs. One out of the four ex-MNC professionals in the second group also returned to full-time work in an MNC. Ex-MNC professionals that played the leading roles were those who belong to the second group. They were involved actively in providing solutions in terms of ideas as well as physically involved in implementation.

Ex-MNC professionals who were retired were less proactive in terms of contribution but they could create significant value in their field of interest when called upon. They tended to be more inclined towards idea generation and less towards physical involvement. Moreover, ex-MNC professionals have vast knowledge and experience in best practices and technology that are relevant and applicable to SMEs. Their network with other ex-MNC professionals and the industry played a significant role in attracting more resources to fill in the gaps, a necessary stage in transforming the SMEs. There is a time limit to ex-MNC professionals' willingness to contribute and they are selective in their involvement.

The second set of characteristics relate to currently practicing experts of MNCs. The three MNC professionals played a significant role in introducing USM to the MNC (Company E) and its CMs. They also contributed significantly in transferring practical knowledge to the students and the CMs. Through them, identification of projects was facilitated. There are limitations, however, regarding the roles of the present MNC professionals. They are busy with their current jobs. Their involvement can be constrained by the policy and priority of their own organization.

Third are the characteristics of university researchers and students. The process of involvement from project identification to implementation takes time due to the constraints of students' timing and researchers' mindset. The drafting and signing of an MOU takes months and has to be agreed upon by both parties. We found a mismatch of students' capability with the needs of the industries. The KPIs of USM and industries is another mismatch. It is hoped that the opportunity for engagement with industry will allow USM and researchers to identify these mismatches and continuously adapt to each other's strengths, weaknesses and needs. This requires mindset change and motivation.

Conclusion

The utilization of a triangular perspective enabled us to implement phase 1 of the SME Assist model by drawing untapped resources from the university, industry and the state through a network of relationships intended to transform local SMEs and cut short the process of knowledge transfer to students.

SME Assist Cluster: The phase 1 strategy was implemented by setting up the SME Assist Cluster as a gateway for USM to enable the students and the academic staff to engage and reach the industry to provide a continuous improvement intervention. It is also a gateway to energize the inclusion of ex-MNC professionals as one of the key stakeholders to provide least-cost, timely, competent and sustainable solutions to meet the needs of all stakeholders.

Elements of the Model: The preliminary efforts of the pilot project implementation enabled greater understanding of various elements of the model. This included motivation (transformation starts with motivation); trust (which takes time to nurture); customer-driven solutions; matching the competency of different stakeholders to form an integrated end-to-end solution competency; timing of available resources; least-cost transformation mechanisms; continuous improvement mechanisms; and the process of stakeholder recruitment.

Three Major Resources: From the implementation of phase 1 of the model we have learnt the importance of leveraging three major resources. First is leveraging the strength of USM as a learning organization and providing students as a constant resource for learning, implementation and knowledge transfer. Second is leveraging MNCs to lead the mindset change of their respective CMs and suppliers to embrace the process of transformation. To achieve this, we understand from the theory of embeddedness put forward by economic sociologists (Granovetter 1985), that each organization's mindset and activities are different as they are embedded in broader social and economic structures, as evident in the five case studies.

Third is leveraging the pool of ex-MNC professionals who had experienced the transformation of MNCs from the competency level in the 1970s of low technology and capability to the current level of competency. They play a key role as process consultants in improving task performance (Gummings & Worley 2009: 253) by providing help to employees and managers, and adding students and academics to the process of transformation. In practice, this pool of retired professionals provides an alternative to the shortage of talent available to industry.

Fundamental Competency: The pilot studies also showed that the fundamental competency of waste and variation reduction practiced by many MNCs is still applicable and is an important competitive element for industries of different competency levels. In fact, the challenge faced by the SMEs and CMs related to this fundamental competency is on a relatively small scale.

Practical Insight: The implementation of phase 1 of the model provides some insights. First, *the voice of the customer* is one of the best ways to trigger the transformation mindset. Second, *the MNC as sponsor* triggers the mindset change for continuous improvement intervention of CMs and SMEs and is an important success factor. In the case study of companies C and D, we experienced the effectiveness of the MNC's role in transforming the mindset of CMs. Third, *trusting relationships* take time to nurture. Lowering the barrier of cost incurred by CMs and SMEs helped to build initial trust and relationships. The competency and performance results helped to sustain them. Fourth, there is a lack of competency and resources *in continuous improvement* in waste and variation reduction in the industries piloted. The expertise of ex-MNC professionals can fill the gap in this lack of competency. Students can be good resources to support the experts in the implementation of transformation. Fifth, *the timing of availability* of the students for industry placement is critical but the effect can be minimized by the temporary support of experts. The expertise of USM researchers is a potential resource pool.

Least Cost Engagement Mechanism: With the collaborative efforts of MNCs, SMEs, USM, current MNC professionals, ex-MNC professionals, students and academic staff, a least-cost mechanism and resources were available to SMEs and CMs to start the process of transformation.

During the initial engagement, minimum cost was incurred by the SMEs, CMs and MNCs. The main cost involved was the time spent by the stakeholders. This approach enables the building of trust and lowers the barrier to transformation created by concern about cost and the confidence of value creation. The least-cost mechanism has the potential to generate reward through the sharing of cost savings generated from the continuous improvement activities.

Continuous Improvement Intervention Mechanism: The development of the model is based on the framework of continuous improvement brought to life by actual implementation to enable the evolution of engagement and transformation of all the stakeholders. While actual transformations are being implemented, it is important to focus on developing three key competencies. The three key competencies are

alignment of motivation, the process of collaboration deployment and the ready availability of knowledge for end-to-end solutions.

The influence of an MNC facilitates the alignment and motivation of its CM to collaborate with universities and consultants for transformation initiatives. The process of collaboration deployment of various stakeholders, which includes the process of students' deployment, ex-MNC professionals' recruitment and retention, the involvement of more MNCs and their experts and their CMs and the involvement of academics of various schools of USM, have to be continuously refined through feedback based on actual applications. The experience gained from continuous improvement engagement has to be extracted and structured into reusable knowledge.

The strategy of phase 1 for building the foundation of continuous improvement in waste and variation reduction is applicable to all participating industries. As we enter phases 2 and 3 of the model, with the Malaysia Higher Education Ministry's knowledge transfer programme for students and industry gaining momentum (RM14 million has been committed for 70 projects in 2012), we see the SME Assist model as a way forward to address issues and challenges that have been identified in the government's New Economic Model. These include: high demand for skilled workers, lack of skilled employees, mismatches of skills, and weak linkages between university and industry. The model, when it gains momentum, could eventually transform the competencies of Malaysian SMEs in the global arena.

Chin Yee Whah received his Ph.D. (2002) in Sociology from the National University of Malaysia. He is Associate Professor and Deputy Dean (Industry and Community Network) at the School of Social Sciences, Universiti Sains Malaysia. His research interests include Chinese business, family business, entrepreneurship, ethnic relations in business partnerships, ethnicity, knowledge management and Malaysian Chinese investment abroad. Email: ywchin@usm.my

Lim Ka Tiek was in senior management, LEAN 6 Sigma Master Black Belt and a Distinguished Innovator of a Fortune-500 MNC. Lim holds 14 USPTO-issued patents and has over 29 years of experience as a change agent and innovator in organization development and transformation. Lim holds Bachelor and Master degrees from the University of Birmingham, UK. Email: katiek.816@gmail.com

NOTES

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