

Ramli Bin Haji Rashidi

(Advanced Technology Training Center (ADTEC) Bintulu)

Evaluation of collaboration between public training institutions and private industries and its importance in improving the quality of training delivery in TVET in Malaysia

Abstract

This paper undertakes to examine collaboration in the National Dual Training System (NDTS) in Malaysia that follows the example of the Dual Training System in Germany. The ultimate goal of the collaboration is to produce a highly competent, skilled and educated work force relevant to the needs of the industries of Malaysia in particular. It has conceived in the notion that such an apprentice system would produce graduates that are competent, skilled and knowledgeable commensurate with industry standards. However, it is necessary for there to be a certain amount of collaboration between educational institutions, the workplace and its development in TVET arenas. This research identifies several key factors that will form the framework for the dual system collaboration. The identified key factors are, a) goal setting, b) partnership development, c) collaboration management, d) impact of learning and competence, e) evaluation of collaborative performance and dual system in use. 23 interviews, 100 survey questionnaires and 4 focus group discussions and workshops provided the data. The results showed that the factors development of partnerships, partnership management, the impact of learning and skills development are most critical in the formation of a collaboration framework. This paper will attempt to determine the importance of collaboration that is needed for the integration of workplace, education and technology (WET) to be successful in a nation's development of its work force. This paper will also highlight the actual collaboration in the workplace in Malaysia.

1 Introduction

The introduction of the National Dual Training System (NDTS) in the Malaysian VET system to develop self-reliant and highly skilled workers who can continually meet the technological advancement needs of industry is indeed timely. The Malaysian government wishes to ensure that private industry and public training institutions (PUTRI) collaborate successfully towards developing the desired human resource talent pool to make it capable of increasing the income and economic status of the country on a par with international standards. The private industries and PUTRI should be inspired and guided by the national human resource vision and collaborate through the dual system, by sharing resources, expertise, facilities, information, and funds to develop highly skilled workers. The purpose of this study is mainly to identify the key factors and evaluate the potential to form an effective framework for the desired collaboration between public training institutions and private industries. With such a framework the collaboration partners can ensure that the dual system implementation can

benefit the learning process of their apprentices whose success will be paramount in serving the interests of all parties involved, including Malaysia's national interests.

2 Problem statement, purpose of the research and research question

2.1 Problem statements

2.1.1 The desired cooperation for the learning venues

In Malaysia, a VET reform was introduced in 2004. The strategic approach was to add a dual training component to institutionalized skill training by introducing a National Dual Training System (NDTS) based on the work-process approach. Learning arenas supporting the work process-oriented approach are replacing the old idea of school subjects (Deitmer & Heine-mann 2009, 139). This model allows apprentices to learn about the practical aspects of work processes in industry via monitoring by the workplace supervisors - often called foremen. Holistically, actions in the workplace will enhance the theoretical knowledge learned at school. Deitmer (2010, 1) states that "The apprentice shall deeply acquire theoretical and practical insights in his or her professional field". In this way, apprentices are in a better place to understand the context of the theory and practice of their vocational discipline.

This approach of learning and teaching obviously requires the development of progressive interactive collaboration between parties that will merge experience-based workplaces and systematic theory-based learning at schools.

The effect of the new curriculum leads to improved teaching provision in the training institutes. The company also has to balance working plans to provide work process experience to the apprentice. The new method of learning and working at the training institute and in the company allows the apprentice to learn about the real world of work. Through this exposure, he should be able to apply the understanding gained in the classroom to his company's real work tasks.

For Malaysia to accelerate the development of highly skilled workers to a world-class and high-income economy nation status, a reform of VET programmes by means of a National Dual Training System (NDTS) must be supported by the public training institutes and industry (here, in particular, by instructors and coaches). This takes place by means of close cooperation in the implementation of NDTS. Thus, focused strategies are developing a framework for effective collaboration in mainstreaming and expanding access to skill training at the training institutes and companies. Such actions will significantly improve the capacity of skilled workers and greatly increase the number of highly skilled workers entering the job market. This would be the kind of win-win scenario most desired by all parties.

2.1.2 The ground level scenarios relating to the implementing of NDTS

NDTS, the new apprenticeship programme, is intended to train skilled workers through the sharing of resources between public training institutions and the private sector. In this collaboration, industry must be willing to support students in acquiring work process knowledge, provide an allowance of RM 350-500 per month and provide other facilities to the apprentice. In addition, industry needs to provide qualified trainers or supervisors from its technical staff to act as supervisors, coaches or facilitators. Therefore, the companies need to see that changes in the production system need to take place to match training needs and resources, including continuous financial commitment that has to be made available in the name of the dual training system. Many things have to be changed to accommodate the needs of a dual training approach. In addition, it must be remembered that both employees and employers generally are not always confident that learning in dual training organizations can work in parallel to daily regular job responsibilities.

The Department of Skills Development (DSD), a department under the Ministry of Human Resources of Malaysia, has been appointed as the agency responsible for administering, supervising, evaluating and ensuring the quality of the dual training approach. It is also the curriculum and standards developer and is responsible for testing and final certification. It also monitors, evaluates and conducts research on the implementation of NDTS. Consequently, it plays a prominent role in promoting NDTS to the training institutes and private industry. At the training institutions, most of the training involves running certificated full-time courses. Which specific courses are run, is at the discretion of each institute's management. At the end of the semester, students are required to undertake workplace practical training for 3-6 months depending on the type of course. A certificate may be awarded after completing the training requirements and passing all exams. Private industry employers claimed that such graduates proved to be a 'mismatch' as they did not meet the industry's workplace skills demands.

Meanwhile, all public training institutions have been directed to implement training to produce skilled workers by using NDTS. These institutions are public training institutes administered by various ministries and departments such as: the Department of Manpower; Ministry of Education (Vocational Schools and community colleges) and the Ministry of Youth and Sports; Ministry of Rural and Regional development and many other government agencies concerned with skills training. Nevertheless, most of the institutes under the respective ministry do not show keen interest in private industry partnership stipulated by NDTS. This is because, first of all, there is not an important reason for cooperation, and secondly, institute staff wish to concentrate fully on training their full-time students.

According to the Ninth Malaysia Plan review (2006b), based-on annual statistics, the country has 3.4 million young people in the 17-20 age group. The number of school leavers of the group joining the labour market without participating in higher education and training amounts to 136,404 or 26.7% of the cohort. The challenge is getting this enormous number of school leavers into the main skill training system. Thus the public training institutions and the

owners of private industry need to be an integral part of the NDTs equation. For this reason, serious working collaboration between the two players must be initiated.

The lack of soft skills such as positive work ethics, communication skills, teamwork and decision-making and leadership abilities is a main factor affecting the marketability of Malaysian graduates. Malaysians are also significantly less skilled people at a technical level compared to some neighbouring Asian countries and on the international stage. Technical and highly skilled workers comprise only 26% of the total workforce in Malaysia compared to 61% in Germany (Rauner 2007, 8). The Malaysian government definitely faces an urgent task in ensuring the country has sufficient highly qualified and multi-skilled human capital with high marketability. The move towards more customized products in world markets creates a demand for more skilled workers (Deitmer & Rashidi 2007, 20). Highly skilled workers are those with the right attitude, a capacity for self-reliant planning, self-reliant monitoring and self-reliant assessing (Hoepfner & Koch, 2003, 31). In the modern era the development of skilled human resources forms the basis for a productive nation. For growth and development it is essential to have sufficient highly-skilled and knowledgeable workers. The House of Lords, UK, (2007, 10, article 13) quoted that employees' skill level is one of the three determinants (along with earnings and employment) of productivity differences between countries.

Despite the pressing needs, results of an initial study done via interviews with experts and focus group workshops revealed a serious lack of understanding between public training institutions, private industry owners and the Department of Skill Development (DSD). To begin with, the three parties do not have a strong common interest to motivate them to work with each other. Being the only commercial party, private sector owner's prime motivation is to make money. They do not see NDTs providing them with any immediate monetary result. In fact as mentioned earlier, NDTs even demands immediate commitment from them in terms of financial investment, time, space and expertise. Public training institutions are represented by public servants. NDTs is not at all their core agenda. They have their own stakeholders to serve and students to train. DSD is another entity run by public servants from the Ministry of Human Resources with the duty to uphold the implementation interest of NDTs.

However, the main problem between industry and training institutions is a lack of understanding about cooperation requirements, especially regarding the roles of instructors and trainers. Private industry criticises public training institutions for not being up to date in relevant technical and work technology processes demanded by the industries. The training institutions complain that the industries are not providing enough information and assistance to the training institutions especially in preparing an appropriate curriculum. The training institutions are late in picking up the requirements of the industries. There is definitely a gap between the existing requirements of private industry and the day-to-day training taking place at the institutions. In summary, there exists a poor collaboration between public training centres and private industry in the vocational training sphere.

DSD also has problems of its own. The issues, discussed by experts, point to the quality of DSD's dual system experts (DSE). The DSE's task is to convince the CEOs or managers of

private industries to join NDTs. They have to ensure that the training institutes and industry have an agreed framework to carry out training under the rules of NDTs. They help both parties to work together, and carry out training in accordance with the requirements of NDTs. From enrolment to graduation, DSE have to make three visits per year for each group of apprentices. It is the DSE's responsibility to ensure that training is conducted in accordance with the requirements of the DSD and that the procedures and certification of apprentices are administered appropriately. Basically the NDTs' ground and door to door operations are run by a group of low-paid part-time professionals entrusted with the tasks of convincing 'reluctant' industry players to embrace the dual training scheme and collaborate with the "equally reluctant' trainers of the public training institutions. The description is a wicked summary of the harsh reality of NDTs implementation in Malaysia. It is a bitter pill to swallow, but this study is obligated to sound the alarm calling for a renewal formula for the collaboration.

2.1.3 Practical and policy reform of the VET system to implement NDTs in Malaysia

In response to the need for higher skilled workers, a vocational education and training (VET) amendment was passed by the government. On May 19, 2004, the Malaysian House of Parliament approved the National Dual Training System (NDTS) as a new apprenticeship programme. The NDTS is an apprenticeship training programme adapted from the German Dual System where teaching and learning is carried out both in industry as well as at a public training institute. In Germany it takes 3-3.5 years (BiBB 2006, 9) while in Malaysia it takes about 2 years to complete the apprenticeship scheme.

By introducing NDTs, the Malaysian government hopes that the private sector can collaborate with the public sector through sharing resources. In accordance with the NDTS approach, each skills training is to be done at the institute and at a company workplace. The NDTS approach differs from traditional teaching methods in that 30% of learning is conducted in classes and a 70% practical portion takes place at work premises. In order to make school learning more action-oriented and relate it better to complex situations or problems in the workplace, the traditional separation between theoretical and practical education within a particular subject and between different subjects must be eradicated (Koch 1994). The purpose of this scheme is to provide suitable professional and skilled employees to the industries. The aim of the dual teaching philosophy approach is to develop an appreciation of work processes by using real equipment and machines as well as engaging in social interactions with practitioners in the workplace leading to an essential sharing of information and experiences.

Students taught and trained using National Occupational Skills Standard (NOSS) curriculum found themselves unfamiliar with modern work processes. This is because the tasks given by instructors at the training institutes are in the form of discrete work-piece training projects. This contrasts with the dual training conducted at company workplaces where the learning tasks are more substantial and based on real work processes.

The lack of coordination between state education institutions and private industry occurs in spite of the government's tax incentives and payments for training places.

There is also little research on assessment and developing tools to assess the strength and weaknesses of the public and private sector's collaboration. "The lack of information on the educational value" is regrettable (Cresswell 2003, 78). To attain successful government policy in human resource development, an improvement in collaboration between the private sector and public training institutions must be devised. A feasible win-win framework has to be created, and based on that the level of collaboration must be seriously monitored and evaluated regularly

2.2 Purpose of the research

The purpose of this study is to examine factors influencing the effectiveness of the current status of cooperation between public training institutes and industries involved in the implementation of the NDTS. Successful collaboration is essential in the development of a skilled workforce through apprenticeship programmes in Malaysia, based on collaboration between public VET institutions and industries. This study investigates whether the identified factors could be the basis for the development of a better framework for this interactive collaboration between the dual partners that will assist trainers and teachers in implementing a quality work-based training according to the dual-system approach. The result of this investigation may be used to formulate a new conceptual and operational framework for the development of a stronger relationship between the participating stakeholders from the public training institutions and private industry.

2.3 The research questions

The author has examined factors that may affect the successful collaboration between instructors and trainers of public training institutes and industries by addressing the following questions:

- i. How does one evaluate the collaborative performance of the public training institutes and private industry in the implementation of the Malaysian National Dual Training System?
- ii. What is the appropriate framework to be used to infuse an effective collaboration?

In research question (i.), information on effective partnerships was gained through feedback from partners that work closely together in NDTS implementation. Focus group workshops were organized to obtain information on convergent and divergent experiences. Assessment of the actual situation helped to determine the actual performance of the cooperation between participating parties to ensure that the project endures. The results of this working group were channelled back into the system, and consequently resulted in improvement of the implementation of the joint mission to train apprentices in a real industrial and technological work process environment. This collaboration may also enhance the expertise and the professionalism of apprentices and trainers.

In order to answer research question (ii) the study chose to look at various collaboration frameworks as practiced in different countries. The appropriate best practices were compared with the intention of arriving at a new framework for the NDTS. Montiel-Overall (2005, 1 ff.) indicated that a new theoretical structure and framework is needed to assist individuals and groups to engage in successful collaboration.

The research questions also attempted to understand and identify the key components/elements, process factors and outcomes of all parties collaborating in the implementation of the NDTS. However, since the term ‘collaboration’ is quite broad, this research has limited itself to considering five components for effective collaboration in the context of the NDTS implementation. In this context, the word “collaboration” may sometimes mean the same as ‘cooperation’, ‘partnership’ and ‘network’ as used by many researchers in international and European research and development arenas. Five tentative "key components/elements" are outlined below:

- i. Goals of cooperation are clear, well defined and achievable.
- ii. Partnership development addresses communication, cooperation and trust.
- iii. Management of cooperation addresses rules and procedures, clear allocation of responsibility and fair distribution of modules to be implemented according to agreements.
- iv. Impact of learning competencies addresses the needs of students, instructors and coaches as well as organizational learning.
- v. Evaluation of the collaborative performance in the dual system between public training institute and company are clearly defined. Improvement areas for external interest in dual system are clearly defined.

3 Methodology, approach and realization

The methods and procedures chosen to collect data and information were:

- Identifying individual perspectives of all parties concerned using surveys and interviews;
- Identifying probabilities of the harmonization of individual and collective perspectives from different parties to assess and evaluate the partnership formation using focus group workshops

The purpose of this study was to develop the framework for effective collaboration between the public training institutes and private industry. The framework will be used to assist in the implementation of effective NDTS collaboration. The study utilized a combination of qualitative and quantitative research methodologies. Nevertheless, the key study methodology attempted to answer each of the research questions using a qualitative approach supported by quantitative data. The three main approaches were interviews, surveys, and a focus group

workshop to gather relevant information on the topic. All data obtained was analysed (triangulated) in the hope that it will provide the answers to the research questions. The research went through five stages:

- i. Interview (explorative inquiries);
- ii. Expert workshops that include personnel from industry to validate ERC;
- iii. Standardized survey; and
- iv. Focus Group Discussion Workshops;
- v. Validation workshop or discussion of the new proposed framework with both parties.

In this paper, the focus group discussion is discussed where the evaluation of regional collaboration (ERC) tool was used as an instrument to gather the data. The ERC tool is specifically designed to determine the significance of the complex aspects of effective collaboration considering 5 criteria. In brief, the main and sub-criteria read as follows:

1) Goals of the cooperation between training institute and industry

The first main criterion was “Goals of the cooperation between training institute and industry” including sub-criteria such as the goal of the cooperation between partners being clearly defined, transparency of collaboration goals between partners, and goal of cooperation achievement.

2) Partnership development between instructor and coaches

The second main criterion was “partnership develops between instructors and coaches”. This criterion grouped the following three sub-criteria: level of communication, level of cooperation between instructors and coaches, and level of trust between instructors and coaches.

3) Management of cooperation between institutes and industry

This third main criterion examines the “process of managing the partnership” and is broken down into three sub-criteria: Implementation of rules and procedures, clear allocation of tasks, fair distribution of work modules implemented according to terms of agreement.

4) Impacts of learning and competencies

This fourth main criterion was the “impacts of learning and competencies” and looks at the students’ improvement in learning and competencies as well as instructors’ and coaches’ improvement in learning that have to occur in the partnerships during the course of the collective learning efforts between institutes and private enterprises. It relates to the increase of the parties’ vocational work ethic towards professionalization. It examines whether the impacts substantially improved learning and competencies as well as the level of partners’ professionalism,

5) Evaluation of collaborative performance in the dual system

This fifth main criterion was sub-divided into sub-criteria such as “collaboration between institute and company is working well, growing external interest for the dual system and whether the dual system has improved”.

The following sections describe the ERC tool in which those involved in the project play the most important roles. The convergent and divergent views in the evaluation of their project (individual and collective assessments) were elucidated. The aim of the evaluation was to provide for a systematic and responsive dialogue structure within the partnerships. The aim was to elucidate the context in the background in terms of its inhibiting and promoting factors. Knowledge of the effect of these factors on NDTS helped those involved to more easily identify what was helpful to them and what was not. Through this kind of evaluation action, reflexive learning processes were fostered in the course of a project particularly when the results of these learning processes prompted concrete action (Deitmer et al. 2003). Basically, the process consists of three general steps:

1. The moderated internal self-assessment workshop;
2. Examination and analysis of the results of the evaluation from the workshop by facilitators and external evaluators/researchers;
3. The planning meeting, designed to reflect the results of the project and to develop project prospects.

A good ”mix” of participants is essential – depending on the project, this should include, for example, representatives from research and development, human resources, production etc. from the various companies and of course personnel from the public training institutes. As a rule it is insufficient if only members of senior management take part in the evaluation meeting.

The planning meeting took 2 to 5 hours. Evaluation software can speed up the procedure. In principle, an innovation spider web (or spider diagram) can be worked into the evaluation meeting. It could also be possible to discuss the prospects of the project immediately after the evaluation – possibly after a longer break. On the other hand, a certain “pause for thought” between the evaluation and the prospects meetings can be an advantage. The decision on how to proceed should be made in each individual case.

The evaluation method can be applied twice, sometime after the start of the project and again in the second half of the project's lifetime. The second evaluation round was less demanding in terms of external moderation and facilitation. Experience showed that the participating parties could get acquainted with the methodology. The evaluation process could be performed by any party in NDTS alone. This means that in the second evaluation project participants could make the project evaluation without any support from external facilitators.

The evaluation discussions aimed at establishing a consensus, and focused on the sense and purpose of the network of collaboration, which was measured very specifically in terms of the separate actions in which the participating parties were engaged. Full documentation of the

process, in the form of an evaluation report, provided wide-ranging ideas and reasons for improving certain weaknesses in the project. If the evaluation team guides this process in a sensitive manner, it allows for deep insight into the on-going project (cf. Deitmer et al. 1997 on this point).

After the workshop, the results were analysed. This can be done by the external moderator to ensure that a comprehensive summary of the discussion process is made and the results of the evaluation workshop are clear to everybody. These results were documented as the ‘list of strengths and weaknesses’, by a ‘spider web’, and other graphical explanations (bar and line charts). In a concluding feedback meeting the “list of strengths and weaknesses” and the graphical explanations were discussed (Deitmer & Heinemann 2009). The overall goal was to reflect on the results and to determine the prospects for the learning partnerships to sustainably prosper.

The ERC tool integrated two different evaluation perspectives:

1. *Internal evaluation* of the learning partnerships in order to improve cooperation. The aim is to support cooperative learning under instructors and coaches within the partnerships by identifying the strengths/weaknesses in respect to aspects such as goals of cooperation, partnership development, management of cooperation, impacts of learning and competencies and evaluation of the collaborative performance of the parties and of dual system in use.
2. *External evaluation* by means of the summary made by the external moderator of what was mentioned during self-evaluation. The results of the internal evaluation session are validated from an external perspective. In some cases, this could also allow comparison of the projects with other partnerships engaged in a similar process. (Deitmer et al. 2003, Deitmer & Heinemann 2009).

The most important element of the ERC tool is a criteria-based questionnaire. The criteria were selected on the basis of the innovation theory research literature (Deitmer et al. 2003, 157-170, Deitmer & Heinemann 2009) and deal with five topics, namely, goals of cooperation, partnership development, managing of cooperation, impacts of learning and competencies, and evaluation of collaborative performance and the dual system in use (Rashidi 2011).

3.1 Methodology of quality improvement of the effective collaboration

The framework (see Figure 1) for effective collaboration was designed based on the findings of this study and was discussed with 12 people including experts and industry consultants, director of the institute, company managers and supervisors. Seven people gave feedback asserting the framework to be appropriate and timely. Currently, the framework has been tested for use by the ITI Miri (PUTRI) which has been working with Samling (private company). The framework for effective collaboration is categorised into five parts appended below:

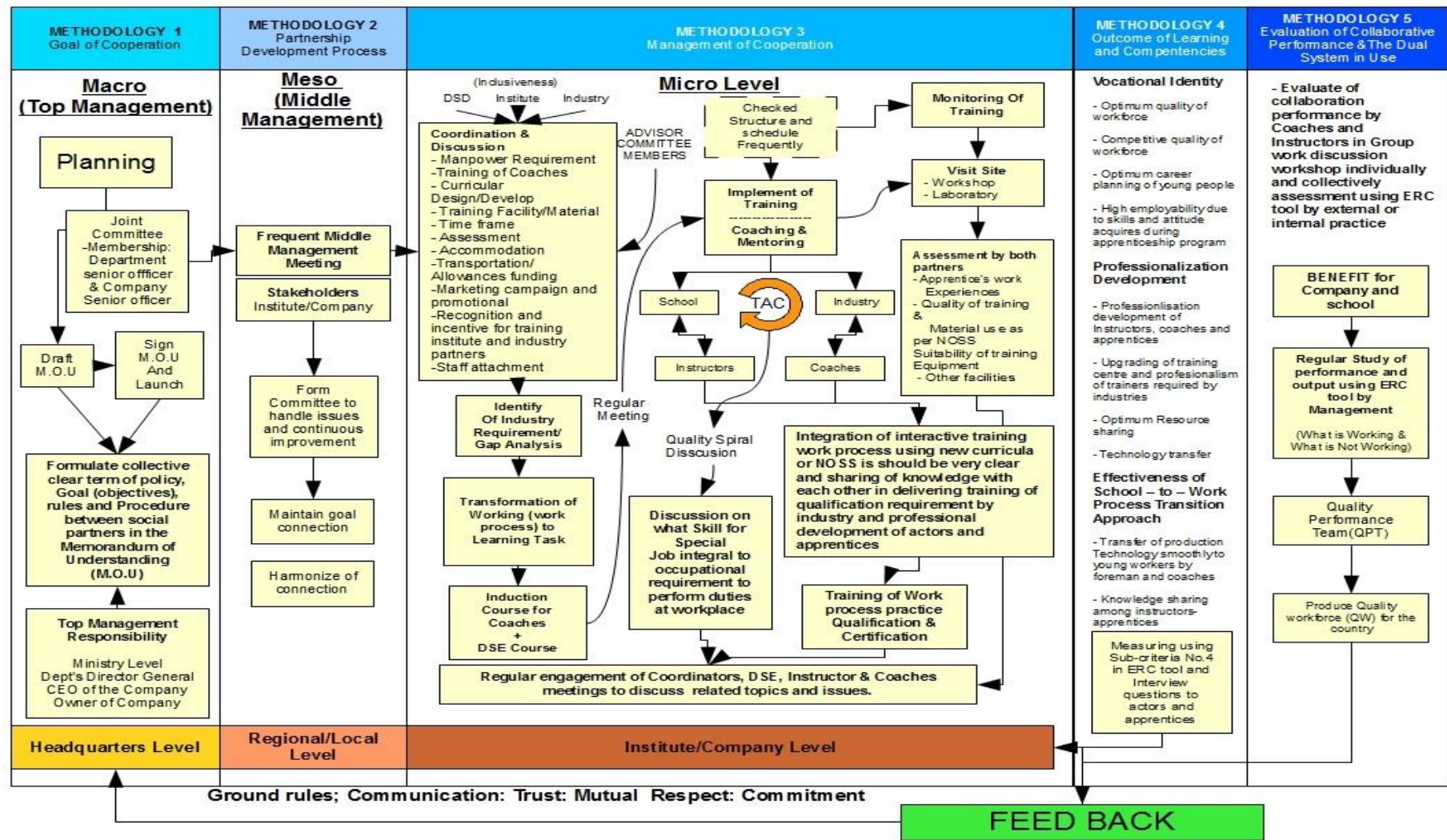


Figure 1: The holistic view of the Framework for Effective Collaboration in NDTs

4 Findings and their significance

This paper was written with great dedication intensity and was based on the author's PhD thesis (Rashidi 2012). It is also viewed as a sincere contribution to Malaysian practising scenario on collaboration. Hopefully it will stimulate more interest in the research of this increasingly important skill area, and to the knowledge repository that accumulated in this field.

4.1 Summary outcomes of overall focus group

Figure 2 shows the aggregated outcome of the 4 focus groups regarding the quantitative weighting of the main criteria in terms of importance, “goal of the cooperation” being the most significant with 28% followed by “impact of learning and competencies” as the second significant criteria with 23%, whereas “evaluation of collaborative performance and the dual system in use” formed the least with 13%. The partnership average rating attributed “partnership development” 17% and “management of cooperation” as equally important with 19%.

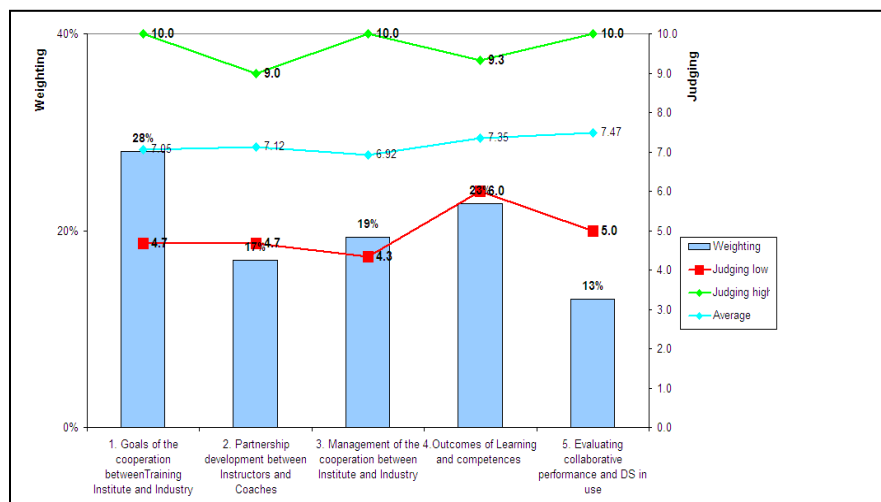


Figure 2: Overall Weighting and Scoring of 4 Focus Group

The significant factors for effective collaboration are ranked as follows:

- i. Goal of cooperation (28%)
- ii. Impacts of learning outcome and competencies (23%)
- iii. Management of cooperation (19%)
- iv. Partnership development (17%)
- v. Evaluation of collaborative performance and the dual system in use (13%)

Holistically, the average weighting from the focus groups ranked the criteria according to their importance. According to the analysis of the data collected there quite a difference has

been revealed between the judgements of the different focus groups, regarding the ratings for sub-criteria, the largest variations being observed with an average of 6.92 to 7.47. For the main criteria the following variations were observed (see Figure 3).

- i. "The goal of such cooperation" has a higher variation from 4.7 to 10.0;
- ii. "Management of Cooperation" with the scoring from 4.3 to 10.0 (high variation);
- iii. "Partnership development" has moderate variation from 4.7 to 9.0;
- iv. "Impacts of learning and competencies" share a low variation from 6.0 to 9.3; and
- v. "Evaluation of collaborative performance and the dual system in use" has an average variation from 5.0 to 9.3.

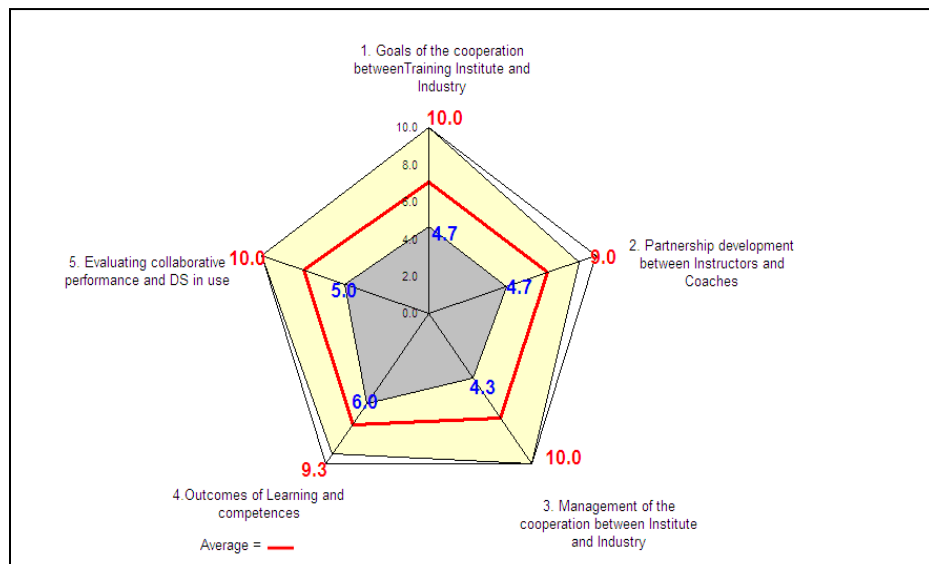


Figure 3: The average result of all responses from 4 Focus Group Workshops

The diversity of goals of some NDTs projects can suffer from a lack of clarity and focus in their goals or sub goals. This is the case with some partnerships where the main goal was to create highly skilled workers (in some cases receiving financial resources by creating cooperation with the institutes) but without having defined precisely what the task of the collaboration programme was to be.

Another problem identified during the evaluation sessions concerned the management of the cooperation. One significant problem encountered by the project partners was the lack of support from their own organization or the lack of impact of project results in the organization work schedule. One evaluation participant suggested "develop a common platform for monthly meeting/discussion between industry and institute for further improvement" and another partner commented "Work distribution needs to be fair and even".

Self-assessment of the collaborative performance approach using a quantitative weighting and scoring helps create a common culture of performance for members of NDTs project. This is for the foundation of a common understanding of efficiency (cost) and effectiveness (result).

All cases of assessment seem to have had a significant impact. It is not only a form of analysis to identify weaknesses and issues, but also a method for determining the strength of cooperation. Thus evaluation methods have provided more visibility for the organization to follow up with the discussion. The ERC tool is a process that enables relevant partners to discuss and share their perceptions (with often but not always obvious differences) on the network, members, structures and processes.

Such discussions can assist participating partners in developing a clearer view on the purpose and status of their collaboration via discursive processes. It relates to acute organizational dimensions essential to the NDTs project (agenda, resources, procedures, communication, etc.). It also helps partners formulate problems and alternatives aimed at enhancing cooperation (Deitmer et al. 2003).

There have been tremendously supportive and motivated results from the focus group's evaluation exercises which lead to the scores in Table 1 when asked about learning effects through the evaluation exercise.

- i. Learning and using the new evaluation method has been voted by all partners at 4 marks;
- ii. Discussions about a new solution for improvement also was rated at 4 marks;
- iii. New problem formulation has 3 mark; and,
- iv. Making new decision has 3 marks.

Table 1: Learning effects of the Focus Group through the participative evaluation of collaborative performance and the dual system in use

NDTS Partner	Learning and using new evaluation method	New Problem formulation	Discussion about new solution for improvement	Making new decisions
ITI-SAMLING	x	X	x	x
ITI-NAZA	x		x	x
ADTEC-SUMITOMO	x	X	x	
ADTEC -HICOM	x	X	x	x
Total	4	3	4	3

In summary the study found that:

- i. The goal needs to be explained and discussed and be transparent to all individual partners. Institutes and industry will take time to build good cooperation. Transparency of the collaboration goal increases students' technical knowledge and improves students' attitude and quality awareness.

- ii. Trust between partners is extremely crucial in maintaining the current close relationship and understanding of each other's roles. Communication is always courteous and effective to ensure that quality collaboration lasts longer. Good communication and feedback in the classroom and workplace where coaches and trainers are sharing strengths is needed. Good relations between instructors and trainers helps students to easily understand what they want.
- iii. The dual system should be extended to all stakeholders to launch an effective challenge to the NDTs. Clear allocation of tasks and work distributions satisfies partners. DSE should help partners understand the mission and work process loads and explain the benefits to both parties. The relationship between industry and institutions has improved since taking part in focus group discussions. Trainers, instructors, and apprentices have more experience and confidence in dealing with work processes in the workplace.
- iv. Sharing roles in increasing the learning organization through a dual system with minimum expenditure has motivated the partners. Apprentices managed to perform the work process duties needed by the industry. Trainers shared the work experience and knowledge.
- v. The dual system still has a deficiency to a certain extent (module argument), but more time is needed to see improvements. However, the relationship has strengthened. Even though there is a lack of clear understanding of the dual approach, both parties can agree on the benefits.
- vi. Based on interviewed responses, that collaboration can be assessed by taking stock of the feedback and discussions with participants of the training such as apprentices, trainers, administrators, coaches and managers, especially on the training being conducted.
- vii. Based on survey responses, the dual system has shown that co-operation is beginning to gain ground and the relationship fostered with more people who have already become involved has reflected an interest in registering their company with the NDTs programme and sharing a learning platform. The benefit of sharing knowledge and information has improved their apprentices' learning activities.
- viii. A formative evaluation involving all partners is necessary.

In conclusion, all learning partners are encouraged to look at the current state of their learning partnership and to identify what is strong in the partnership and what is not. In other words the evaluation tries to look into the 'black box of innovation' in the development partnership, its focus being the innovation process itself (Deitmer et. al. 2003, 161).

Collaboration has to be evaluated (Deitmer et al. 2003, 135-170); reviewed and evaluated (Head 2006, 8) and co-evaluated (Callison 1997). The measure of successful collaboration is what people perceive from the outside (Gulati & English 2005). The holistic view of the framework for effective collaboration in NDTs in figure 1 explained the process for the

effective collaboration in five stages that the partners should inculcate in the governance of the partnership in the future.

5 Implications for future work

Implications of this research are as follows:

- i. Requirement for a Vocational Act and the setting-up of an apprentice board.
- ii. To study the possibility of embracing the dual system education officially at the main-stream level.
- iii. To inculcate the culture of evaluation for every collaboration involving two parties of different entities but doing a similar thing in apprenticeship training.

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The Author



Dr. RAMLI BIN HAJI RASHIDI

Advanced Technology Training Center (ADTEC) Bintulu, Manpower
Department
and Ministry of Human Resources Malaysia

E-mail: ramlilabuan@yahoo.co.uk

WWW: <http://www.adtecbintulu.my/v2/>

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