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A Development of Management Framework for Technical Vocational Education Training Institutes in Malaysia

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Abstract

A number of government agencies work together to coordinate TVET's operations in Malaysia. However, the management of TVET institutions requires re-evaluation to standardise operations across the country. There is a need for a management framework to guide the entire process from start to end. This study aims to identify the management structure of TVET institutions. The main structures were identified through literature review and the Delphi Method. Subsequently, Interpretive Structural Modelling (ISM) was used to develop the framework. The proposed management framework of Malaysia's TVET institutions is intended to offer a robust system that satisfies industry requirements.

Keywords: TVET; Interpretive Structural Modelling; Delphi Method; Framework

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1.0 Introduction

Technical and Vocational Education and Training (TVET) in Malaysia plays a crucial role in equipping the workforce with practical skills and competencies. TVET aims to provide students with hands-on skills and knowledge in various fields, ensuring they are job-ready upon graduation. There are numerous TVET institutions, including polytechnics, community colleges, and vocational schools, each offering specialised programmes in fields like engineering, hospitality, and information technology. TVET programmes are not limited to vocational schools only. In order to provide technical and vocational education and skills training across the nation, other TVET institutions, such as the Industrial Training Institutes (ITI), Polytechnics, MARA Vocational Institutes, National Youth Development Corps (NYDC), and the Centre for Instructor and Advanced Technology Training (CIAST), have been expanded or developed. TVET programmes in Malaysia are offered at certificate, diploma and degree levels by various institutions under seven ministries, as well as state and private skills development centres (Yeap et al., 2021).While Malaysia houses various TVET institutions, the coordination of their management still requires further improvement. Uncoordinated TVET governance remains the greatest challenge for TVET programmes in the country (Abd Hamid et al., 2023). Due to the number of TVET institutes under the supervision of various different ministries, the management of TVET needs to be uniform and consistent for the same goal. It is important in this study to identify the

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management structure of TVET institutes in Malaysia for the uniformity process for each centre and the aim of the study is to develop a framework that can be used by all TVET institutes in Malaysia.

2.0 Literature Review

The idea of Technical and Vocational Education and Training (TVET) management is founded on the belief that education and training are critical to personal and societal development. TVET aims to equip individuals with the skills and knowledge required for successful employment, entrepreneurship, and lifelong learning, notably in technical and vocational disciplines. The philosophy of TVET management covers a collection of concepts, attitudes, and practices that drive the administration, organization, and delivery of TVET programs to ensure that they satisfy the needs of learners, industry, and the greater economy.

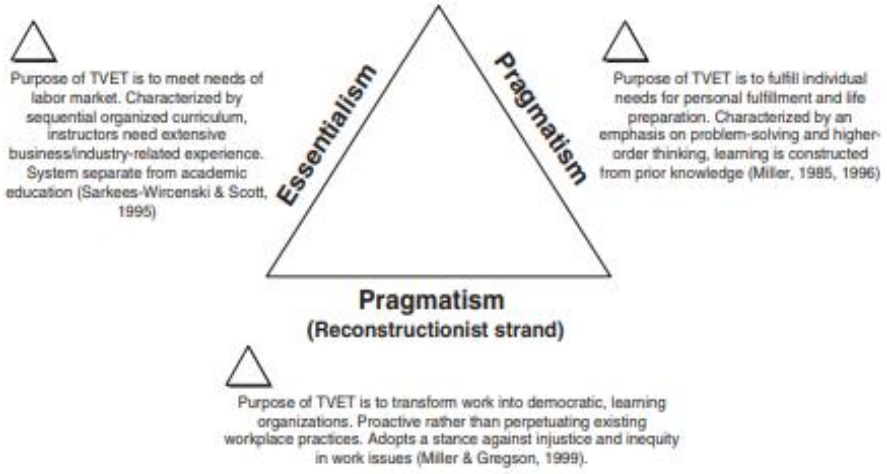

Fig. 1: Theoretical Framework of TVET (Rojewski, 2009)

2.1 The operational organisation of Technical and Vocational Education and Training (TVET) in Malaysia

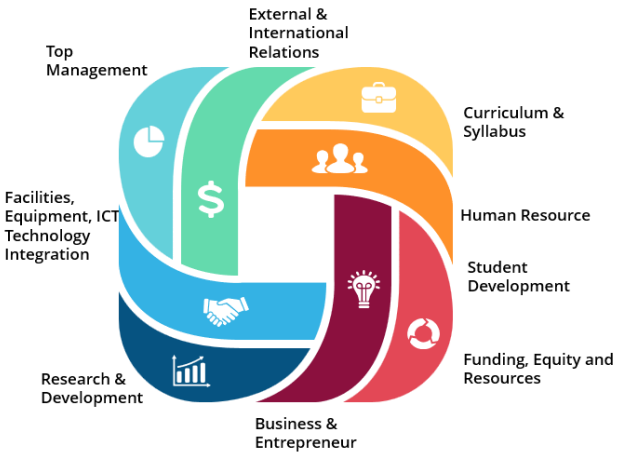

Fig. 2: Conceptual Framework for Technical and Vocational Education and Training (TVET) Management

The operational organisation of Technical and Vocational Education and Training (TVET) in Malaysia is a collaborative effort involving multiple government ministries, educational institutions, and industry partners. Through this cooperation, these entities aim to enhance the quality and relevance of vocational training, ultimately fostering a skilled and competitive workforce. The Instructional Leadership Model among institutional leaders can be used as an instrument in governing educational institutions that provide skill certification. The structure and framework of TVET institutions in Malaysia are designed to provide comprehensive training and skill development, catering to industry needs. A positive educational planning and development climate will have an impact on instructional leadership exhibited by the management of an organisation (Jamaludin et al., 2023). However, to produce skilled labour, TVET in Malaysia still has to be improved and restructured (Hassan et al., 2019). The absence of efficient coordination, resource sharing, and articulation across the whole system is one of the major obstacles facing TVET in Malaysia (Amin et al., 2023). Hence, the management structuring of TVET institutions requires re-evaluation to launch operations in one standard in Malaysia. To link the TVET system with continuous

organisational training and development, a regulatory framework is essential to guide and regulate the entire process from start to finish. The ensuing regulations, laws, instruments and guidelines would provide this linkage with clear goals, desired outcomes, implementation mechanisms, compliance and enforcement mechanisms (Mutebi et al., 2023). The structure and framework of TVET institutions in Malaysia are designed to provide a robust system that meets the needs of the labour market while ensuring quality education and training. By focusing on industry collaboration, competency-based training, and continuous improvement, Malaysia strives to cultivate a skilled workforce that can contribute effectively to economic growth.

A conceptual framework for Technical and Vocational Education and Training (TVET) offers an organized method to understanding the aspects, connections, and processes that go into providing high-quality technical education and vocational training. It guides the development, implementation, and assessment of TVET systems, ensuring that they are aligned with broader educational, economic, and social goals.

2.2 The Management Structures of TVET Review

After reviewing the literature from 20 papers, nine main structures in Technical and Vocational Education and Training (TVET) management were identified, as outlined in Table 1. The structures include Top Management, Facilities, Equipment, ICT, Technology Integration, Research & Development, Human Resource, External & International Relations, Curriculum & Syllabus, Student Development, Funding, Equity and Resources, Business & Entrepreneur. However, most authors primarily stressed on the importance and challenges of the structure to TVET management Additionally, most papers do not emphasise on how these structures should be uniformly present in every TVET organisation. Top management plays a crucial role in the effectiveness and success of TVET institutions. Their leadership influences policy implementation, strategic direction, and overall organisational performance. According to Gachunga et al. (2020), leadership is a key aspect in an organisational performance, but this is achieved through inclusivity and direction setting. The effectiveness of TVET in Malaysia relies heavily on the availability and quality of equipment, facilities, and information and communication technology (ICT). Challenges such as shortages in workshop equipment, machinery, audio-visual equipment, accommodation, and transport hinder the establishment of a conducive teaching and learning environment (Mushwana et al., 2020). Although basic structures were identified through the literature review, further investigation was necessary to determine which structure are most critical for developing a framework in the management and organisation of TVET. Hence, these identified structures underwent analysis using Fuzzy Delphi Method to ascertain which could serve as pillars in managing key aspects of TVET, such as industry collaboration, equipment and technology, human resources, syllabus and others.

Table 1. The Management Structures of TVET

No.	Authors	The Management Structures of TVET								
		Top Management	Facilities, Equipment, ICT, Technology Integration	Research & Development	Human Resource	External & International Relations	Curriculum & Syllabus	Student Development	Funding, Equity and Resources	Business & Entrepreneur
1.	(Yeap et al., 2021)	√	√		√		√	√		
2.	(Halik Bassah et al., 2023)				√	√		√		
3.	(Anwar et al., 2022)				√		√			
4.	(Adams, 2019)	√				√				
5.	(Hassan et al., 2019)	√			√					
6.	(Abd Hamid et al., 2023)	√						√		
7.	(Mohd Salleh et al., 2020)	√	√	√			√			
8.	(Halik Bassah et al., 2023)						√	√		
9.	(Harun et al., 2021)						√	√	√	√
10.	(Ridzuan et al., 2022)		√		√	√	√	√		√
11.	(Abu Bakar et al., 2024)							√		√
12.	(Rizal Ramly et al., 2022)		√		√		√			
13.	(Subramaniam et al., 2020)								√	√
14.	(Ngatiman et al., 2023)		√		√	√	√			
15.	(Amin et al., 2023)	√	√	√			√		√	
16.	(Mohamad et al., 2023)	√			√	√			√	
17.	(Deenesh et al., 2023)	√	√	√		√		√		
18.	(Ramadan et al., 2019)	√	√	√	√		√		√	
19.	(Jamaludin et al., 2023)	√				√	√	√		
20.	(Mutebi et al., 2023)	√			√	√	√	√		

3.0 Methodology

3.1 Literature Review

The current study employed a Literature Review alongside the Fuzzy Delphi Method to identify the optimal main structures in managing Technical and Vocational Education and Training (TVET) institutions. Conducting a literature review involves a systematic examination of existing research and publications on a specific topic. In the context of TVET in Malaysia, such a review provides valuable insights into its operation, organisation, and structural direction. A literature review has the potential to answer research problems by combining the conclusions and points of view from several empirical studies(Mutebi et al., 2023).

3.2 Fuzzy Delphi Method

The researcher has developed this set of Fuzzy Delphi questionnaires through a literature review. The purpose of this questionnaire instrument is to obtain quantitative data for developing the framework. The questionnaires meet the criteria and conditions for using the Fuzzy Delphi technique, which involves applying mathematical formulas to obtain expert agreement. The instrument used by the researcher was modified based on the research to suit the study's needs. By systematically analysing existing research, the main structures of TVET management were identified, and were further refined through the Fuzzy Delphi Method, ultimately contributing to the framework of TVET management structures in the country. To determine the pillars influencing main structures of TVET Management, a series of in-person interviews and a standardised, open-ended questionnaire were administered to the chosen TVET management experts. The description of the originally identified criterion was derived in the last round of the structured interview session, as outlined in Fuzzy Delphi Method.

3.*3 Interpretive Structure Modelling (ISM)*

The recommended TVET management structures framework was subsequently developed using Interpretive Structure Modelling (ISM) software. The ISM approach is employed to ascertain and enumerate the correlation between specific factors and a problem or issue (Yadav et al., 2017). Interpreting Structural Modelling (ISM) was used in the creation of this framework. ISM uses an interpretive method since the group determines whether and how the different components are related to one another (Fathi et al., 2019). Positive interactions between the various components result in a complex set of elements from which an overall structure is produced. It is necessary to identify a group of experts before beginning the ISM technique. Their selection was predicated upon their willingness to engage and them having over ten years of experience in the industry. All of the experts are knowledgeable about the issue and have held upper- or mid-level managerial or teaching positions (Faisal et al., 2016). 10 experts from TVET institutions and the industry participated in this study. The ISM approach requires fewer expertise (Yadav et al., 2017).

4.0 Findings

4.1 Identification of TVET Structures Framework Elements

The researcher proposed only the necessary constructs to develop the Management Framework of Technical Vocational Education Training Institute in Malaysia. Still, the appointed experts determined the validation and selection. The main elements were formed into seven (7) elements from nine (9) as shown in Table 1 and were evaluated by a panel of experts through the Fuzzy Delphi Method (FDM). The researcher conducted a literature review of previous studies to ensure that these items become the foundation for the main elements in developing Management Framework of Technical Vocational Education Training Institute in Malaysia. The research findings for the main construct of the Management Framework of Technical Vocational Education Training Institute in Malaysia, based on expert consensus using Fuzzy Delphi Method analysis, are shown in Table 2.

Table 2. Identification of TVET Structures Framework Elements

No.	Elements	Description
1.	Top Management	• Director and Deputy Director • Mission & Vision • Quality
2.	Research & Development	• Before, Current and After TVET operation • Way Forward • Budget Distribution
3.	Facilities, Equipment and ICT	• Procurement and Maintenance • Physical Project Management
4.	Curriculum & Syllabus	• Syllabus Revision • Program Revision • Accreditation
5.	Human Resource	• Staffing • Training • Career Path

6.	External & International Relations	• Industrial/University/Agency Collaboration • World Skills & Innovation • Technopreneurship
7.	Student Development	• Quality of Student • Student Achievement • Enrolment • Employability

4.2 Framework Development

Table 3. Voting Process

No.	Element Aggravates	Votes (yes/no)	Majority	Direction of relevance
1	The Element 1 Aggravates the element 2	10 experts vote yes	Yes	↔
2	The Element 2 Aggravates the element 1	7 experts vote yes and 3 experts vote no	Yes	
3	The Element 2 Aggravates the element 3	10 experts vote yes	Yes	Not related
4	The Element 3 Aggravates the element 2	3 experts vote yes and 7 experts vote no	No	→
5	The Element 4 Aggravates the element 2	4 experts vote yes and 6 experts vote no	No	Not related
6	The Element 2 Aggravates the element 4	10 experts vote yes	Yes	→
7	The Element 3 Aggravates the element 4	10 experts vote yes	Yes	→
8	The Element 4 Aggravates the element 3	10 experts vote no	No	Not related
9	The Element 5 Aggravates the element 3	10 experts vote no	No	Not related
10	The Element 2 Aggravates the element 5	10 experts vote yes	Yes	→
11	The Element 4 Aggravates the element 5	9 experts vote yes and 1 expert vote no	Yes	↔
12	The Element 5 Aggravates the element 4	3 experts vote no and 7 experts vote yes	Yes	
13	The Element 3 Aggravates the element 6	10 experts vote yes	Yes	↔
14	The Element 5 Aggravates the element 6	10 experts vote yes	Yes	
15	The Element 6 Aggravates the element 5	10 experts vote yes	Yes	↔
16	The Element 3 Aggravates the element 7	4 experts vote no and 6 experts vote yes	Yes	
17	The Element 6 Aggravates the element 7	9 experts vote yes and 1 expert vote no	Yes	→
18	The Element 7 Aggravates the element 6	3 experts vote yes and 7 experts vote no	No	Not related

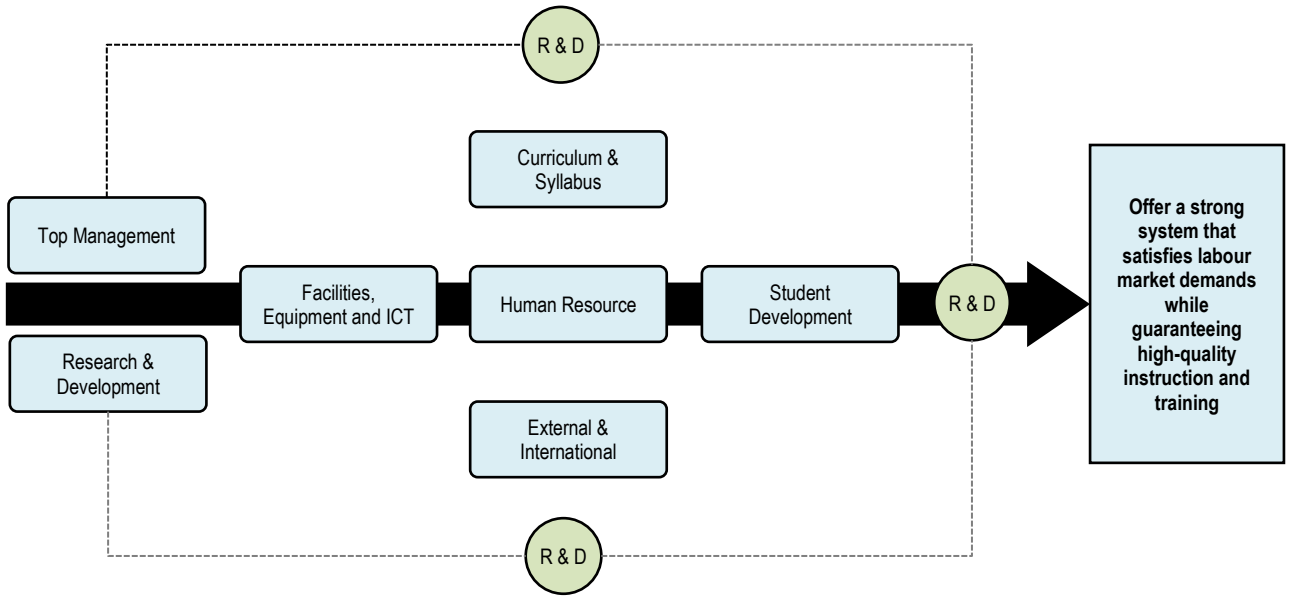

Fig. 3: TVET Institution Management Framework

The next stage after assembling the expert group was to conduct a brainstorming session to establish the fundamental components that will make up the TVET management framework. The results of Fuzzy Delphi have facilitated the establishment of a TVET management framework. The seven structures of TVET management are used as the basic structure in the formation of the framework. The structures of the management framework are identified as shown in Table 2. Following the formation of each component, voting took place as

shown in Table 3. The purpose of the voting procedure is to ascertain how the suggested elements relate to one another. Using ISM software, the expert voting procedure was carried out concurrently. Simultaneously, modelling in the ISM software transformed the object system into a representational and well-defined system made up of directed graphs (digraph). In addition to the structural interpretation, a content interpretation of the object system was also performed; context (information) completed the digraphs.

The fundamental structural model was then formed by mapping the object system as digraphs. The final result of the content expansion is an interpretive structural model. Every fundamental structural component of the framework is explained in detail. In conclusion, as shown in Fig. 3, the TVET institutes framework was completed and made available to all institutes. The TVET framework's existence contributes to TVET's sustainability and helps students satisfy industry demand standards. The framework that was created has been adjusted to fit the present condition of the field. The management structure framework for TVET institutes essentially consists of seven essential components that need to be strictly followed.

5.0 Discussion

The present TVET management framework differs from the previous one in a number of key areas, including governance, curriculum, training methodologies, industry relationships, and the role of technology. These changes are frequently impacted by increasing labour market needs, technology improvements, and global trends. A TVET framework is a structured approach that outlines the policies, practices, and systems to develop and deliver TVET programmes effectively. The goal is to ensure that education and training meet the needs of both the labour market and the learners, providing them with relevant skills for employability, economic growth, and personal development. Overall, the transition from the previous to the current TVET management framework is a step toward a more adaptable, industry-driven, and inclusive system that better serves the demands of today's workforce. Technology integration, greater governance, tighter linkages to industry, and a focus on lifelong learning have all contributed to TVET's status as a dynamic and crucial component of global education systems.

6.0 Conclusion and Recommendations

The number of TVET centres in this study does not include those in the private sector. Therefore, the next study for this study needs to be enlarged in scope to include the full TVET under the private and the government sector. Respondents also need to be expanded to TVET centres including the private sector, industry, and other agencies. The existence of a TVET management framework opening a new space for the study of the relationship between each element on the structure. Although the development of this framework structure is based on fundamental structures, each pillar contains sufficient units and roles. Each unit has a detailed role, as stated in Table 5. The initiative within the TVET framework aims at developing excellent students who meet industry demands in terms of skills, personality and technocratic expertise. However, the role of each pillar can be updated and developed according to the advancement in technology and changing needs. To ensure the success of this framework, further research can be conducted to assess and verify its implementation and impact.

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Paper Contribution to Related Field of Study

This paper significantly contributes to the field of Technical and Vocational Education and Training (TVET) by developing a comprehensive management framework tailored to Malaysian institutions. It addresses the critical need for standardising operations across diverse TVET institutions, national TVET council and ministries ensuring alignment with industry demands and enhancing graduate employability.

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