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Hypothesis Test of Human Capital Investment Determinants on Institution's Performance Using PLS-SEM Approach

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Abstract: Accelerating the quality of education institutions remains a priority for the Malaysian Government as it forms the foundation for building a high caliber talent in the labor market. Focusing on improving the quality of universities one of the main concerns is to develop the human quality through increasing the quality and resilience of human capital as the enabler towards competitive global market. In general, this paper recognizes the findings on the role of human capital investment determinants and their significant contribution to the institution's performance. It also highlights the importance of HCI in ensuring institutional success and sustainability within a highly competitive business landscape, as outlined in the Twelfth Malaysia Plan (2021-2025) and Malaysia Education Blueprint 2015-2025. Human capital plays a strategic role in enhancing academic quality, which in turn influences issues like labor market inefficiencies and the overall improvement of Malaysia's education system. Hence, to analyze the contribution of determinants a theoretical model was constructed underlined by the Human Capital Theory, Resource Based View (RBV) and Malcom Baldrige criteria. Then to obtain the feedback a survey consisting of sixty (66) items with a seven (7) Likert scale was used as the measurement instrument to gather the data from 309 lecturers in UiTM. Data then were analyzed using the Structural Equation Modelling (SEM) approach on the SmartPLS3 platform. The result indicates that the coefficient of determination (R^2) value of 66.9% value suggests that the variation in institutional performance can be moderately explained by HC determinants, with knowledge, skill and training positively influencing institutional performance.

Keywords: *Human Capital Investment, Malcolm Baldrige, High Education, PLS-SEM & Performance*

1. Introduction and Background

One of the factors influencing the nation's development indication, strengthening lifelong learning (LLL) and sustaining the quality of the labor market to meet industry demand requires a strong effort to reach the institution's standard of performance. The Twelfth Malaysia Plan (2021-2025), demonstrated a comprehensive commitment to developing human capital quality under the 29 actions of the Service Sector Blueprint, 2015-2020 (SBB). As part of that, the Blueprint has outlined that Priority Area D consists of seven strategies (Strategy D1-Strategy D7). This component of priority describes the government's national agenda concerning Bumiputera's socioeconomic development providing a priority through governance, service delivery and human capital development. The strategy includes:
Strategy D1- Accelerating Bumiputera Socioeconomic Development
Strategy D2- Improving Governance and Strengthening Service Delivery
Strategy D3 – Strengthening Education and Empowering Human Capital
Strategy D4- Increasing the Resilience and Sustaining of Bumiputera Business
Strategy D5-Increasing Bumiputera Wealth Creation
Strategy D6-Optimizing Malay Reserve Land and Waqf Instruments
Strategy D7-Ensuring Sustainable Corporate Equity Ownership

Therefore, as one of the education institutions that aim to optimize its quality in delivering high-quality service, UiTM progressively provides the opportunity to improve the quality of lecturers by encouraging involvement in the human capital development program. On the other hand, these days society also expects universities to perform better in their basic roles of outreach, research teaching and learning (Diaz et al. (2022). Therefore,

focusing on this demand, one of the institution's strategies is to increase the efficiency of their lecturers through the human capital development program. On the other hand, the education institution must strategize its efforts to assist the government in achieving the Priority Area D strategies.

This process requires a fair amount of work up front and a lot of organization member involvement but is well worth the effort. Implementatively, a streamlined process to ensure work activities are aligned to the right place in strengthening education and empowering human capital is being provided as an alternative. Education instructors with higher levels of potential are more skilled and productive in terms of contributing to economic growth and development. Whereas, investing in human capital is also crucial because it positively associates the student's success and excellence in an education setting. To put it another way, our higher education system needs competent talent who consistently develop their capabilities related to their knowledge, skills, and intellect to produce better job quality. The process is carried out because all employees need knowledge related to increasing their skills, experience, and abilities to improve their careers as well as the institution's performance.

2. Literature Review

Human Capital

One metric used to assess the long-term sustainability of institutional achievement is human capital. Human capital is one of the important inputs relating to the performance, competitiveness, and sustainability of organizations. It is necessary to focus on the effectiveness of the utilization of these inputs and to take the appropriate measures. Generally, the Human capital theory (HCT) discusses the role of education and training as investments in individuals (Becker, 1964). Next according to Schultz (1961), human capital refers to the knowledge and skills that individuals acquire through formal education and training. This type of capital arises from deliberate investments that yield returns. Moreover, he also considers the investment in human capital as the criteria for educational enhancement for self-development. While Islam & Amin (2021) stated, the terminology of human capital relates to the individual capability to bring their knowledge, skill.

Recently, human capital has been recognized as a key factor to maintain a company's position, by improving its performance in both financial and non-financial aspects. abilities, and other characteristics (KSAOs) to the institution, but such contributions are intertwined with their health and well-being. In debt, because an organization cannot own its human capital in its entirety, its essential competencies must be protected. The well-being lens should be used to see human capital to gain a deeper understanding of how to manage it. All of this emphasizes how important it is to embrace broader viewpoints on human resources that connect well-being to human capital. Equally important, Zane & DeCarolis (2024) contend that an organization's future success can be influenced by early choices on human capital, including what resources and knowledge to acquire.

Malcolm Baldrige Criteria for Performance Excellence

Maintaining the high institution's quality is not a simple effort but it is a dynamic and challenging process. The education atmosphere always changing times. Because of this phenomenon education institution performance is the result of the work in quality and quantity of education staff in their career. Better service to the students resulted from a highly competent of academic staff (Budiarti, 2020). by identifying the potential areas of improvement. The Baldridge has been recognized globally for more than 32 years as the cutting edge of validated performance practice, and it is utilized by a wide range of originations, including government agencies, non-profits, healthcare organizations, manufacturers, service providers, small businesses, schools, colleges and universities.

The Malcolm Baldrige Criteria for Performance Excellence assist in assessing the institution's strengths and opportunities. This framework appears to help the institution to understand how well you are achieving its standard of performance. This framework underlying seven categories of areas include leadership, strategic planning, customers and market focus, measurement, analysis and knowledge management, human resource focus, process management and results (Foster et al. (2007). Similarly, Kanter & Page (2020) emphasize that Baldridge was proven able to provide the organization with better financial results, satisfied loyal customers, improved products and service and an engaged workforce. On the other hand, Baldridge also helps to align the

organization with existing resources, improve better communication, increase effectiveness, and achieve strategic goals.

Training

The human capital of an organization is one of its most important assets and it has a big impact on how well the organization performs (Wright, 2021). Therefore the organization needs to examine how this resource can play as a strong predictor of its agility, long-term sustainability and competitiveness. In a broader sense, Islam & Amin (2021) highlight, that human capital's emergence extends beyond formal training and encapsulates social boundaries, work processes and culture. This includes the organization's formal training, learning environment, and work practices, together with individual self-endeavors, which contribute to shaping the workforce's core competence in performing the task efficiently and effectively. Investing in developing human capital helps to develop employees, and its deployment improves organizational performance. Thus, when the organization provides training, educational development and work experience the individuals hold this as a personal asset and can choose to deploy it to best effect for their own career growth (Shortland & Porter, (2020). Therefore, the contribution that job-related training can make to individuals' knowledge and expertise can be disseminated throughout their employing firms. Consequently, Becker (2009) through Human Capital Theory postulates that expenditure on education and training is an investment in human capital with positive economic outcomes, raising company productivity and individuals' income levels.

Education

As a pioneer of Human Capital Theory Schultz (1973) discussed that in developing an individual investment should be directed to the highest education level, training in the workplace, migration between sectors, health, and economic information. Next Bontis (1999) lists genetic inheritance, education, expertise, and attitudes as factors that constitute human capital. Additionally, Ragoobur & Narsoo (2022) investment in education brings a significant result to a long-run rise in the stock of human capital which raises income and provides a greater return in terms of increased productivity, better employment opportunities, higher income, and economic growth. Next Spence (1973) demonstrated a classic view of the human capital concept saying a candidate can signal high levels of competence with a degree from a quality university. From this signal, the employer can deduce the candidate's abilities. A degree from a reputable university serves as an effective signal because it is perceived as challenging to acquire for someone without the necessary competence It has been shown that a good university degree is a powerful signal because it is seen as being hard for someone who lacks competence to earn one.

Knowledge

Accumulating a robust set-in intangible asset provides the organization with opportunities for enhancing business performance as well as maintaining its long-term sustainability. Zane & DeCarolis (2024) conceptualized human capital which encompassed employee's knowledge, skill, and experience. They believed the acquisition of knowledgeable employees is critical to the successful development and commercialization of products and services. According to Ngoc (2020) nowadays, managing knowledge is one of the crucial parts of facing a competitive environment. Generally, sustainable knowledge creation starts with informal interaction, then it turns to formalize it into a systematic format. In other words, knowledge begins with the accumulation of experience, fact, intelligence, value, information, and intelligent understanding that could help evaluate and gain new experience and information. Organizations that rely on this capability will be able to assist the employees in building their learning abilities and solve various problems regarding the organization's commitment. Many studies have shown that the knowledge and experience associated with human capital are crucial for organizations to adapt to environmental changes.

Knowledge areas are recognized as key indicators and an essential aspect in identifying and leveraging business opportunities (Kidwell et al, 2020). Lastly, Islam & Amin (2021) emphasized defining the concept of human labor with the boundary of individual physical strength, with little consideration for the individual's knowledge and competence. It pertains to the level of understanding of relevant theoretical and procedural knowledge as it relates to work processes. Functional competence addresses how and when to apply this knowledge, reflecting the degree to which an individual develops crucial work skills through practice and learning. This concept demonstrated the crucial role of knowledge in the organization's quality and agility. More precisely, knowledge denotes the comprehension and theoretical knowledge required to do a task;

Functional competence, or the degree of task-specific expertise, is referred to as skills; ability, or an enduring capability, applies to a variety of tasks relevant to the job; and other characteristics are personal qualities related to the performance of the job (Islam & Amin, 2021).

Skill

As discussed by Harris, Brown & Spence (2024), organizations must balance the benefits and drawbacks of each human capital strategy and thus, it is important to recognize the factors that influence an institution's choice of human strategy internally and externally. Focusing on the roles of human capital which provide a significant value in terms of acquisition of knowledge, skills, and abilities typically the organization needs to understand the uniqueness of the process. Conventionally in a working environment, people need the opportunities to learn and practice new skills as a strategy to invest time and efforts in life-long learning activities to develop and build personal relationships with internal and external professional clients as well as with other individuals whom we interact on a personal basis.

Realized the importance of this Felstead, Gallie & Green (2019), discussed in a job context skill is explained as the required level of worker to perform the given task, involving the use of their skills and abilities and the extent to which workers receive training that develops job-related and task. Significantly it allows the employees to have a special capability in performing the responsibilities and making use of their professional skills to perform their assigned task in the institution. Moreover, employees' skill development aims not only to expose them to lifelong learning but also to improve their employability and their quality of life and contribute to sustainable organizational development.

Experience

In a research context theoretically, a human capital perspective suggests that people are rewarded for their investment in undertaking professional assignments as this increases their knowledge, skills and experience which can be used to organizational advantage in general. Commonly, in developing a human capital strategy organizations make decisions regarding how to acquire human capital to meet the needs of the organization Harris et. Al (2024). This is important because the decision determines how the organization sees how each strategy is better to meet the needs of the organization. Then Becker (1964) makes a distinction between human capital investments, such as education and work experience and actualized human capital outcomes, such as knowledge and skill required to perform the specific task. The concept of human capital as a means of framing the development of knowledge and experience has immense relevance to the organization itself (Shortland & Porter, 2020).

Ability

A wide definition of human capital typically includes both an individual's intrinsic qualities and abilities as well as the knowledge and skills they pick up from education and training. Through the acquisition of new knowledge, skills, and abilities (KSA), employees are likely to become more productive and achieve better results. As introduced by Schultz (1961), investment in skills and knowledge provides individuals with "human capital", comprising knowledge, skills, and abilities, and this generates productive capacity, leading to the creation of wealth. According to Lenihan, Mcguirk, & Murphy (2019), the employee's ability attributes like cognitive ability, general knowledge, job-specific knowledge, and problem-solving skills are essential to perform the task more effectively.

As highlighted by Alawamleh, Ismail, Aqeel & Alawamleh (2019), the interpretation of human capital was first introduced by Adam Smith in *The Wealth of Nations* in 1776. He defines it as one aspect of capital, along with land, labor, and monetary capital. The way to improve human capital quality is through training, education, and experience so that an enterprise becomes more profitable, not only at the individual level but also adds to the collective wealth of society. Moreover, the organization should also play a role in optimizing the individual level by systematically identifying the employee's need as one of the investment activities and outcomes.

The following discussion explains that there is a relationship between the human capital investment factors and the institutions' performance.

H^1: Training has positively influenced the institutions' performance.

H^2: Education has positively influenced the institutions' performance.

H3: Knowledge has positively influenced the institutions' performance.
H4: Skill has positively influenced the institutions' performance.
H5: Experience has positively influenced the institutions' performance.
H6: Ability has positively influenced the institutions' performance.

3. Research Methodology

To achieve the research objective, the process continues with data collection activity. Feedback from the targeted respondents was gathered. For this purpose, a series of sixty questionnaires was employed. Next, the model selected is Structural Equation Modeling-Partial Least Square (SEM-PLS) with PLSPM - R package Programming, where abnormal data, small sample size, and the possibility of using indicators with few references are the most prominent reasons for the application (Hair, 2014).

Then the software Smarts PLS 3 was used by Ringle et al. (2015) for the data analysis to assess the measurement and structural model. The measurement model consists of the outer and inner tests to obtain indicators/factors reflecting the latent variables and determine the relationship. The main purpose of conducting these tests was to assess the outer model through convergent (AVE Value), discriminant (Loading value), and validity (Cronbach's alpha value) tests.

Convergent validity for the measurement model was investigated by recognizing the Average Variance Extracted (AVE) value. AVE is a method used to estimate the convergent validity of the measurement model. For the estimation, the AVE must exceed than 0.5 to gain an acceptable convergent validity. Next the Composite reliability (CR) value must be 0.7 or above is deemed to be acceptable. Table 2 shows the results of the measurement model. By implementing the Smarts PLS the responses gathered were analyzed for assessing the reliability of measurement. The recorded Cronbach Alpha for all variables employing multi-items estimated range exceeds 0.9 which suggests that the questionnaires were reliable for further analysis as cited in Kline (2011). Next is the assessment of the structural model which provides the relationship between latent variables in the research model. The following criteria facilitate this assessment: Coefficient of determination (R^2), cross-validated redundancy (Q^2), and path coefficients (Hair et al., 2014). Finally, Table 4 shows the path coefficient of assessment of all items.

Population and Sampling

The total population for this research comprised 309 lecturers, with a sample of 95 lecturers from the UiTM Kelantan Branch. Faul, Erdfelder, Lang and Buchner (2007) indicate that G*Power software can be used to determine the sample size based on the statistical power. The minimum required sample size is 74 respondents given an actual statistical power of 0.95 for model testing. However, for analysis reasons, all 95 questionnaires were evaluated.

Demographic profiles

The purpose of assessing the demographic profile is to identify the characteristics of targeted respondents. Thus, the overall sample shows there are 71 female respondents with a percentage of 74.7% as compared to only 24 male respondents with 25.3%. From the overall population based on age, the highest frequency of respondents is 31-40 years old with a total of 56 (58.9%) followed by 41-50 years old with 26 (27.4%), then 51-60 years old with 8 (8.4%) and below 30 years old with 5 (5.3%). The highest faculty members were from Faculty of Business Management with 37 respondents (38.9%) followed by Faculty of Computer Science and Mathematics with 18 respondents (18.9%), Faculty of Information Management 13 respondents (13.7%), Academy of Language 12 respondents (12.6%), Faculty of Art and Design 6 respondents (6.3%), Faculty of Accounting 5 respondents (5.3%) and Faculty of Administrative Science and Policy 2 respondents (2.1%) and Academy of Contemporary Islamic 2 respondents (2.1%).

4. Results and Discussion

Common method variance (CMV)

Podsakoff and Organ (1986) indicate that common method variance (CMV) refers to variance caused by the measurement method rather than the constructs that measures are intended to represent. To assess CMV,

Harman's Single Factor test involves entering all primary constructs into principal component factor analysis, where the percentage of variance explained should be less than 50%. The results revealed that the variance accounted for all factors was 49.25%, indicating that there is no common method issue present in the dataset as supported by Podsakoff and Organ (1986).

Measurement Model

Before evaluating the structural model, the measurement model was constructed to assist the analysis process. This process began with assessing the convergent validity of the latent constructs. The first step requires that the factor loadings should be 0.7 or higher. Additionally, the Average Variance Extracted (EVA) should exceed 0.5 for acceptable convergent validity, and the Composite Reliability (CR) must be 0.7 or above (Hair et al.,2014). Then the assessment revealed that items C2, with a loading of 0.626 and C6 with a loading of 0.621, were excluded from the data set because the loading values did not meet the 0.7 threshold (Hair, Hult, Ringlet & Sarstedt,2014). Lastly, the measurement model is presented in the GoF table.

Table 1: Goodness-of-fit measurement model (n=95)

Latent Variable	Factor Loading	CR	AVE
Institution Performance (IP)	0.933	0.942	0.539
Training (TR)	0.945	0.954	0.722
Education (ED)	0.943	0.953	0.717
Knowledge (KN)	0.947	0.956	0.731
Skill (SK)	0.941	0.954	0.774
Experience (EX)	0.953	0.963	0.811
Ability (AB)	0.954	0.963	0.812

The analysis continues with assessing the result of discriminant validity. The discriminant validity is tested by means of assessment for Fornell Larcker, cross loadings and the Heterotrait-Monotrait ratio (HTMT). As displayed in Table 2 the square root of AVEs is greater in all cases than the off-diagonal elements in the corresponding row and column, so that the required discriminant validity by Fornell-locker has been achieved. This is because the square root of the AVE when compared against the correlations of the other constructs, the AVE extracted is greater than its correlations with all the other constructs then discriminant validity has been established.

Validity Assessment of Factor Loading, CR and AVE, Fornell and Larcker

Table 2: Fornell-Larcker criterion (n=95)

	AB	ED	EX	IP	KN	SK	TR
AB	**0.901**						
ED	0.644	**0.847**					
EX	0.765	0.703	**0.900**				
IP	0.473	0.502	0.528	**0.734**			
KN	0.576	0.745	0.697	0.709	**0.855**		
SK	0.433	0.566	0.552	0.730	0.816	**0.880**	
TR	0.574	0.669	0.612	0.725	0.798	0.689	0.850

Note: Values in the diagonal (bolded) represent the square root of the AVE while the off-diagonals are correlations

As shown in Table 2, the square root of the Average Variance Extracted (AVE) is greater in all instances than the off-diagonal elements in their respective rows and columns, indicating that the necessary discriminant validity, as outlined by Fornell and Larcker, has been achieved. This means that when the square root of the AVE is compared to the correlations with other constructs it exceeds those correlations confirming the establishment of discriminant validity. Then the second option (Table 3) to assess the discriminant validity is conducting the Heterotrait-Monotrait (HTMT) test Henseler et al. (2015). The rules of thumb stated if the HTMT

Value is greater than 1.0, then there is a problem with discriminant validity. Subsequently, Garson (2016) explained the value must be lower than the required threshold value of HTMT for the assessment. Therefore, for this HTMT assessment, all constructs do not exceed the threshold. Therefore, this dataset does not demonstrate a problem with discriminant validity.

Table 3: Heterotrait-Monotrait ratio (HTMT) (n=95)

	AB	ED	EX	IP	KN	SK	TR
AB							
ED	0.673						
EX	0.805	0.735					
IP	0.492	0.524	0.548				
KN	0.605	0.788	0.729	0.810			
SK	0.454	0.596	0.578	0.775	0.863		
TR	0.602	0.706	0.644	0.762	0.843	0.725	

Assessment of Structural Model

The relationship between the latent variables in the research model is provided by the structural model. The following criteria facilitate this assessment: Coefficient of determination (R^2), cross-validated redundancy (Q^2), and path coefficients (Hair et al., 2014). Table 4 shows the path coefficient of the item. The result shows a positive relationship between knowledge on the institution's performance with β=0. 451 and significant with t-value= 2.774 and p<0.05, next is a positive relationship of skill towards institution performance with β=0. 283 and significant with t-value= 1.981 and p<0.005. Finally, the analysis shows there is a significant positive relationship between training to institution performance with β=0. 299 and significant with t-value= 2.371 and p<0.05

Table 4: Significance result of path coefficients (n=95)

Hypo	Path	Beta value	Sample Mean	Std. error	t-value	P-value
H1	AB→IP	0.093	0.099	0.100	0.933	0.351
H2	ED→IP	-0.218	-0.184	0.162	1.348	0.178
H3	EX→IP	-0.027	-0.045	0.120	0.226	0.821
H4	**KN→IP**	**0.451**	**0.418**	**0.162**	**2.774**	**0.006**
H5	**SK→IP**	**0.254**	**0.283**	**0.128**	**1.981**	**0.048**
H6	**TR→IP**	**0.299**	**0.292**	**0.126**	**2.371**	**0.018**

Note: ** Significant at p<0.005 (p<0.05)

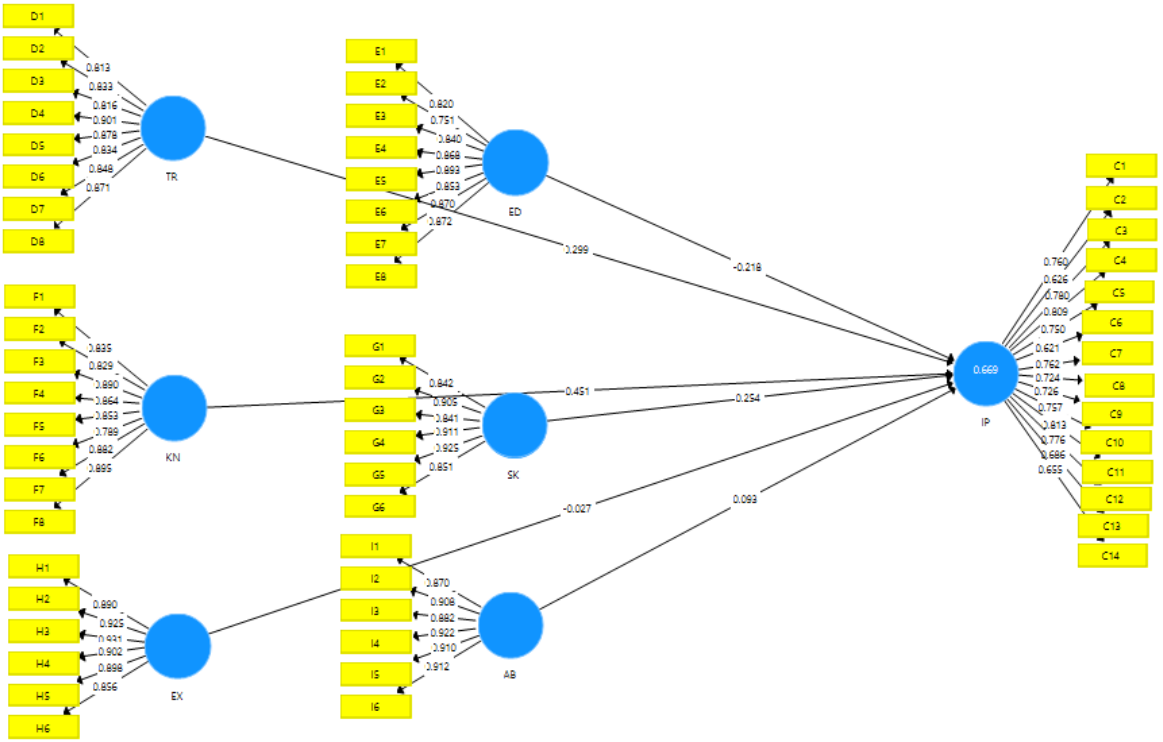
Assessment of the predictive relevance -Q^2

As demonstrated by the blindfolding procedure outlined by Hair et al. (2014), Q^2 assesses the predictive validity of a model using PLS (see Table 5). Q^2 values greater than zero suggest that the exogenous constructs hold predictive relevance for the endogenous construct. According to Hair et al. (2014), a Q^2 value above zero indicates that exogenous constructs are relevant predictors of the endogenous construct.

Table 5: Predication Relevance of the Model

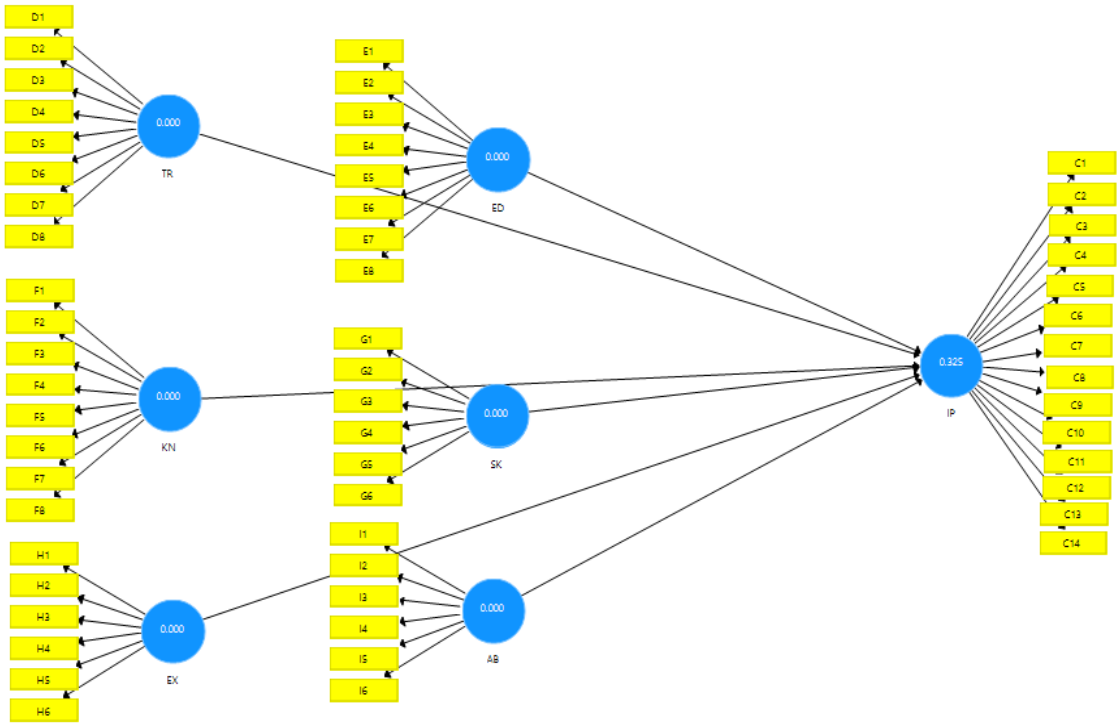
Latent	SSO	SSE	Q^2 (=1-SSE/SSO)
Ability	570.000	570.000	
Education	760.000	760.000	
Experience	570.000	570.000	
Institution Performance	1,330.00	897.403	0.325
Knowledge	760.000	760.00	
Skill	570.000	570.000	
Training	760.000	760.000	

Figure 1: PLS-Path diagram



As shown in Figure 1, the R^2 value for the endogenous latent variable is 0.669, indicating that 66.9% of the variance in institutional performance can be explained by the human capital investment factors among the respondents.

Figure 2: Blindfolding model (DV)- *Q^2*



The following Figure. 2, shown Q^2 for institution performance (=0. 325), which means the research model has good predictive relevance.

Table 6: The Hypotheses Analysis (n=95)

Hypotheses	Path	Results
H1: Ability has positively influenced the institutions' performance.	AB→IP	Not supported
H2: Education has positively influenced the institutions' performance.	ED→IP	Not supported
H3: Experience has positively influenced the institutions' performance.	EX→IP	Not supported
H4: Knowledge has positively influenced the institutions' performance.	KN→IP	Supported
H5: Skill has positively influenced the institutions' performance.	SK→IP	Supported
H6: Training has positively influenced the institutions' performance.	TR→IP	Supported

The study's findings are applied to address the topic of how an institution's performance in UiTM is impacted by its investment in human capital activities. To sum up, among these six variables, three variables are not significant consists of ability, education, and experience, and another three variables: knowledge, skill and training are significant towards the performance as displayed in Table 6. To review training is the most significant factor that affects performance with β=0. 299 and significant with t-value= 2.371 and $p<0.05$.

5. Conclusion

Hermanus et al., (2024) stated in evaluating the university performance there are a few other components of assessment that should be considered including assessing the different stakeholder needs, including government agencies, businesses, and international institutions and how external factors, like government grants, industrial partnerships, and international collaborations, affect it. Moreover, Leal Filho et al. (2021) suggest that involvement in the activity like research projects, conferences, workshops, and project-based learning also positively contribute to the long-term sustainability of a university. In summary, the findings are consistent with well-established research regarding human resource systems, human capital, and institution performance, that organizations adopting high-involvement human capital development systems to enhance the achievement of the overall goal of positive organizational performance**.** There is no doubt human capital plays a crucial role in the current ever-challenging and aggressive business environment and human resources have the greatest importance in gaining sustainable competitive advantage and efficiency (Pasban & Nojedeh, 2016). Organizations aiming for success and competitiveness must actively seek out and implement better strategies to enhance their business performance by effectively leveraging their human capital.

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