

Lean Management and HRM Practices in Relation towards Operational Performance: Confirmation of Measurement Model

Azhani Ismail

Faculty of Industrial Management
University Malaysia Pahang (UMP)
Pahang, Malaysia
azhani2013@gmail.com

Yuserrie Zainuddin

Faculty of Industrial Management
University Malaysia Pahang (UMP)
Pahang, Malaysia
yuserrie@ump.edu.my

Abstract— This study explores the influence of human resource management (HRM) practices on the adoption of lean management (LM) that affect operational performance (OP) in Malaysia local authorities (LAs). The purpose of this paper is to empirically investigate the latent constructs of and the scale for evaluating LM and HRM practices in relation towards OP in organization. This research analyzes the data using Partial Least Square-Structural Equation Modeling (PLS-SEM) and utilizes SmartPLS 3 to investigate the impact of HRM practices on LM and OP in organization. With data collected from 177 Malaysia LAs, a one-stage approach is conducted in the assessments of the measurement model through confirmatory factor analysis (CFA) and adjusted according to the guidelines set to verify reliability and validity. The empirical findings suggest that the measurement model demonstrates satisfactory reliability and validity. This study contributes to the literature on empirical examination of the constructs of LM, HRM practices and OP, and to the practices of managers with validated measurement scales to evaluate the strengths and weaknesses in different facets of implementing LM in improving OP through the role played by HRM practices in the organizations.

Keywords— lean management; HRM practices; operational performance; measurement model

4. INTRODUCTION

Increased competition and globalization have raised the need for lower costs and higher quality in producing goods and services, which generally explains the success of lean management (LM) as a concept [12, 26, 42]. LM is well-known to pursue waste elimination and reducing non-value-added activities in the organization [17] to create a streamlined, high quality system that enhances operational performance, ultimately yielding competitive advantage [8, 102]. It has been promoted as enabling public service providers to 'do more with less' [78, 79], and capable to fulfil the needs of key stakeholders, and to stretch public sector limited resources towards producing more value for the customers [77].

LM is very much a people-driven system. In fact, recent literature identifying barriers to LM transformation suggests that the largest hurdles faced by organizations pursuing LM transformation are people-related [42, 86]. Accordingly, some researches suggests that LM and human resource management (HRM) practices are closely related and can interact in order to improve operational performance (OP) in organization [10, 56, 90, 97, 102, 107]. One of the distinctive features of LM and HRM practices is that better performance is achieved through the people in the organization. The greatest impact the human resources (HRs) organization can have on a LM transformation is the education and training on skills and behaviours on what respect for people really means and looks like to buy in engagement and commitment from everyone in the organization. [56] in his study stated that establishing a LM organizational culture very much depends on the organization's ability to select, develop, engage, and inspire HRs through effective performance management strategies.

There has been a spate of research that has sought to test whether LM increases OP [84, 98]. However, the role of the HRM practices as mediation variables has not been analysed in the relationship. Therefore, this study is timely and necessary to better aid organizations in the management of LM principles, as well as to cover the gap by means of scrutinizing the impact of HRM practices on the LM-OP relationship. To advance investigation and practice of LM in improving OP with the effect of HRM practices in organization, appropriate measurement scales are needed. In general, identification of appropriate measurement scales for emerging concepts and theories is necessary to complete robust research and to advance the body of knowledge in a field. [23] stated that, measurement is a fundamental activity of science and that measurements and broader scientific questions interacting with each other within their boundaries are almost imperceptible.

The field of LM, HRM practices and OP are arguably in their early development phases, both academically and practically. Academically, to effectively and empirically advance theory within these fields, some useful and testable multi-item measurement scales are needed. Thus, greater attention will need to be focused on employing multi-item latent constructs, assessing them for content validity, and purifying them through field-based testing [55]. Using literature in LM, HRM practices and performance of organization, the study introduces a number of scales that may be used to help evaluate practices in the areas of LM, HRM practices and OP in Malaysia public sector. Practically, organizations can also benefit from development of reliable and valid scales to measure LM, HRM practices and OP in organization. Practitioners can use these scales for benchmarking, continuous improvement and project management activities when seeking to implement LM to improve OP via HRM practices. One contribution of this study is to help public sector in Malaysia understand the different facets of LM implementation and identify the strengths and weaknesses of the LM implementation in improving OP of organization with the role played by HRM practices.

Given the theoretical and practical importance of developing LM, HRM practices and OP measurement scales in public sector, this study introduces a research based on an empirical survey of Malaysia public sector. The public sector in Malaysia is a major service provider, particularly business services and social services [64]. Hence, the importance of OP in public sector should be given due emphasis as this sector contributes significantly to the Malaysian economy and society. In 2016, Malaysia has 1.3 million employees in the public sector contributing to 9% of Malaysia's total employment. This will have a major impact on the country's productivity as this sector accounts for almost 30% of Malaysia's gross domestic product (GDP) [64]. These factors mean that any changes in the public sector often have an impact on productivity and have significant economic implications. Therefore, in order to sustain OP enhancement effectively in the public sector, the measurement's intention should focus on both efficiency and effectiveness of the organization. However, in Malaysia, LM is still yet to be considered as mature state as there are still many organizations that are not applying LM either as a system-wide approach or partial LM implementation. The lack of widespread use of LM in Malaysia can be potentially due to many factors such as lack of awareness in LM, not knowing the appropriate guidelines to apply LM in organizations, and the research theme that is not well-studied yet in Malaysia [17].

The aim of this study is to investigate the LM, HRM practices and OP constructs and their defining measurement items emphasizing Malaysia public sector with broader implications for application of these scales to other environments. The present paper is structured into five parts. Section 1 discusses the introduction, while Section 2 underlines literature review of main variables conceptualization. The methodology used to develop and validate the main variables scales is presented in Section 3. Section 4 presents the analysis and empirical results of this study, followed by discussion on findings in Section 5. Section 6 concludes the discussion by summarizing the findings, implications, limitations, and potential for future research.

5. LITERATURE REVIEW OF MAIN VARIABLES CONCEPTUALIZATION

There are three main variables in this study namely: (1) lean management, (2) HRM practices, and (3) operational performance. Concise explanations for each main variable are as listed in the following subsections.

A. Lean Management Conceptualization

Over the years, there has been considerable development of LM concept, and many views of what constitutes LM. LM research has evolved from early conceptualization [66, 88] to the purported benefits of implementation [28, 32, 80, 84] and to a unified definition [83], with various extensions such as agility [35], and even the possibility of becoming "too lean" [27]. LM roots in the Toyota Production System (TPS) [44, 61], which was originated within the Japanese automobile industry following World War II and was developed by a production executive named Taiichi Ohno. [50] stated that outside of Toyota, TPS is often

known as lean, since this was the term made popular by the two best-selling books, “The Machine that Changed the World: The Story of Lean Production”, and “Lean Thinking: Banish Waste and Create Wealth in Your Corporation” [104].

From the current review, LM has been implemented in various kind of manufacturing sector in developed countries. In manufacturing, the concepts of LM tools are ultimately useful in the shop floor practices that involved continuous improvement elements [17]. As such, numerous studies have concluded that LM is a multifaceted concept that may be grouped together as distinct bundles of organizational practices [9, 10, 21, 54, 59, 63, 84, 97, 101]. A list of bundles of LM practices includes just-in-time (JIT), total quality management (TQM), total productive maintenance (TPM), HRM, kaizen, kanban, 5S, pull, flow production, low setup, controlled processes, and involved employees [17, 51, 58, 83, 84, 85, 89, 93]. However, these studies have mainly focused on manufacturers, and mostly in developed countries. Each of them has introduced a group of dimensions particular to the setting of their study. Thus, their results cannot be freely generalized to Malaysia public sector, which incorporates a different culture [70], traditions [7], and management paradigms [49] from the western world manufacturing context.

There is a significant need for exploring the key dimensions of LM that suit best to the Malaysia public sector context. Following the theoretical stance of the present research, the researcher defines LM as “an integrated socio-technical system” [26, 29, 63, 65, 83], with a long-term philosophy, where the right processes will produce the right results and value can be added to the organization by continuously developing people and partners, while continuously solving problems to drive organizational learning [50, 76]. This study then follows [24], who conceptualize LM from the four principles (4P) dimensions of LM developed by [50] to guide the understanding of the key elements associated with LM which include four dimensions: (1) philosophy; (2) process; (3) people and partners, and (4) problem solving. This 4P dimensions of LM being chosen to measure LM in the current study because the researcher believes that organizations can dramatically improve their OP by successfully implement LM strategy which stems from a deeper business philosophy based on the understanding of people and human motivation, the ability to cultivate leadership, teams, and culture to devise strategy, to build supplier relationship, and to maintain a learning organization. Furthermore, this 4P dimensions encompasses a more comprehensive variable set than the ones developed by past studies in manufacturing industry in Western world. It is also based on a broad consensus that the success of a LM transformation not only depends on the application of tools and techniques [107], but that for the sustainable benefits of these to be achieved, it is necessary to pay attention to the human factor [22, 60, 92] and the establishment of a culture that sustains the LM transformation [50].

B. HRM Practices Conceptualization

In the literature, there appears to be no consensus on the nature of HRM practices. Some studies focus on the effectiveness of the HRM department [95], some on the value of HRM in terms of knowledge, skills and competencies [43], several define HRM in terms of individual practices [6] or systems or bundles of practices [13, 69] and yet others acknowledge the impact of these practices or systems on both the human capital value in terms of knowledge, skills and abilities, and directly on employee behavior in terms of higher motivation, increased satisfaction, less absence and increases in productivity [105].

[11] examine the enormous variety of different practices being used in the 104 analyzed articles. There is not one fixed list of generally applicable HRM practices or systems of practices that define or construct HRM. In total they are able to list 26 different practices, of which the top four are: careful recruitment and selection, training and development, performance management (including appraisal), and contingent pay and reward schemes. These four dimensions are also agreed by [4]. [6] comes to the same conclusion which suggests that four practices can be seen to reflect the main objectives of the majority of strategic HRM programs, namely, to identify and recruit strong performers, provide them with the abilities and confidence to work effectively, monitor their progress towards the required performance targets, and reward staff well for meeting or exceeding them. In the services context, [53] made the same conclusion, which stated that the HRM practices that fit the context of a service sector are not duplicates of the HRM practices of a manufacturing context. A number of HRM practices, which are considered to be the appropriate practices for the service sector, are: staffing, training, employee involvement and participation, performance management and appraisal, compensation and rewards, and caring.

The literature on advanced HRM practices [47, 54, 75] identifies HRM factors that have a good fit with LM, including teamwork, job rotation, ongoing training, contingent rewards, job security, versatility and participation [57]. [67] identify LM-oriented work organization strategies, including standardization, ongoing training, teamwork, participation and empowerment, versatility, commitment to company values, and contingent rewards. Meanwhile, [10] point to LM production-oriented companies promoting flexibility and versatility, investing in training and committing to variable compensation. [56] in his study on lean transformation, suggested that the HRM practices should be comprised of four primary dimensions: selection and hiring, training and development, performance evaluation, and rewards and incentives. He then defined HRM practices from the lean

viewpoint as a set of practices, processes, and procedures that are utilized to select, develop, appraise and reward the organization's HR as a mean of achieving lean transformation success.

Following the theoretical stance of the current study, this study follows [56] and defines HRM practices from the LM viewpoint as a set of practices, processes, and procedures that are utilized to select, develop, appraise, and reward the organization's HRs as a means of achieving LM implementation efficiently and effectively. Based on this definition, the study then conceptualizes HRM practices along the four most commonly recognized areas of HRM: selection and hiring, training and development, performance evaluation, and rewards and incentives [4, 6, 11, 56]. These four dimensions of HRM practices were chosen based on the reasons that: first, they have a role to play in influencing OP [73, 99]; second, they are theoretically linked to the extended concept of LM [10, 56, 57, 87, 96, 107] and finally, they are among the most popular in both the research literature and organizational practice [11, 56] and fit the context of a service sector [53].

C. Operational Performance Conceptualization

Business performance index (BPI) is the key to evaluate the achievement and effectiveness of LM system in an organization [17, 52, 81, 83]. There are several dimensions of BPI that could be used for the assessment effectiveness of LM such as OP, financial and marketing [31]. For OP, non-value-added activities, defect rates, scrap and rework processes are crucial in measuring the BPI in this dimension. These are wastes that will cause losses to the organization and lead to low BPI [14, 52, 81]. For financial aspect, return on assets (ROA), return on investment (ROI), and return on sales (ROS) are basically covered all the financial aspects of performance in the organization. Finally, marketing performance is usually represented by the market share, sales volume and product delivery cycle time that contribute in the evaluation of BPI [14, 52, 81, 83]. Nevertheless, this study will focus on OP in measuring the achievement and effectiveness of LM system in the organization as other two dimensions, namely financial and marketing focus on the manufacturing industry, whereas this study focuses on the public sector. Furthermore, majority of research in public sector operations management is to improve the OP, where the main focus is on customer, quality, and process efficiency [78].

However, OP is a concept that is still being debated by scholars to this day [4]. The debate is on what is meant by performance and how can it best be measured in the public sector: should the focus be on input indicators (units of output/service provided), outcome indicators (the results of service provided), the cost effectiveness indicators, or the productivity indicators [106]. The OP of public sector is a multi-dimensional construct [48]. There is no single, widely accepted definition of public sector performance in the social sciences. Consensus on the measurement of public sector performance, in particular, is conspicuously absent in the literature. The most widely used terms to measure OP of public sector in the literature are productivity indicators which focus on efficiency and effectiveness [62]. [91] in his study on measuring performance of Malaysia local authorities (LAs) also measures OP through both efficiency and effectiveness. This measurement is in line with [45], which stated that, in both profit and non-profit organizations, OP can be defined as an appropriate combination of efficiency and effectiveness. [64] also defined OP through these two dimensions.

Thus, the researcher looks hard at what is working well and what is not working well at present and by looking for what priority to measure performance in public sector, since the main focus of the current study is on the public sector OP. The public sector is a non-profit organization, so the profit is not a main focus [106]. Following the theoretical stance of the current study, then of interest for this study to defines OP from logistics point of view, which is the extent to which an organization is successful in achieving its planned targets by carefully and considered use of limited government resources [45] as well as being able to conduct its internal operations smoothly and efficiently [106]. This study then conceptualizes OP through productivity indicators which focus on an appropriate combination of two dimensions: efficiency, and effectiveness [45, 62, 64, 91]. These organizational efficiency indices should more directly reflect the impact of implementing the management practices [8, 19, 71, such as LM. [21] consider that productivity is a crucial indicator of employee performance and represents a direct link between human capital and OP.

6. RESEARCH METHODOLOGY

Following [18] paradigm for construct development and measurement, after conceptualizing the three main variables under study, the study then operationalized the constructs by developing a multi-item seven-point likert measurement scale to evaluate the different facets of LM, HRM practices and OP in Malaysia LAs. To help support scale generalization, it is important to collect data from a broad variety of organizational and contextual characteristics. Even though we focus on one agency, the features that exist, particularly in terms of resources, capabilities, position, roles and responsibilities, services provided, and the system practiced within Malaysia LAs provides a robust contextual environment that may indirectly reflect the real state of the public sector in Malaysia in terms of quality of service delivery to customers.

The measurement scale instrument in the form of a survey questionnaire developed from the various literature sources was initially pre-tested with seven industry experts and three academics to ensure content and face validity of the measurement items. The study then refined the measurement items with feedback from the pre-test to improve the wording and seminal meanings of some individual measurement items. Subsequently, the refined scale was administered to capture LM, HRM practices and OP in a cross-sectional survey among Malaysia LAs. To evaluate the construct of LM, HRM practices and OP, confirmatory factor analysis (CFA) tests were performed in the study to examine the measurement properties of these three main variables.

A. Measurement Development

The model specification in this study has been achieved by a theoretical review of the literature. A great deal of measures was carried out to address the three main variables included in the research, namely LM, HRM practices and OP. In the questionnaire, all the 49 indicators covering LM, HRM practices and OP were measured at the organizational level with the use of perceptual measures by using seven-point likert scale, ranging from 1=strongly disagree to 7=strongly agree. Respondents were asked to indicate to what degree they agreed or disagreed with each statement. The scale measuring each construct employed a seven-point likert scale as it had been shown to achieve the upper limits of reliability [3].

Firstly, to develop a measurement scale for the implementation of LM, this study utilized the 14 Principles that have been developed by [50] as measurement items in measuring the 4P dimensions of LM. However, most measurement items are adopted and modified to make them more suitable for this study setting (see details in Table 1). The 4P dimensions of LM are conceptualized as first-order constructs (FOCs) which are measured by their respective reflective indicators. The LM scales comprises 17 indicators: philosophy (4 indicators), process (7 indicators), people and partners (3 indicators) and problem solving (3 indicators).

Table 1: Measurement items of 4P dimensions of lean management.

Philosophy (LMph)	
LMph1	Base management decisions on a long-term philosophy, even at the expense of short-term financial goals
LMph2	Focus on long-term rather than short-term results
LMph3	Reinvestment in people, service and organization
LMph4	Unforgiving commitment to quality into workplace system
Process (LMpr)	
LMpr1	Create continuous flow to bring problems to the surface so that waste time and resources can be eliminated
LMpr2	Use pull systems to avoid overproduction
LMpr3	Level out the workload (Heijunka)
LMpr4	Build a culture of stopping to fix problems or when there is a quality problem to get quality right the first time (Jidoka)
LMpr5	Standardize tasks as the foundation for continuous improvement and employee empowerment
LMpr6	Use visual control so no problems are hidden
LMpr7	Use only reliable, thoroughly tested technology that serves employees and processes
People and Partners (LMpp)	
LMpp1	Grow leaders who thoroughly understand the work, live the philosophy and teach it to others
LMpp2	Respect and develop exceptional people and teams who follow organization's philosophy
LMpp3	Respect extended network of partners and suppliers by challenging them and helping them improve
Problem Solving (LMps)	
LMps1	Go and see to thoroughly understand the situation (Genchi Genbutsu / Gemba)
LMps2	Make decisions slowly by consensus, thoroughly considering all options, and implement decisions rapidly
LMps3	Become a learning organization through relentless reflection (hansei) and continuously improvement (kaizen)

Secondly, to develop a measurement scale for the HRM practices, this study develops a data collection questionnaire based on the previous work of [56], whereby the study utilizes the same set of measurement items in measuring the four dimensions of HRM practices. However, most measurement items are adopted and modified to make them more suitable for this study setting

(see details in Table 2). The four dimensions of HRM practices are conceptualized as FOCs, which are measured by their respective reflective indicators. The HRM practices scales comprises 22 indicators: selection and hiring (5 indicators), training and development (5 indicators), performance evaluation (6 indicators) and rewards and incentives (6 indicators).

Table 2: Measurement items of four dimensions of HRM practices.

Selection and Hiring (HRMsh)	
HRMsh1	Use problem-solving aptitude as a criterion in employee selection
HRMsh2	Use attitude/desire to work in a team as a criterion in employee selection
HRMsh3	Use work values and behavioural attitudes as a criterion in employee selection
HRMsh4	Select employees who can provide ideas to improve the lean transformation process
HRMsh5	Use pre-employment testing/screening to select employees
Training and Development (HRMtd)	
HRMtd1	Offer developmental opportunities to employees
HRMtd2	Ensure employees are well trained in problem solving skills
HRMtd3	Use coaching as a significant component of employee development
HRMtd4	Ensure employees are cross-trained to perform a variety of activities
HRMtd5	Offer training to build the capabilities of employees
Performance Evaluation (HRMpe)	
HRMpe1	Ensure performance evaluations account for performance outcomes/results
HRMpe2	Ensure performance evaluations assess individual contribution to process/team performance
HRMpe3	Ensure lean initiatives are a significant part of the performance evaluations
HRMpe4	Ensure performance evaluations focus on achievement of goals/targets
HRMpe5	Ensure performance evaluations focus on problem-solving aptitude
HRMpe6	Ensure multiple people provide input to the performance evaluations of each employee
Rewards and Incentives (HRMri)	
HRMri1	Offer rewards/incentives for performance
HRMri2	Ensure incentives encourage employees to vigorously pursue lean objectives
HRMri3	Ensure incentives are fair in rewarding people who accomplish lean objectives
HRMri4	Ensure reward system really recognizes people who contribute the most to organization
HRMri5	Ensure employees are rewarded for continuous improvement
HRMri6	Ensure compensation and rewards are competitive

Thirdly, to develop a measurement scale for the OP, a combination of efficiency and effectiveness scales is used to provide more comprehensive measurement of OP in public sector. Efficiency is measured by 6 items, which are derived from several researchers [1, 9, 25, 76, 91, 97, 100]. Effectiveness is measured by 4 items, 3 items are adopted from [91], and 1 item from several researchers [9, 25, 76, 97, 100]. However, most measurement items are adopted and modified to make them more suitable for this study setting (see details in Table 3). The two dimensions of OP is conceptualized as FOCs, they are: efficiency and effectiveness, which are measured by their respective reflective indicators. The OP scales comprises 10 indicators: efficiency (6 indicators) and effectiveness (4 indicators).

Table 3: Measurement items of two dimensions of operational performance.

Efficiency (OPey)	
OPey1	Show reduction in customer lead time
OPey2	Show improvement in labor productivity
OPey3	Show reduction in the cost of services
OPey4	Show reduction in service cycle time / processing time
OPey5	Show improvement in service delivery time
OPey6	Ensure the number of staff sufficient to provide the best service to customers
Effectiveness (OPes)	
OPes1	Show reduction in rework/error
OPes2	Show achievement of the targeted tasks is exceeded the expectations
OPes3	Always be an example, reference and is often praised for services performed
OPes4	Does not have a problem to achieve the targeted tasks although there are directions or work outside the scope of tasks to be completed

The use of reflective FOCs is evident in the past research in operations management. For example, [56] conceptualized HRs performance management with four dimensions: selection, development, evaluation and rewards as FOCs, and lean transformation with three dimensions formed by achievement of objectives, improved organizational capabilities, and alignment

with organizational strategy as FOCs. [17] specified determinants of lean as FOCs and used these to examine their impact on lean manufacturing and business performance.

B. Data Collection and Sample Characteristics

The population of this study included all 149 LAs in Malaysia having any good practices of process or operations improvement that have resulted in a reduction of waste, improved the flow and provided a better concept of customers and process views. The population was derived from the database of Ministry of Urban Wellbeing, Housing and Local Government (MUHLG). The respondents were senior level management, because high ranking informants tend to be more valuable sources of information [68, 74, 97].

The questionnaires were sent out through ordinary postal mail and internet-based survey on October 2017, to 447 senior level managements from three departments of each LAs, i.e. chairman office, corporate and HRM departments. Each questionnaire was accompanied by an explanatory note which highlighted the purpose of the research and encouraged the chairman to participate. After a follow-up process by telephone, 177 (39.605) questionnaires were attained, each completed to the furthest extent. The resultant response rate of 39.60% is quite high, given the length of the survey instrument and the position within the organisation of the senior level managers targeted, the rate of response is acceptable [82]. Regarding the nature of respondents, only 1 of the respondent is president, 51 are head of departments, 19 are senior managers, and 106 are from other managerial level. The geographical distribution of the organizations was also considered. It is reported that the distribution of the organizations covered the entire Malaysia except Perlis. The majority of the organizations are located in Perak (18.64%), Sarawak (16.95%) and Selangor (15.25%). The sample encompasses that majority (53.11%) of participating organizations were district councils, followed by municipal councils (34.46%) and city councils (12.43%).

7. ANALYSIS AND EMPIRICAL RESULTS

This research utilizes Partial Least Square-Structural Equation Modeling (PLS-SEM) approach for data analysis and utilizes SmartPLS 3 to investigate the impact of HRM practices on LM and OP in organization. In PLS-SEM, the measurement model evaluates the validity and reliability of the indicators before testing the structural model in order to ensure that the indicators are representing the constructs of interest [15, 38]. The measurement model defines how each block of indicators relates to their latent variable [38, 41]. Reliability shows the stability and consistency of the scale in measuring the concept, while validity indicates the ability of a scale to represent the concept being measured [82].

The indicators representing the reflective FOCs in the measurement model need to demonstrate reliability as well as convergent and discriminant validity. Hence, a confirmatory factor analysis (CFA) is performed to confirm unidimensionality of the indicators that reflect the underlying constructs [94, 103]. In other words, CFA aims to verify whether a set of indicators shares sufficient common variance to be regarded as measures of an intended single factor [5] Generally, CFA is used to identify and remove indicators that load weakly on intended constructs thus, establishing unidimensionality. By following SEM literature recommendations, the reliability and validity of the reflective measurement model can be evaluated in four different ways: (A) indicator reliability, (B) internal consistency reliability, (C) convergent validity, and (D) discriminant validity [16, 34, 37, 40]. These four conditions are therefore assessed for ten reflective FOCs in this study, which are philosophy (LMph), process (LMpr), people and partners (LMpp), problem solving (LMps), selection and hiring (HRMsh), training and development (HRMtd), performance evaluation (HRMpe), rewards and incentives (HRMRI), efficiency (OPey), and effectiveness (OPes).

A. Indicator reliability

This study follows [30] and agreed by most of the researchers [37, 72] which suggest that item loadings should be at least 0.70 or more in order to achieve item reliability of approximately 0.5. Loadings are correlations and the items reliability are the square of the loading. Therefore, with the loading value at 0.70, the item reliability of 0.5 is yielded, showing that 50% or more of the variance in the observed variables is due to the latent variable [2, 46]. Table 4 shows that, all reflective indicators have loaded significantly and highly between 0.741 and 0.923 on their intended constructs achieving unidimensionality in the PLS-SEM model. Loadings above the threshold value of 0.70 are indicative of larger shared variance between a construct and its indicators than the variance of the measurement error [36]. Hence, results from CFA show strong evidence for reliability of the indicators [37, 68].

Table 4: Outer loadings of reflective indicators.

Reflective Indicator	Outer Loading	Reflective Indicator	Outer Loading	Reflective Indicator	Outer Loading	Reflective Indicator	Outer Loading	Reflective Indicator	Outer Loading
LMph1	0.840	LMpr7	0.791	HRMsh4	0.869	HRMpe4	0.904	OPes1	0.747
LMph2	0.777	LMpp1	0.923	HRMsh5	0.741	HRMpe5	0.882	OPes2	0.905
LMph3	0.876	LMpp2	0.897	HRMtd1	0.815	HRMpe6	0.783	OPes3	0.860
LMph4	0.829	LMpp3	0.863	HRMtd2	0.900	HRMri1	0.769	OPes4	0.848
LMpr1	0.819	LMps1	0.865	HRMtd3	0.859	HRMri2	0.841	OPey1	0.819
LMpr2	0.781	LMps2	0.895	HRMtd4	0.879	HRMri3	0.894	OPey2	0.855
LMpr3	0.798	LMps3	0.897	HRMtd5	0.860	HRMri4	0.884	OPey3	0.828
LMpr4	0.748	HRMsh1	0.832	HRMpe1	0.870	HRMri5	0.877	OPey4	0.834
LMpr5	0.830	HRMsh2	0.882	HRMpe2	0.872	HRMri6	0.882	OPey5	0.879
LMpr6	0.778	HRMsh3	0.895	HRMpe3	0.813			OPey6	0.850

B. Internal consistency reliability

There are two measures on internal consistency reliability, namely cronbach's alpha and composite reliability. Cronbach's alpha indicates lower bound estimates of reliability compared to composite reliability [39]. As such, composite reliability is generally regarded as the more appropriate criterion to establish internal consistency reliability of a construct compared to cronbach's alpha [39]. Therefore, composite reliability should be assessed in the current study as it is a reliable alternative measure of internal consistency reliability. In exploratory research, composite reliability of 0.6 or higher is acceptable, but in higher stages of the research, this reliability measures should be 0.7 or higher [17]. [2] noted that 0.7 as a benchmark for modest composite reliability, whereas value below 0.6 indicates a lack of reliability [68]. Table 5 presents values of composite reliability. As depicted in the table, all FOCs displayed composite reliability values between 0.899 and 0.944, which is well above the threshold value of 0.7. This result indicates the internal consistency reliability [68]. Hence, the results from composite reliability suggest that the indicators are appropriate for their respective latent variables.

Table 5 : Internal consistency and convergent validity.

First Order Constructs	Composite Reliability	Average Variance Extracted
HRMpe	0.942	0.731
HRMri	0.944	0.738
HRMsh	0.926	0.715
HRMtd	0.936	0.745
LMph	0.899	0.691
LMpp	0.923	0.801
LMpr	0.922	0.628
LMps	0.916	0.785
OPes	0.907	0.709
OPey	0.937	0.713

C. Convergent validity

The quality of the measurement model or convergent validity is evident when each measurement item correlates strongly with its intended theoretical construct [33]. Convergent validity of the FOCs in this thesis was examined via average variance extracted (AVE) values as suggested by [30]. AVE shows the average variance shared between a construct and its measures relative to the amount of measurement error [15, 46]. Sufficient convergent validity is achieved when AVE value of a construct is at least 0.5 [30]. This means that a construct explains more than 50% of the variance among the scale indicators [36, 38]. Table 5 provides adequate convergent validity because all the AVE values for reflective FOCs are within the range of 0.628 and 0.801, which are significantly greater than the generally accepted cut-off value of 0.50 [30, 37]. These results demonstrate that there is convergent validity in the measurement model. This implies that the measurements items of each latent variable measures them well and are not measuring another latent variable in the research model.

D. Discriminant validity

To assess discriminant validity, the study uses two tests: (1) analysis of cross loadings, and (2) analysis of the square roots of AVE. Discriminant validity was examined through the cross-loading table (Table 6). The table shows that in all cases in the reflective measurement model, an indicator’s outer loading on its designated construct is greater than all its cross loadings with other reflective constructs (see the highlighted correlation coefficients) [37]. This analysis cross-loading thus indicates that all the 49 indicators loaded distinctly on the specified latent variables they measured hence demonstrating discriminant validity of the latent variables.

Discriminant validity was also supported by the correlation matrix of the reflective constructs as presented in Table 7. When comparing the square roots of the AVE for each construct with the correlations among other constructs, results in Table 4 shows that, in all cases, the square root of AVE for each reflective construct, as the diagonal elements are larger than the off-diagonal correlations in rows and columns. Hence, the discriminant validity at the construct level is supported [16, 40, 46]. This result shows that there was no correlation between any two latent variables larger than or even equal to the square root AVEs of the two latent variables. Hence discriminant validity test does not reveal any serious problem, and this shows that all the latent variables are different from each other. In sum, the reliability and validity of reflective construct measures have been confirmed.

Table 6 : The cross loadings among reflective constructs.

Indicators	HRMpe	HRMri	HRMsh	HRMtd	LMph	LMpp	LMpr	LMps	OPes	OPey
HRMpe1	0.870	0.591	0.593	0.706	0.600	0.633	0.533	0.661	0.518	0.508
HRMpe2	0.872	0.665	0.591	0.740	0.633	0.612	0.563	0.615	0.586	0.561
HRMpe3	0.813	0.556	0.546	0.619	0.528	0.592	0.508	0.598	0.527	0.519
HRMpe4	0.904	0.618	0.683	0.715	0.614	0.619	0.575	0.696	0.585	0.556
HRMpe5	0.882	0.691	0.717	0.703	0.595	0.629	0.590	0.647	0.536	0.568
HRMpe6	0.783	0.537	0.538	0.543	0.489	0.504	0.526	0.613	0.469	0.465
HRMri1	0.650	0.769	0.567	0.547	0.498	0.511	0.439	0.495	0.501	0.419
HRMri2	0.581	0.841	0.456	0.535	0.542	0.478	0.478	0.407	0.446	0.470
HRMri3	0.631	0.894	0.530	0.591	0.580	0.515	0.538	0.521	0.554	0.604
HRMri4	0.656	0.884	0.598	0.637	0.537	0.512	0.588	0.532	0.583	0.611
HRMri5	0.571	0.877	0.566	0.573	0.527	0.490	0.554	0.517	0.561	0.585
HRMri6	0.601	0.882	0.583	0.625	0.557	0.553	0.552	0.535	0.515	0.591
HRMsh1	0.556	0.538	0.832	0.583	0.564	0.489	0.539	0.537	0.374	0.386
HRMsh2	0.647	0.576	0.882	0.635	0.613	0.643	0.638	0.643	0.492	0.513
HRMsh3	0.668	0.603	0.895	0.677	0.646	0.635	0.691	0.698	0.524	0.516
HRMsh4	0.578	0.498	0.869	0.647	0.601	0.576	0.563	0.612	0.396	0.496
HRMsh5	0.574	0.487	0.741	0.595	0.518	0.491	0.482	0.531	0.341	0.376
HRMtd1	0.601	0.452	0.658	0.815	0.508	0.561	0.593	0.543	0.410	0.419
HRMtd2	0.683	0.591	0.634	0.900	0.626	0.649	0.534	0.610	0.522	0.498
HRMtd3	0.690	0.635	0.686	0.859	0.639	0.630	0.588	0.618	0.461	0.532
HRMtd4	0.685	0.657	0.634	0.879	0.629	0.625	0.568	0.568	0.518	0.563
HRMtd5	0.734	0.590	0.600	0.860	0.607	0.609	0.517	0.632	0.541	0.485
LMph1	0.545	0.515	0.546	0.542	0.840	0.538	0.574	0.594	0.447	0.469
LMph2	0.477	0.499	0.573	0.533	0.777	0.482	0.542	0.536	0.306	0.427
LMph3	0.602	0.576	0.621	0.619	0.876	0.603	0.616	0.604	0.478	0.521
LMph4	0.614	0.497	0.581	0.626	0.829	0.680	0.684	0.591	0.483	0.481
LMpp1	0.628	0.571	0.608	0.641	0.624	0.923	0.683	0.644	0.535	0.567
LMpp2	0.671	0.544	0.661	0.694	0.659	0.897	0.664	0.769	0.496	0.506
LMpp3	0.579	0.472	0.541	0.576	0.586	0.863	0.613	0.628	0.528	0.492
LMpr1	0.593	0.574	0.642	0.598	0.699	0.635	0.819	0.661	0.482	0.537
LMpr2	0.433	0.465	0.499	0.497	0.542	0.552	0.781	0.473	0.376	0.431
LMpr3	0.522	0.475	0.565	0.473	0.513	0.587	0.798	0.536	0.467	0.429
LMpr4	0.425	0.373	0.459	0.407	0.482	0.474	0.748	0.459	0.353	0.361
LMpr5	0.568	0.545	0.575	0.570	0.651	0.639	0.830	0.602	0.520	0.567
LMpr6	0.482	0.437	0.534	0.512	0.531	0.491	0.778	0.520	0.344	0.349
LMpr7	0.509	0.498	0.556	0.500	0.584	0.639	0.791	0.566	0.429	0.485
LMps1	0.588	0.479	0.579	0.503	0.569	0.656	0.571	0.865	0.506	0.519
LMps2	0.692	0.518	0.682	0.660	0.620	0.650	0.606	0.895	0.489	0.522
LMps3	0.697	0.555	0.646	0.656	0.665	0.718	0.666	0.897	0.578	0.553
OPes1	0.436	0.451	0.316	0.318	0.412	0.405	0.391	0.431	0.747	0.658
OPes2	0.596	0.579	0.461	0.544	0.440	0.525	0.472	0.550	0.905	0.710
OPes3	0.502	0.541	0.445	0.494	0.428	0.491	0.488	0.469	0.860	0.608
OPes4	0.573	0.494	0.483	0.542	0.473	0.523	0.473	0.538	0.848	0.548

OPey1	0.443	0.485	0.426	0.416	0.391	0.378	0.432	0.464	0.568	0.819
OPey2	0.666	0.624	0.589	0.638	0.557	0.604	0.574	0.642	0.658	0.855
OPey3	0.462	0.532	0.395	0.388	0.484	0.455	0.412	0.469	0.570	0.828
OPey4	0.439	0.540	0.362	0.431	0.477	0.443	0.424	0.415	0.586	0.834
OPey5	0.541	0.522	0.485	0.514	0.518	0.542	0.494	0.519	0.684	0.879
OPey6	0.549	0.532	0.476	0.510	0.449	0.496	0.563	0.493	0.708	0.850

Table 7 : Correlation matrix of the reflective constructs.

Construct	HRMpe	HRMri	HRMsh	HRMtd	LMph	LMpp	LMpr	LMps	OPes	OPey
HRMpe	0.855									
HRMri	0.715	0.859								
HRMsh	0.717	0.641	0.846							
HRMtd	0.788	0.682	0.743	0.863						
LMph	0.676	0.629	0.699	0.700	0.831					
LMpp	0.701	0.593	0.677	0.714	0.697	0.895				
LMpr	0.643	0.614	0.696	0.647	0.729	0.731	0.792			
LMps	0.747	0.585	0.720	0.689	0.700	0.762	0.695	0.886		
OPes	0.630	0.615	0.510	0.571	0.520	0.580	0.542	0.593	0.842	
OPey	0.621	0.642	0.547	0.581	0.572	0.584	0.578	0.600	0.748	0.845

8. DISCUSSION ON FINDINGS

In this study, constructs for LM, HRM practices and OP, utilizing a survey instrument administered to Malaysia LAs, are examined and measurement scales for evaluating the different facets of LM, HRM practices and OP are tested for their validity and reliability. The measurement items in the scale for evaluating LM implementation are classified into 4P dimensions: philosophy, process, people and partners, and problem solving. The measurement items in the scale for evaluating HRM practices are classified into four dimensions: selection and hiring, training and development, performance evaluation, and rewards and incentives. The measurement items in the scale for evaluating OP are classified into two dimensions: efficiency and effectiveness. The constructs of all the main variables appear to adequately fit the data collected. The validity and reliability of the scales for evaluating the three main variables under study are established with the systematic and scientific procedures used in this study.

The one-stage approach measurement model provides acceptable fit. The results of the reflective measurement model evaluation suggest that the LM, HRM practices and OP scales in the current study have good overall face and construct validity, discriminant validity among the dimensions, and high reliability. These scales can be valuable tools for accumulating empirical evidence about the important of HRM practices in the relationship between LM and OP in organization.

The implication of these results is that, public sector believes that LM, HRM practices and OP should be multifaceted, and not limited to specific practices. For research investigations, these multiple factors and their measurement items should be utilized to arrive at a more complete picture of organizational LM implementation in improving OP with the role played by HRM practices. Practically, public sector should strive to improve on multiple dimensions of LM, HRM practices and OP, to arrive at the full realization of benefits which may include improved economic benefits.

The multidimensional conceptualizations provide insights into the constructs of LM, HRM practices and OP and their relationships with the underlying factors. First, the items and the factors of the construct provide direct and actionable information on the three main variables. Second, conceptualization of the construct at FOCs, provide managers with an opportunity to observe LM, HRM practices and OP at a higher level of abstraction beyond the individual items and factor tiers. At the individual item and factor levels, managers might consider the LM, HRM practices and OP for each individual item and factor and may identify areas in need of specific attention.

9. CONCLUSION AND FUTURE RESEARCH

This study presents practitioners with a 49-item measurement scale for evaluating the different facets of the LM (17 items), HRM practices (22 items) and OP (10 items) in organization. The empirical results suggest that all 49 measurement items are critical attributes of the ten underlying factors under study. Public sector wishing to improve their LM practices need to constantly monitor their implementation. The measurement scale validated in this paper can be used as a self-diagnostic tool to identify areas where specific improvements are needed and pinpoint aspects of the public sector LM practices that require additional implementation.

This study has several limitations. Firstly, the data for this study was collected in a cross-sectional manner, indicating that the perceptions regarding LM, HRM practices and OP are collected at a single point in time and conditions and influences can change over time. Therefore, future research could expand of study using the case study methods or conduct a longitudinal study to investigate how organizations design their LM and how LM assists in managing OP through the effect of HRM practices.

Secondly, this research emphasizes measuring LM in terms of 4P dimensions covering philosophy, process, people and partners, and problem solving, which are less frequently examined by previous researchers. Further investigation in this area is obviously needed to explore whether it holds true in other research or industry contexts. This is particularly important in the validation of the scale employed in this present research to measure LM for public sector.

Finally, a more comprehensive consideration of other LM related practice scales could be incorporated. As we have stated that, the LM factors in our study are a starting point and future works should at minimum include these factors. There exists a wide scope for future research on the instrumentation issues of LM implementation. The validation of this scale is an ongoing process and validity is established only over a series of studies that further refine and test the measurement items across sectors and countries [23]. Development of valid and reliable measurement items will only be accomplished through the use and refinement of the measurement scale in subsequent studies. These measurements can evolve and progress into many new areas supporting the construction and confirmation of theories. Future research can also focus on measurement models' comparisons of LM practices among different countries, to help determine if the construct is culturally robust, i.e. have a consistent fit for whatever country this measurement scale is measuring.

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