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## **IMPACT OF MANAGEMENT PRACTICES ON ORGANISATIONAL INNOVATION IN THE DIGITAL AGE: A STUDY OF THE MANUFACTURING INDUSTRY IN MALAYSIA**

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### **ABSTRACT**

The manufacturing industry is an indispensable part of the economy, especially for Malaysia. The manufacturing sector in Malaysia is not only transforming raw material into products, but also contributing significantly to the country's economy. Malaysia has attained a significant position in the world by exporting its manufactured goods. However, the production services always require innovation to meet the ever-changing customer demands. With the advent of Industry 4.0, the manufacturing industry faces constant challenges such as the innovation capability of organizations, and swift and frequent shifts in the use of technology. These issues may hamper the efforts

of manufacturing firms to fully participate in Industry 4.0 Malaysia. Therefore, the objective of this study is to identify the influence of knowledge-oriented leadership, electronic human resource management (E-HRM), and decentralised organisational structure on organizational innovation. The current research has adopted a quantitative method to establish the relationship between these three variables and innovation in organizations. A total of 218 samples were collected from manufacturing firms located in Malaysia. Data collected through a self-administered questionnaire was examined by using SmartPLS software. The results of this research has added to the body of knowledge in the respective field by highlighting the significance of knowledge-oriented leadership and E-HRM in predicting organizational innovation. It can further help stakeholders to plan a way forward in facing Industry 4.0 through the development of innovation competencies.

**Keywords:** Decentralized organisational structure, digital age, electronic human resource management, Industry 4.0, knowledge-oriented leadership, organizational innovation.

## INTRODUCTION

In the digital era, it is important for a country to be innovative in transforming its economy, especially in the context of a country like Malaysia. Like other countries, the Gross Domestic Product (GDP) of Malaysia also depends on the value added by its industries, particularly the manufacturing industry (MacDougall, 2014). The manufacturing sector is regarded as an enabler for employment and economic quality. However, the revolution wrought by Industry 4.0 has changed the way of running businesses. For example, Industry 4.0 integrated humans with machines and production processes to create a smart value chain (Schumacher et al., 2016). Therefore, companies will be confronted with complexities and challenges in their business operations with the integration of the concept of organizational innovation. These challenges are linked to all levels of the organization and will affect the business processes directly.

To deal with the challenges associated with this rapid change, organizational innovation has been suggested as a critical factor for the success of manufacturing firms (Hecklau et al., 2016). Moreover, innovation is imperative to improve the performance of manufacturing

companies. However, innovation does not come on its own, firms have to adapt suitable management approaches that support the development of organizational innovation competencies. According to Shamim et al. (2016), long-term innovation capabilities could only be realized with the assistance of management practices such as knowledge-oriented leadership and appropriate structure. In sum, it is only innovative organizations which will be able to survive in the dynamic and ever-changing environment of Industry 4.0.

Despite the importance of innovation in the Industry 4.0 thrust, researchers have mainly discussed only the associated risk and opportunities (Moeuf et al., 2020; Preuveneers & Ilie-Zudor, 2017). However, a few recent studies have highlighted the importance of the technological aspect of innovation (Lorenz et al., 2015; Frank et al., 2019). It has become clear that there is a gap in this research field as past researchers did not consider management practices which were prompting factors of innovation (Shamim et al., 2016). Mohelska and Sokolova (2018) also endorsed researches focused on management approaches (Leadership, HRM and Structure), which recognized the critical importance of adopting the lens of organizational innovation.

The actual test for firms nowadays is to look for qualified leaders who can create a knowledge-sharing culture (i.e., knowledge oriented leader) to respond to any new challenges in a responsive way. Additionally, the human resource practices that are digitally backed (E-HRM) are necessary to meet the standards of digitization. Finally, the decentralized structure that enhances the free flow of information and promotes autonomy to develop new ideas and innovation plays a crucial role. In light of this, the current research has focused on examining how management practices such as knowledge-oriented leadership, Electronic Human Resource Management (E-HRM) and decentralised organizational structure influenced organizational innovation in light of the challenges of Industry 4.0.

## **THEORETICAL FOUNDATION AND LITERATURE REVIEW**

### **Dynamic Capability Theory**

Dynamic Capability Theory (DCT) has discussed the development of capabilities to tackle the shift in business processes (Teece et al.,

1997). This theory has stated that competitive advantage depended on the ability to use practices that could develop firm capabilities to offer new products and services (Parnell, 2011). Organizational innovation referred to the capability to create possibilities to offer novel services (Burns, 2016). The application of DCT in this research was about in terms of the usage of suitable management practices for the improvement of innovation capabilities. Accordingly, knowledge-oriented leadership was seen as having a support role in building organizational innovation capability by encouraging the use of new and important information that was created, shared and applied for purposeful outcomes (Mabey et al., 2012). E-HRM, on the other hand, was seen as assisting firms by motivating employees to train themselves and meet the firm's requirements. Similarly, a decentralized organizational structure will enable firms to develop new ideas that can lead to a fast response to changes. Through appropriate management approaches, a firm can build competencies to ensure organizational innovation capability, ultimately helping to accomplish its strategic goals in line with Industry 4.0 (Paauwe & Boselie, 2005).

### **Organisational Innovation**

Innovation was initially described in a conceptual way by Schumpeter (1934) when he was discussing factors of economic growth. He discovered that innovation was a significant factor involved in organizational growth and success. Till today, innovation has been considered a chief concern for most organizations. In light of the present day business environment, change is the only constant phenomenon and this underscore the critical role innovation has to play. This was because a study has found that innovation would enable organizational self-efficiency to respond to any change faster than non-innovators (Jiménez-Jiménez et al., 2008).

According to Baregheh et al. (2009), "Innovation is the process of transforming ideas into new products or processes to advance and differentiate themselves successfully in their marketplace" (p. 1326). Innovation is seen as having the power to change a firm, by an action or response to the external environment, or as a pre-emptive action to influence the surrounding environment. Innovation for organizations is crucial for their growth and success. It determines the continued existence of companies and can also contribute to their competitive advantage.

In the era of digitalization, the introduction of the boundary-less business environment has increased the complexity of manufacturing processes. Companies are starting to face many challenges which are part and parcel of new technological concepts and a fast-changing environment. These inevitable challenges, including the change of customer requirements and demands for tailored products, make marketplaces more volatile. It is making innovation the business imperative for organizations. Innovation can build the capability of organizations to tackle rapid changes in the business environment. However, innovation does not just happen on its own. Appropriate organizational practices such as knowledge-oriented leadership and organizational structure are needed to develop innovation (Shamim et al., 2016; Stock-Homburg, 2013).

### **Knowledge Oriented Leadership**

The leadership of a firm is the key to impact the firm's performance and its direction (Nguyen & Mohamed, 2011). Competent leaders would outline a clear vision for workers that could guide and motivate them to achieve the firm's objectives (Rivière & Sitar, 2003). For knowledge-oriented firms, strong leadership will enable the employees to regard themselves as assistants in innovative and knowledge activities. Moreover, leaders should identify and compensate innovative attempts by their employees, instead of promoting adverse actions that would endanger knowledge exchange and its application. A leadership style that comprises components such as inspiration and interaction is called knowledge-oriented leadership. The concept of knowledge-oriented leadership was only recently developed (Shamim et al., 2019) and not very well understood in a true sense (Mohsenabad & Azadehdal, 2016).

Knowledge-oriented leadership is a necessary instrument that is based on a mixture of transformational and transactional leadership styles, along with communication and motivational elements. It would include knowledge creation, transfer, storage, and its application (Donate & de Pablo, 2015). Knowledge-oriented leadership was determined as an action or ability that could encourage new and important information that has been created, shared, and applied to bring about positive outcomes (Mabey et al., 2012). This type of leadership has been suggested for companies, and those who valued knowledge-oriented leadership were often successful in their businesses (Donate & de Pablo, 2015).

Knowledge-oriented leadership is imperative for every organization, especially for manufacturers. This type of leadership brings about a number of benefits for organizations. It enhances the performance of organizations and is effective for the development of new products. An effective leader could act as a role model for employees, promote a learning environment, motivate them to develop new knowledge, and would compensate those who were willing to share their ideas and contribute towards the firm's organisational knowledge (Naqshbandi & Jasimuddin, 2018).

### **Knowledge Oriented Leadership and Organisational Innovation**

Modern firms are characterized by their complexity level and experience of turbulence. The capability to gain competitive advantage depended on the selection of leadership and innovation (Sheng, 2017). In this context, a recent development of the knowledge-oriented leadership concept has gained much attention (Shamim et al., 2019; Donate & de Pablo, 2015). It offers the instilling of extraordinary potential within individuals and enables the creation and application of new knowledge, which is key to innovation performance. Furthermore, the knowledge managed by this leadership would bring about strategic changes in a firm's operations and processes (Donate & de Pablo, 2015; Slezdik, 2013).

Present day business operations are dynamic, which will replace the manual routine work with machines, and these new tasks would often require a high level of expertise and skill sets. Hence, knowledge-oriented leadership becomes an asset for the company, which is hard to ignore throughout the innovation process. The concept of such a leader was someone in a position to generate knowledge that could develop and offer new and transformative solutions for society (Vafaie, 2016). By applying their up-to-date knowledge, they can manage to produce unique products and services. According to Ślezdik (2013), borrowing the words of Joseph Schumpeter, there were five different types of innovations, namely innovation of new product, new methods of production, new markets, new sources of supply and new ways to organize the business. Thus, depending on the type of innovation, leaders can use their wealth of knowledge to plan, organize, lead, and control the process accordingly.

It has become evident that organizational innovation depends on the availability of the latest knowledge and skills. A knowledge-oriented leadership style will assist in creating the required knowledge and then processes whatever general knowledge into specific information that can play a critical role to further the innovation process. The significance of knowledge-oriented leadership with respect to innovation was its emphasis on the role of systems and to always keep culture and structure in mind (Nam et al., 2017). Knowledgeable leaders have a vital responsibility to execute a positive and complex change in order to achieve the company's goals. This means that their influence will create a domino effect, and with minor alterations can bring about more substantial changes.

A major role that the knowledge-oriented leader plays is to inspire followers in achieving an innovation objective. The same argument was used by Kasemsap (2017) in his research which underscored the importance of knowledge-oriented leadership for innovation. He argued that knowledge-oriented leaders offered firms the prospect of developing their unique set of competencies and expertise. These competencies together with the use of the appropriate knowledge will create the desired innovation for the company. Such leaders also motivate employees in taking risk to apply new knowledge that subsequently facilitates innovation for the organization (Williams & Sullivan, 2011). The close relationship between a knowledge-oriented leadership and organizational innovation in modern firms is clearly evident in the current literature. Therefore, the present study has hypothesized that:

H<sub>1</sub>: Knowledge-oriented leadership has a positive and significant relationship with organizational innovation.

### **Electronic Human Resource Management (E-HRM)**

The management of employees is an important activity and the competitiveness of any company depends on its human resource management functions. The activities that were performed electronically for employee's management was known as E-HRM (Armstrong & Taylor, 2020). According to Bondarouk and Ruël (2009), "E-Human Resource Management is an umbrella phrase

covering all possible integration systems and contents between human resource management and information technology (IT), seeking at developing value within and across companies for workers and management” (p. 507). E-HRM is specifically designed to apply information technology (IT) in HRM practices that will in turn, enable convenient interaction between employees and the company. This practice includes E-Recruitment and Selection, E-Communication, E-Learning and E-Performance Appraisal. More specifically, E-HRM has integrated technology to perform HR operations (Bondarouk et al., 2017).

To meet the challenges of current and future complex markets, firms require a workforce with a special set of skills, abilities, knowledge, and motivation to effectively deal with job challenges. Human resource management (HRM) was seen as an approach for the employment and development of a qualified workforce to attain the objectives of the firm (Armstrong & Taylor, 2020). With functions such as recruitment and selection, communication, training and development and performance appraisal, E-HRM has highly impacted the performance of the company (Becker, 2013).

Although E-HRM is a relatively new term, it has the ability to transmute old-fashioned HRM practices completely. Some optimistic technological voices have gone to the extent of assuming that, from a technical perspective, all HR processes should be supported by IT. To cite an example, in the context of E-Communication, employees from different locations can still interact with one another using the email and relevant software. Many companies also have their own internal communications system with a specific Internet Protocol (IP) address that employees will be provided, which means that everyone in the company can access files and communicate with managers or colleagues using a secured local network. For E-Recruitment, companies could announce job openings online to fill vacant positions and even conduct online interviews (Okolie, & Irabor, 2017). For E-Training and development, employers can easily share training materials and track trainee learning performance.

One of the most important challenges that most companies faced nowadays has been the revolution brought about by the internet and entailed technological changes (al Shobaki et al., 2017). As it has



also brought about drastic changes in all functions of human resource management, it has enormous implications in the development of strategic HRM plans. Moreover, this revolution has resulted in extensive changes in organizational structures and reduced the workforce due to the automation applied. Therefore, E-HRM has emerged as a solution that will enable swift changes and adaptations to the new dynamic environments (al Shobaki et al., 2017).

### **Electronic Human Resource Management (E-HRM) and Organizational Innovation**

E-HRM practices have become progressively necessary for the vast majority of firms around the world because of its ability to make use of the online knowledge repository to improve organization innovation. Now is the opportune time for stakeholders to set their E-HRM goals according to their company's requirements. It can be to address the issues of cost reduction, productivity, service improvement, etc. The E-HRM tool has become inevitable with the recent disruption triggered by the Covid-19 pandemic, a world-wide scourge that has made innovation a need rather than a luxury. Since most businesses nowadays are conducted online, this development has become a litmus test of the viability of E-HRM.

The emergence of information technology is evident in all our daily activities, be it in the amazon shopping platform, food delivery service, or work emails. In other words, IT has impacted all fields and definitely its influence on HR practices would not be any different. In such an IT ecological environment where companies have to compete for their survival, E-HRM has become more essential than ever, and organizations must have a survival strategy to continue to compete successfully. A study conducted by Iqbal et al. (2018) has concluded that E-HRM could not only help companies to grow, but also enhance quality labor activities as well. Therefore, E-HRM is the organizational innovation that has to be embraced in this time of urgent need. Otherwise, many companies may have to bite the dust, and many already have.

It is therefore no surprise that many modern companies have been developed on the foundation of innovative concepts, with E-HRM amongst the top priority areas under organizational innovation

(Jonczyk & Buchelt, 2015). E-HRM has always been a primary concern as it is considered by many experts in the field as the starting point for innovation or creativity. Innovative organizations need to spend more on human resource, and research and development activities. Previous studies, especially the study by Escribá-Carda et al. (2014), have all shown a positive connection between E-HRM and innovation in the organization. This is especially so in practices such as recruitment and training which are closely linked to organizational innovation. Empirical research has also confirmed that E-HRM positively affected knowledge creation (Collins & Smith, 2006) as well as learning and innovation (Nam et al., 2017). Therefore, the present study has proposed that;

H<sub>2</sub>: Electronic human resource management has a positive and significant relationship with organizational innovation.

### **Organisational Structure**

Organizational structure is the organization of tasks and individuals within the company in order to achieve the company's objectives. It outlines the activities, including the rules, roles and responsibilities crucial for the success of the company. The common organizational structure can be characterized as centralized and decentralized in nature. The centralized structure is the one where only one person or one authority, either the CEO or executive will make all the decisions. Some companies have a specifically designated department that will control all the company activities and drive the innovation performance too. This is generally considered an example of an anti-innovation approach as there will be boundaries established and restrictions enforced on all activities. In contrast, a decentralized structure allows the employees to be involved in decision making and empowers them to participate in making any decision. In other words, employees have a say in the planning and execution of new ideas (Ahmady et al., 2016).

According to O'Grady (2019), "Decentralised organisational structure seeks to reduce the hierarchy and distribute more decision-making authority to a greater number of employees. It enables companies to become more flexible and to better handle unanticipated events" (p. 225). In this structure, most decisions are delegated to subordinates

down the hierarchical order. Furthermore, as reflected in the position adopted in the present research, the research and development activities that were controlled and managed at lower levels of the organization would still be a part of the decentralised structure (Bergfors & Larsson, 2009). This structure is usually applied to deal with dynamic business activities as it offers autonomy to make decisions faster and respond quickly to change.

### **Organizational Structure and Organisational Innovation**

The level of innovativeness in any company is established by the formation of their innovative actions. Literature has also discussed different organizational structure and its effect on the intensity of innovation (Arora et al., 2014). However, extant literature did not investigate the mechanism in which any change in structure is critical for innovation in a company (Argyres et al., 2018). Moreover, it has been argued for some time now that organizational structure affects organizational innovation. However, there is still very few empirical investigations on this matter.

In sum, innovation is all about new ideas and new processes. It is considered as a key factor for a company's progress, as well as crucial for the company's competitive advantage over other players. Organizational structure and organizational innovation have a unique relationship due to their contrasting effects on structural forms and the tendency to transform (innovation) (Geldes et al., 2017). Organizational structures are formed to regularize different qualities including flexibility, stability, empowerment, and technology acceptance. Innovation is the result of these regularizations.

In light of the foregoing discussions, it is clear that organizational innovation is dependent on organizational structure. More importantly, the type of organizational structure determines the intensity of organizational innovation. Centralized organizational structure has rigid rules to follow and a proper chain of command through which decisions are processed. However, a decentralized organizational structure has provided more autonomy for employees in decision making and a channel for the feedback of ideas. Employees can be more productive as they are allowed to express their creativity and participate in innovation. This is because if they feel secure and are

given the support to think out of the box, they can share ideas and come up with more innovation.

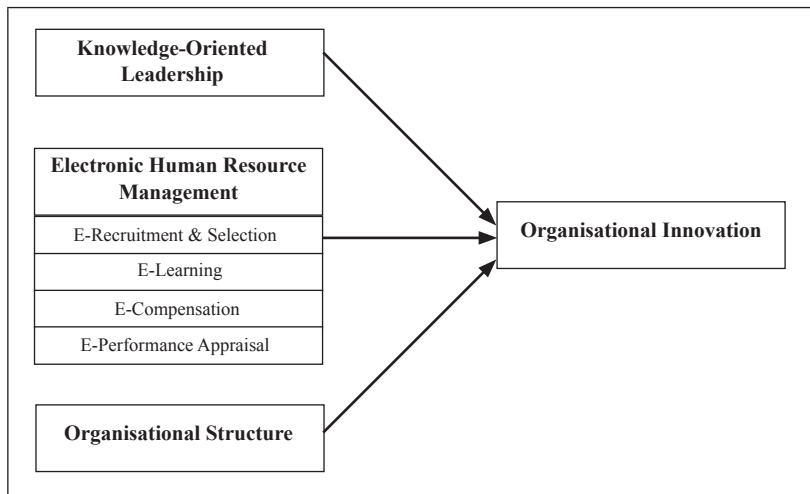
Extant literature has also documented the relationship between organizational structure and organizational innovation. A meta-analysis was conducted by Damanpour (1991) on the relationship between organizational innovation and other determinants. He found that organizational structure was significant for the development of innovation. Turbulent business environments required dynamic capabilities which were only possible with decentralization, resulting in an organizational environment where there would be less formalization, more flexibility and responsiveness (Cosh et al., 2012). Accordingly, the following hypothesis has been proposed for the present study:

H<sub>3</sub>: A decentralized organizational structure has a positive and significant relationship with organizational innovation.

Furthermore, in light of the insights gained from the review of the literature discussed, the following conceptual framework has been developed for the present study (See Figure 1).

**Figure 1**

*Conceptual Framework of the Study*



## **METHODOLOGY**

### **Research Design**

Consistent with positivism philosophy, the current research has used a cross-sectional approach in the collection of its data, and then employed a quantitative method of data analysis. A quantitative research design has enabled this study to investigate the relationship between the independent variables (i.e., knowledge-oriented leadership, E-HRM, and decentralized organizational structure) and the dependent variable (i.e., organisational innovation). Data was collected through questionnaires and analyzed using SmartPLS software. This software has a better analytical accuracy in the results generated as compared to the CBSEM (Chin, 2010). The software is also appropriate for the analysis of causal relationships (Hair et al., 2012).

### **Sampling Design and Procedures**

The population of this research comprised manufacturing companies that were registered with the Federation of Malaysian Manufacturers (2018). From each company, one individual (i.e., Owner, Chief Executive Officer, Director, General-Manager, Senior Manager, Manager, or Executive) was selected to respond to the items about the practices in the respective organizations as they have better understanding of the company's strategies and its operations. Through a simple random sampling technique, a total of 218 usable responses were obtained. The rate of response was considered sufficient for a structured equation modelling (SEM) (Hair et al., 2010).

### **Questionnaire Design and Structure**

A 5-Point Likert scale (i.e., ranging from Strongly Disagree to Strongly Agree) was used to get the responses for each item. Section A of the survey questionnaire dealt with the respondent's demographic information, whereas Section B contained all the items about the variables of interest in this study. Six of these items were on the dependent variable knowledge-oriented leadership. They were adapted from the research of Donate and de Pablo (2015) with two exemplary items: "*Our company managers assume the*

*role of knowledge leaders as a mediator for sharing and applying knowledge” and “Our company managers behave as advisers, and controls are just an assessment of the accomplishment of objectives”.*

As for the dependent variable E-HRM, the scale was adapted from Hooi (2006). Four dimensions (i.e., e-recruitment and selection, e-learning, e-compensation, and e-performance) were covered through 12 items for this variable (Hooi, 2006). Sample items included *“Our company uses recruiting website/job board to identify potential job candidates”* and *“Our company is using performance appraisal software for evaluation purposes”*.

The scale for decentralized organizational structure was adapted from Willem et al. (2007). Four items were used to measure this construct. Sample items were *“Every matter in our company have to be referred to someone higher up for the final answer”* and *“In our company, a person who wants to make a decision on his own is discouraged”*. These items were included and reverse coded to measure the flexibility of employees for decision making. For the organizational innovation scale, six items from the study by García-Morales et al. (2012) were adapted, and the sample items included were, *“Our company’s emphasis is on developing new products”* and *“Our company has spent on new product development activities in last 12 months”*.

## **RESULTS**

This results section will provide an insight into the demographic profiles of the respondents. It will also discuss the measurement model and the structural model assessment. The reliability and validity properties will be explained in the measurement model, while the hypotheses testing and their results will be discussed in the structural model.

### **Respondents’ Demographic Profiles**

To help the study obtain the viewpoints from both genders equally, the samples selected comprised 46 percent females and 54 percent males. Furthermore, 30.6 percent of the respondents were from companies

located in Selangor, this was followed by Perak and Kuala Lumpur with 17.3 and 15 percent, respectively. These three states were considered as industrial hubs and thus, represented the main portion of the required samples. In addition, most of the respondents (44.5%) were holding the position of either Senior Manager or Manager, while 38.5 percent of the respondents fell into the category Owner/CEO/Director/General Manager. This tier of officials are normally involved in decision making and have great influence because of their experience and overall control of a company's activities (Bahari et al., 2018). As such, it was crucial to be able to include this latter category of respondents in the present study. Approximately 84 percent of the respondents in this study came from the category involved in decision-making and knew first hand the policies of the organization well. A total of 69 percent of the respondents were from the middle age group, they were between 25 and 44 years old. At the same time, six percent of the respondents were above 55 years old. The details are as presented in Table 1.

**Table 1**

*Demographic Details of the Sample*

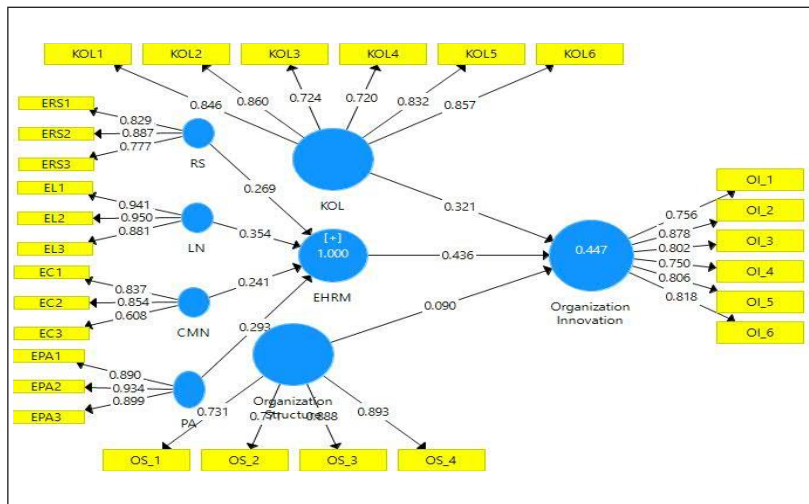
| Characteristics                    | Sample (n = 218) |            |
|------------------------------------|------------------|------------|
|                                    | Frequency        | Percentage |
| Gender                             |                  |            |
| Male                               | 117              | 54%        |
| Female                             | 101              | 46%        |
| Job Status                         |                  |            |
| Senior Manager/Manager             | 97               | 44%        |
| Owner/CEO/Director/General Manager | 84               | 39%        |
| Executive                          | 37               | 17%        |
| Age Group                          |                  |            |
| 25 to 34 years old                 | 77               | 35%        |
| 35 to 44 years old                 | 74               | 34%        |
| 45 to 54 years old                 | 54               | 25%        |
| More than 54 years old             | 13               | 6%         |

## Measurement Model

A total of 218 usable responses were collected for a Confirmatory Factor Analysis (CFA). In order to ensure the best representation of sample to actual population, the Weighted Partial Least Square (WPLS) method was applied. It helped to estimate the population parameters consistently and further assisted in the generalizability of the results. The percentages of product types were used to revalue the sample for weighted scores and added to assessment for better results. Furthermore, for the purpose of validation, items of the variable with a factor loading above 0.6 were retained (Hair et al., 2015). The measurement model is depicted in Figure 2.

**Figure 2**

*Measurement Model of Variables Understudy*



*Note.* KOL = Knowledge-Oriented Leadership; EHRM = Electronic Human Resource Management; ERS = Electronic Recruitment & Selection; LN = Electronic Learning; CMN = Electronic Communication; EPA = Electronic Performance Appraisal

Firstly, to assess the goodness of measures, validity tests and reliability tests were conducted. Initially, a construct validity test was conducted to check the fitness of all items of the construct. The item loadings



with the same criteria of 0.6 were inspected, as this was suggested by Hair et al. (2010). The respective values confirmed the establishment of the criteria, and hence, no item was deleted.

Secondly, to check the significance of the measurement model, convergent validity was assessed. Random measurement error has been tested by the examination of Cronbach's Alpha, Convergent Validity and Average Variance Extracted (AVE) and there were no problems detected (see Table 2). Additionally, the AVE has to be higher than 0.5 (Hair et al., 2010), a standard which all the variables managed to meet. Hence, all items converged to the respective hypothesized construct.

**Table 2**

*Construct Reliability and Validity*

| Construct Reliability and Validity |                  |       |                       |                                  |
|------------------------------------|------------------|-------|-----------------------|----------------------------------|
|                                    | Cronbach's Alpha | rho_A | Composite Reliability | Average Variance Extracted (AVE) |
| E-HRM                              | 0.927            | 0.93  | 0.937                 | 0.557                            |
| EC                                 | 0.897            | 0.905 | 0.936                 | 0.830                            |
| EL                                 | 0.915            | 0.919 | 0.946                 | 0.855                            |
| EPA                                | 0.893            | 0.896 | 0.934                 | 0.824                            |
| ER&S                               | 0.776            | 0.779 | 0.87                  | 0.692                            |
| KOL                                | 0.894            | 0.915 | 0.919                 | 0.654                            |
| OS                                 | 0.872            | 0.67  | 0.894                 | 0.679                            |
| OI                                 | 0.889            | 0.897 | 0.915                 | 0.644                            |

*Note.* KOL = Knowledge-Oriented Leadership; EHRM = Electronic Human Resource Management; ERS = Electronic Recruitment & Selection; LN = Electronic Learning; CMN = Electronic Communication; EPA = Electronic Performance Appraisal; OS = Decentralized Organisational Structure; OI = Organizational Innovation

A discriminant validity test was performed to address the issue of multicollinearity. The values of factor loading, and AVE were compared with the criteria (Hair et al., 2010). The AVE values should

be more than 0.5 (see Table 2) and the square root of AVE of each construct is greater than the respective column values, as can be seen in Table 3. Finally, the criteria for the Variance Inflation Factor (VIF) has also been met with all values less than 5 (Rogerson, 2001). Therefore, the model and variables were found to be independent of one another (Hair et al., 2015).

**Table 3**

*Discriminant Validity*

|       | E-HRM | EC    | EL    | EPA   | ER&S  | KOL   | Dec.<br>Org.<br>Structure | Org.<br>Innovation |
|-------|-------|-------|-------|-------|-------|-------|---------------------------|--------------------|
| E-HRM | 0.946 |       |       |       |       |       |                           |                    |
| EC    | 0.846 | 0.911 |       |       |       |       |                           |                    |
| EL    | 0.87  | 0.626 | 0.925 |       |       |       |                           |                    |
| EPA   | 0.784 | 0.501 | 0.619 | 0.908 |       |       |                           |                    |
| ER&S  | 0.836 | 0.67  | 0.615 | 0.545 | 0.832 |       |                           |                    |
| KOL   | 0.559 | 0.502 | 0.454 | 0.365 | 0.545 | 0.809 |                           |                    |
| OS    | 0.067 | 0.082 | 0.057 | 0.135 | 0.092 | 0.091 | 0.824                     |                    |
| OI    | 0.65  | 0.583 | 0.592 | 0.383 | 0.595 | 0.553 | 0.099                     | 0.803              |

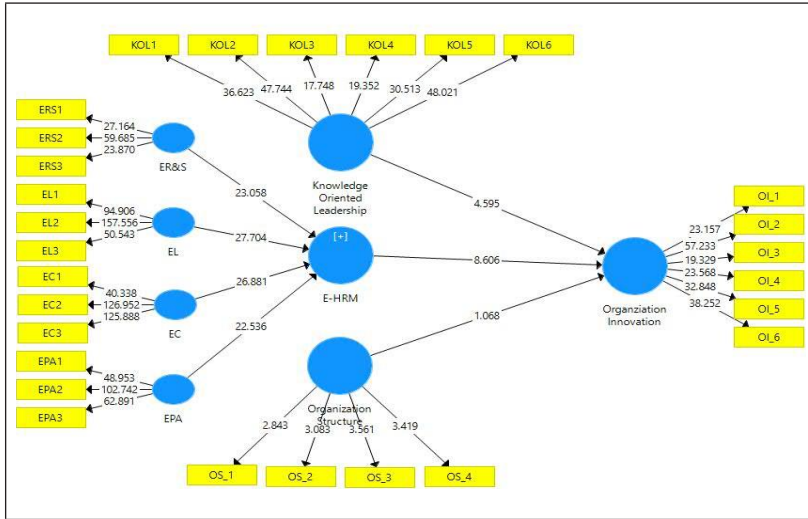
**Assessment of Structural Model and Hypotheses**

After the measurement model was established, the second step of the structural model was assessed *via* a bootstrapping technique of 5000 resamples. All the hypotheses were tested through a structural path modelling technique. The three main hypotheses were tested to determine whether the objective of the research study has been achieved. The results of hypotheses  $H_1$  and  $H_2$  were supported with statistical values of 4.595 and 8.606, respectively. However,  $H_3$  was rejected with a t-statistics value 1.068, as is shown in Figure 3 and Table 4.

Through the thorough structural model analysis, it could be finally concluded that  $H_1$  and  $H_2$  were supported, while  $H_3$  showed insignificant results.

**Figure 3**

*Structural Model*



**Table 4**

*Structural Model Assessment*

| Hypotheses     | Relationship                                                        | T-statistics | p-value | Results       |
|----------------|---------------------------------------------------------------------|--------------|---------|---------------|
| H <sub>1</sub> | Knowledge-Oriented Leadership -> Organizational Innovation          | 4.595        | 0.000   | Supported     |
| H <sub>2</sub> | E-HRM -> Organization Innovation                                    | 8.606        | 0.000   | Supported     |
| H <sub>3</sub> | Decentralized Organizational Structure -> Organizational Innovation | 1.068        | 0.285   | Not Supported |

## DISCUSSIONS

The field of research on management practices to increase organizational innovation is growing, owing to the practical and theoretical importance of firms. The three major practices, namely knowledge-oriented leadership, E-HRM, and decentralized organizational structure, have been introduced to improve organizational innovation.

The first hypothesis was related to knowledge-oriented leadership and organizational innovation. The result showed that knowledge-oriented leadership has a significant impact on the t-statistics value, which was 4.595. There could be several explanations for this significant impact. According to Yahya and Goh (2002), knowledge could contribute to creating conditions conducive to innovation in firms. Nowadays, innovation has become a competitive advantage for successful organizations. The application of knowledge-oriented leadership will help in the creation and application of new knowledge which is necessary for new product development and innovation. This leadership style also accentuates continuous improvement in the firm by using implicit and explicit knowledge (Wang & Ahmed, 2007).

The first objective of this research was achieved by examining the level at which a knowledge-oriented leadership style was vital for organizational innovation. The analysis showed that a specific leadership style that was a mixture of characteristics of transformational and transactional leadership, and with an extra motivational component could have a great impact on organizational innovation performance (DeCarolis, & Deeds, 1999). This leadership style helps firms to understand that knowledge through R&D (innovation) is an imperative for improvement and to outperform competitors. Therefore, nowadays, companies are embracing this style of leadership which will help them to embark on the journey towards organizational innovation.

The second objective of the study was to investigate the extent to which E-HRM could influence the organizational innovation of manufacturing firms. With a t-stat value of 8.606, the results have confirmed that there was a significant relationship between E-HRM and the organizational innovation success of firms. In other words, by accentuating on E-HRM practices, firms can enhance their organizational innovation. This result was also supported in studies by other researchers. For example, according to De-Leede and Looise (2005), a specific approach must be planned in E-HRM to attain innovative organizational performance. The results of the current study offer key insights about E-HRM and organizational innovation for all levels of managerial staff. The results underscored the fact the employee management was critically important for organizational innovation. The empirical evidence provided in the present study has clearly shown that E-HRM (including e-recruitment and selection, e-learning, e-communication and e-appraisal system) had a crucial

impact on organizational innovation. Lin (2011) has emphasized particularly that success in the implementation of organizational innovation would require the synchronization of all functions of the E-HRM of a firm. Organizations are made up of employees and every performance is dependent on how they are managed. E-HRM provides a complete management solution to achieve the objectives of the organization, especially in terms of the performance of organizational innovation. It will help organizations to hire innovation-focused employees, train, and compensate them accordingly to improve the performance of the organization.

Finally, the last hypothesis of this study which sought to examine the relationship between decentralized organizational structure and organizational innovation has been tested and found to have insignificant support. The hypothesis was not supported because the t-value of 1.068 was less than 1.96. It indicated that the change in decentralized organizational structure had no noteworthy impact on organizational innovation. Few past studies have found a positive impact of decentralized structure on organizational innovation (Marín-Idárraga, & Cuartas, 2016). The authors explained that a more flexibility of the organization structure would allowed employees to become creative and achieved their full potential, thus helping to enhance the firm's performance.

However, the current research also showed results which were contrary to some studies highlighted in the literature review. For example, there could be several reasons in support of the insignificant response found in the present study. Initially, due to advancements in technology and the less competitive business conditions, many business persons have been registered as sole-proprietors or partnership corporations to run their businesses. The Malaysian official statistics also stated that 98.5 percent of firms were small and medium enterprises (SMEs). With many of these businesses operating with only one or two persons, it was not seen as necessary to institute any specific organizational structure, which as caused the present inconsequential result. Moreover, the current situation of Covid-19 has disrupted the business environment which included aspects of work, processes, and structure. Present day workers also have to follow various standard operating procedures (SOP), which were in the past not experienced before. These sudden changes have influenced and thus resulted in different findings which were not expected.

## **CONCLUSION, IMPLICATIONS, AND DIRECTIONS FOR FUTURE RESEARCH**

In the current study, three independent variables were studied to determine how they impacted organizational innovation. Knowledge-oriented leadership was found to have a positive effect and a strong relationship with organizational innovation. Likewise, E-HRM also positively impacted organizational innovation. By investigating the relationship between knowledge-oriented leadership, E-HRM and decentralized organizational structure in management practices and determining how these variables impacted organizational innovation, the current research has extended our knowledge on organizational innovation in the context of the current dynamic business environment of Industry 4.0. By testing the proposed conceptual framework, the current study has been able to confirm the importance of certain management practices for organizational innovation, especially with regard to specific leadership styles and human resource practices that are supported by online features.

The present research has added a noteworthy contribution to the literature by filling the research gap on the identification of antecedents to organizational innovation. The critical role of knowledge-oriented leadership and E-HRM in organizational innovation will certainly generate considerable interest among future researchers. Most importantly, the insignificant results on the relationship between decentralized organizational structure and organizational innovation will widen the opportunity for research on the manufacturing sector. Besides, the results of the research have multiple takeaways for the manufacturing industry stakeholders and Malaysian officials. The new Malaysian policy “*Industry4wrd*” which strongly emphasized the importance of innovation for the manufacturing sector has further underscored the valuable contributions of the present study. The industry stakeholders must now make more serious efforts to adopt the relevant recommended management practices to enhance organizational innovation. Due to the fact that manufacturing companies will always require continuous improvement in their processes, they must also continually learn to be more careful in choosing their leaders and the best HR practices.

In future, other management practices such as organizational culture can be utilised to determine and enhance organizational innovation. Moreover, a longitudinal study to analyze the covid-19 impact on

organizational innovation is highly recommended in future studies. The quantitative methodology used in the present study has limited the researcher to using only closed-ended questions to obtain information from respondents. Furthermore, the findings are limited to the manufacturing sector and cannot be extrapolated to other industries. Therefore, it would be interesting to expand the scope to other sectors by choosing different geographical research sites using a mixed methodology to further validate the findings in this study.

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