International Journal of Asian Social Science, 2013, 3(8):1753-1769

International Journal of Asian Social Science
ISSN(e): 2224-4441/ISSN(p): 2226-5139

journal homepage: http://www.aessweb.com/journal-detail.php?id=5007

EXPLORE LINKAGE BETWEEN KNOWLEDGE MANAGEMENT AND ORGANIZATIONAL PERFORMANCE IN ASIAN FOOD MANUFACTURING INDUSTRY

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ABSTRACT

This paper is about to examine the relationship of organisational learning (OL) with knowledge management (KM) and their effect on organisational performance (OP) in food industries. The conceptual framework proposed in this research is a creative model that contributes to relevant theories of KM, OL, and OP literature. 168 companies in food industry were selected in China, Taiwan, Malaysia, and structural equation modelling (SEM) is applied to test the hypotheses in our research model. The research model includes three constructs including KM, OL and OP, and three measurement variables include firm age, size, and type. The results show that KM and OL have positive effect on OL and OL is a mediator in the relationship between KM and OP. Moreover, firm age, size, and type are moderators in the relationship among three constructs in the research model.

Keywords: Knowledge management, Organizational learning, Organizational performance.

1. INTRODUCTION

Nowadays, with ever-increasing competition in the world of business, most of the firms and organizations are obliged to adjust to new ways to enhance their performance. This improvement,

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ISSN(e): 2224-4441/ISSN(p): 2226-5139

however, requires embedding multiple characteristics in the organization. There are several works of previous researchers that focus on factors influencing firms performance (Cherian and Jacob, 2013; Sultana *et al.*, 2013). Therefore, gaining a better understanding of the factors influencing organizational performance is essential. Results of the previous studies mostly emphasized on knowledge management process (Kalling, 2003; Zack *et al.*, 2009; Korte *et al.*, 2011; Mills and Smith, 2011) and organizational learning (López *et al.*, 2005; Som *et al.*, 2012) as key factors influencing organizational performance. However, a number of other studies have focused on the relationship among KM, OL, and OP (Crossan and Bapuji, 2003; Liao and Wu, 2009; Alavi *et al.*, 2010; Abdullah *et al.*, 2013). Accordingly, the main purpose of this study is to examine the relationship between OP and KM in food industry.

Food industry is considered as one of the most knowledge-intensive industries for its considerable amount of knowledge input, short life cycles of product, demand of highly customized products and significant production value. The survey results cover knowledge-intensive food industry companies in Malaysia, Taiwan and China.

Regression (Jenatabadi and Ismail, 2007), data envelopment analysis (Khezrimotlagh *et al.*, 2013) and SEM (Jafarnejad *et al.*, 2009; Moghavvemi *et al.*, 2011; Jenatabadi and Ismail, 2012; Hui *et al.*, 2013) are the most familiar methodologies for model estimating in organizational studies. SEM introduced by Jöreskog (1967), to test the casual organizational characteristics that influences performance of manufacturing companies. This approach has recently been employed widely in different fields with studies on OP including KM (Nejatian *et al.*, 2011; Hui *et al.*, 2013), OL (Hui *et al.*, 2013; Radzi *et al.*, 2013), organizational innovation (Hui *et al.*, 2013), total quality management (Vranakis and Chatzoglou, 2011), Enterprise resource planning (Qutaishat *et al.*, 2012), supply chain management (Ruteri, 2009; Deshpande, 2012; Jenatabadi *et al.*, 2013), and airline industry (Jenatabadi, 2013; Jenatabadi, 2013). SEM is also known as extension of analysis of multiple regressions, factor and path analyses, latent variable analysis, covariance structure analysis and confirmatory factor analysis. SEM is an outcome of multi equation models resulting from econometrics and measurement models from psychology (Black *et al.*, 2010).

SEM combines cause and effect and statistical data to provide a quantitative evaluation of relations among the tested variables. Significant relationships demonstrate validity of the theoretical construction and can be employed to provide practical guidelines for application of the model (Mittal and Kassim, 2007). SEM is a totally practical and appropriate method of causal relationships empirical validation. Furthermore, SEM is also applicable to prediction to some extent. It further specifies, evaluates and estimates linear relationship models among observed variables in terms of smaller number of latent or unobserved variables (Schreiber *et al.*, 2006).

2. LITERATURE REVIEW & RESEARCH HYPOTHESIS

2.1. Km

Knowledge is not only a main resource for a company, but also a vital source of competitive gain (Gold *et al.*, 2001).Therefore, entrepreneurs who are masters in information and knowledge stand to gain more benefits from the market.

KM, branching from knowledge, is about the knowledge exploitation and improvement of a company to achieve the organization's objectives (Ramachandran *et al.*, 2009). Moreover,

Knowledge Management (KM) attempts to solve the problematic paradoxes in business (Anthes, 1998).

Many types of KM processes have been introduced by past researches including: create, transfer, and use (Skyrme and Amidon, 1998); capability-acquisition, conversion, application, and protection (Gold *et al.*, 2001); experiment, acquire, integrate, and collaborate (Leonard-Barton, 1995); and capture, transfer, and use (DeLong, 1997).

2.2. OL

Learning ability is a natural talent in every normal human being through which he/she can adapt to the dynamic environments surrounding him/her. It is through learning that people can arrive at new concepts and insights that guide them to effective decisions for appropriate reactions and immediate correction of mistakes and errors (Argyris and Schon, 1978). As part of human nature, the role and impact of learning extends to our business and career, and consequently, its quality determines the rate of success in our organizational tasks. In this regard, Morgan and Ramirez (1984) suggest that OL depends on the actual learning attempts people apply to get to the solution of a common problem they encounter in their environment. According to Garratt (1990), a OL is the application of organizational improvement, therefore, in order to address consumers' satisfaction, it is necessary for an organization to develop its personal and group learning abilities. For this reason, the organization needs to complete knowledge management process successively; otherwise, development of its personal or group learning abilities would be impossible (Garratt, 1990; Su *et al.*, 2003). Pilar *et al.* (2005) also believe that knowledge and its dissemination and integration, acquisition or creation, within the company would be an essential strategic resource to OL. Moreover, OL is considered as an active procedure founded on knowledge, implying moving along different levels of achievement, from the individual to the group levels, and then to the organizational level and back again (Huber, 1991).

As a viewed by past studies, Ke and Wei (2006) have discussed and identified knowledge as the antecedent and the base of OL. Therefore, as the first hypotheses of this study we can assume:

H_1: KM is positively related to OL in food industry.

2.3. OP

Researchers and specialists active in different fields and disciplines agree that OP covers strategic planning, operations, financial, legal issues and organizational developments. As Hamon (2003) considers, OP is an indicator measuring the quality and the ways an enterprise achieves its objectives. Therefore, an organization's performance can be evaluated base on the levels of the efficiency and effectiveness of goals achieved (Robbins and Coulter, 2002). In this regard, Andersen (2006) considers the concept of effectiveness as a ratio, which requires two entities to define and measure the effectiveness of achieving goals, for example, return on assets. According to Andersen, effectiveness is the degree of goal attainment, i.e., the achievement of profitable objectives. In other words, OP forms the practical products and outputs of a given company measured by the initially intended targets.

According to Schermerhorn *et al.* (2000), performance concerns the quality and quantity of individual or group task achievements. However, in the more recent texts on OP, effectiveness and efficiency are taken as two synonyms and interchangeable terms (Hancott, 2005).

KM is intended to increase the quality and performance of the organizational and help a company to compete effectively with other companies in the market (Wilcox King and Zeithaml, 2003). Bogner and Bansal (2007) have distinguished three mechanisms of KM systems that influence the performance of a company, i.e., its ability to generate new knowledge, and based on this knowledge to effectively achieve a high quantity of the resulted spin-offs (Chen and Mohamed, 2008). An effective operation of KM enables companies to perform more efficiently and survive in the business competitive environment through sustaining their competitive advantages and developing their knowledge assets (Zaim *et al.*, 2007). Knowledge-based view considers knowledge and KM as a vital resource upon which the success of the organization depends on heavily (Beesley and Cooper, 2008). However, occurrence of sustained competitive advantage itself depends on company's development of a distinctive core competency such as KM (Hoffman *et al.*, 2005). The outcome of the above discussion is formulated in the following hypothesis

H_2: KM is positively related to OP in food industry

It is a consensus among various scholars and researchers that OL forms the foundations for gaining a competitive advantage, an important variable in improving the performance of the organization (Brockman and Morgan, 2003). This is true of companies that are able to learn to stand firm and adapt themselves logically with the new conditions and trends in the marketplace to gain the optimal results (Tippins and Sohi, 2003). As a result of learning, companies can be more flexible and quicker in their reactions and responses to the new environments and challenges (Slater and Narver, 1995). The results of past studies provide substantial amount of evidences to support the positive impacts of the OL on company performance. Therefore we assume:

H_3: OL is positively related to OP in food industry

Another study by Tippins and Sohi (2003) has come to the conclusion that OL plays the role of a mediator between IT competency and organization's performance. In line with the literature, the impact of KM on OL is positive (Garratt, 1990; Su *et al.*, 2004). In this study, the relationship between KM flow factors and KM flows is also mediated by OL. In this regard, Darroch (2005) has also discovered that the influence of knowledge acquisition on OP is more indirect than direct. From this discussion, we can arrive at the following proposition hypothesis;

H_4: OL is a mediator in the relationship between KM and OP in food industry.

3. MODERATOS OF FIRM AGE, SIZE, AND TYPE

In order to examine the linkages among KM, OL, and OP in greater depth, this study examines the likely moderating effect on these relations for particular external and internal indicators such as; company size, age, and type. The literature often cites that they can moderate the relationship between KM and OP (Jiménez-Jiménez and Sanz-Valle, 2010). Based on the literature of studies related to organizational performance, firm size is considered as a control (Durand and Coeurderoy, 2001; Liao, 2005; Choi, 2010; Ahlin *et al.*, 2012; Noruzy *et al.*, 2013) and moderating variable (Hofer *et al.*, 2012; Sicotte *et al.*, 2012). Firm age is a variable that has been used in estimating organizational performance as an independent (Powell *et al.*, 1999; Hmieleski *et al.*, 2010; Wang *et*

al., 2011), control (Wang *et al.*, 2010; Carmeli *et al.*, 2011; Ling, 2012) and moderating variable (Jiménez-Jiménez and Sanz-Valle, 2010; Anderson and Eshima, 2011; Onyango *et al.*, 2012). Sørensen and Stuart (2000) illustrated that the experience that delivers by their age is helpful for them to improve their performances more efficiently. Therefore, age and size may increase performance or influence KM and OL on OP.

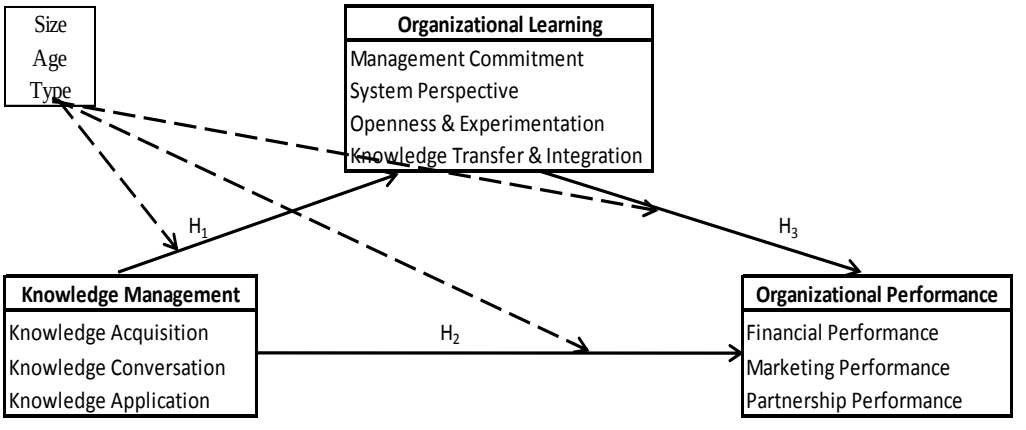
With firm age and size moderate the relationship between KM & OP; KM & OL; and OL & OP. we added firm type variable which is divided into public and private in the research model. This is considered as another contribution of the study. Therefore, we assume:

H_5. Firm size, age, type moderate the relationships among KM, OL and OP in food industry.

4. METHODOLOGY OF THE STUDY

With the above points, it is understood in this study that a system perspective is employed using KM as an initial input, OL as mediator, and OP as output. As per the reviewed literatures, the research framework constructed by this study is displayed in Figure 1.

Figure-1. Research Framework



5. SAMPLING

In this study, qualitative survey is employed to empirically examine the hypotheses proposed in the research framework. The data collection period of five months spanned from October 2012 and February 2013. The prepared questionnaires were distributed to 650 randomly selected food manufacturing companies in China, Taiwan, and Malaysia. The Chief Executive Officers (CEOs), Managing Directors, Senior Managers were targeted as the key informants. Only 168 companies returned the completed questionnaires which provided this study with a response rate of 26%.

6. MEASURES

We use KM model proposed by (Gold *et al.*, 2001) who defined it into three processes including: knowledge acquisition (KM1), knowledge conversation (KM2), and knowledge application (KM3). According to definition, OL refers to activities which firms perform to transform learning capabilities of both competitors and individuals (Jerez-Gomez *et al.*, 2005). OL

has four dimensions, namely: management commitment (OL1), system perspective (OL2), openness and experimentation (OL3), and knowledge transfer and integration (OL4). The three dimensions of organisational performance were applied based on Emden *et al*. (2005) study. These include; financial (OP1), marketing (OP2), and partnership (OP3) performances. In this study, we consider organisation age as the number of years from the date of establishment and organisation size as the number of employees of the organisation. For measuring organisation type, the study uses a dummy variable (0=public, 1=private).

6.1. Path Analysis

Path and factor analyses are incorporated and integrated by SEM analysis that makes a hybrid model which contains both multiple variables for each specified indicator, called construct, latent, or unobservable variables , and paths that link the constructs (Garson, 2007). In case, the composite scores (index or composite items) of the indicators substituted the constructs and the relevant indicators and if the observed items are linked with arrows, the model that results is called path model. Therefore, it can be claimed that path analysis is a part of SEM method (Garson, 2007).

Another name for SEM technique with observed (single indicator) indicators is path analysis (Kline, 1998; Garson, 2007). When SEM method is used for a classic model with each variable having multiple measurements or indicators but no direct effects (arrows) that link the variables, it becomes a sort of factor analysis. However, when SEM software is used for a model with each variable having solely one indicator, or composite score, it is a type of path analysis (Garson, 2007). In path analysis, the observed variables are utilised typically to make a combination of average or sum scores of the items (factors or variables) of every scale to measure a construct (Colak, 2008).

Graphically, it is common to indicate (single-indicator) observed variables by squares, and construct or latent variables by ovals. A model with variables indicated only by squares is called a path model, but if the model contains variables that should be indicated by ovals but are indicated by square objects (i.e., indicators of variables) that are connected to the variables by arrows, it is called structural model.

In order to summarise the differences between SEM analysis and path analysis, it is worth to note that path analysis is I fact a special kind of SEM analysis. While latent variables measured by multiple observed indicators are used in SEM analysis, in path analysis only observed variables produced through the combination of the sum or average scores of the multiple indicators are utilised. These indicators are used to measure the latent constructs. However, SEM analysis and path analysis are similar in features, both are used to see if the model is overall fit and suitable to the obtained data and test individual hypotheses or not.

The previous section elaborated the main trend of this study which shows that path analysis, a special type of SEM is applied in the analysis of the hypothesised relationships within the research model. To carry out these tests, AMOS (Analysis of Momentum Structures) 17.0 (Arbuckle, 2008), a user-friendly graphical SEM software program was utilized. After a diagram of the model is drawn on the computer screen, AMOS automatically produces equations for the model.

7. RESULTS

Table 1 presents the correlations between research variables. As can be seen, the following linkages exist between the research measurements and constructs.

(1) Linkage between KM and OP: KM is positively related to OP, meaning more KM show higher capability in enhancing OP in the food manufacturing industry.

(2) Linkage between KM and OL: KM is positively related to OL, meaning more KM show higher capability in enhancing OL in the food manufacturing industry.

(3) Linkage between OL and OP: OL is positively related to OP, meaning more OL show higher capability in enhancing OP in the food manufacturing industry.

Table-1. Correlation between the indicators and constructs

indicators	1	2	3	4	5	6	7	8	9	10	11	12	13
1.KM	1.0												
2.OL	.45	1.0											
3.OP	.69	.60	1.0										
4.OL3	.43	.96	.58	1.0									
5.OL1	.38	.85	.51	.82	1.0								
6.OL4	.44	.98	.59	.95	.83	1.0							
7.OL2	.40	.89	.54	.86	.76	.88	1.0						
8.OP3	.48	.42	.70	.41	.36	.41	.38	1.0					
9.OP2	.57	.50	.82	.48	.42	.49	.44	.57	1.0				
10.OP1	.47	.41	.68	.40	.35	.41	.37	.48	.56	1.0			
11.KM3	.61	.27	.42	.26	.23	.27	.24	.29	.35	.29	1.0		
12.KM2	.88	.39	.61	.38	.33	.39	.35	.42	.50	.42	.54	1.0	
13.KM1	.84	.38	.58	.36	.32	.37	.34	.41	.48	.40	.51	.74	1.0

8. HYPOTHESIS TESTING

Figure 2 presents casual research model and Table 2 shows the overall model fit and all the hypotheses. As shown, the results of path analysis indicate an adequate fit: AGFI=0.921, RFI=0.911, IFI=0.921, CFI=0.941, GFI=0.907, NFI=0.902, TLI=0.917 and RMSEA=0.056. All hypotheses are shown in Table 2 for details. The influence of the firm's KM to OL (H_1; β_1=0.45, C.R=4.640) is significant. The positive influence of KM to OP (H2; β_2=0.53, C.R=5.002) is supported by our findings. While we expected to find a positive relationship between the firm's OL and its OP (H3; β_3=0.37, C.R=4.402), our findings show a significant positive relationship between these two research constructs.

Table-2. Parameter estimated and goodness of fit indices

Hypotheses	Path	Standardized coefficient	C. R.	p	Result
H1	KM → OL	0.45	4.640	< 0.01	Supported
H2	KM → OP	0.53	5.002	< 0.01	Supported
H3	OL → OP	0.37	4.402	< 0.01	Supported
AGFI=0.921	RFI = 0.911	IFI = 0.921	CFI = 0.941		
GFI = 0.907	NFI = 0.902	TLI = 0.917	RMSEA = 0.056		

Figure-2. Structural model

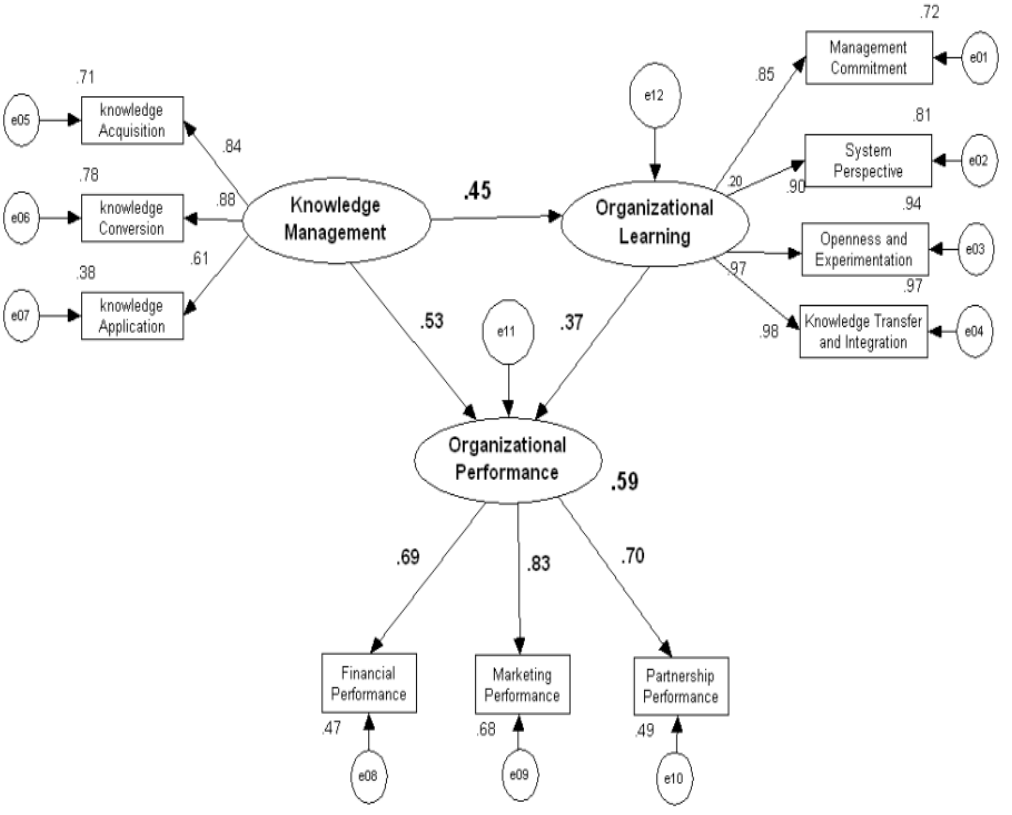


Table 3 presents the results of the indirect, direct, and total impact of each constructs. After the path analysis, it is revealed that the direct impact of KM and OP, i.e., β_2= 0.53, C.R. = 5.002, p < 0.001, is significant, and, the indirect impact is 0.17. Since the indirect impact is not larger than direct one, the relationship between KM and OP is fully mediated by OL in the food industry. This, thus, supports the fourth hypothesis (H_4).

Table-3. Results of direct, indirect, and total impact of research model

Dependent Construct	Independent Construct	Standardized estimates		
		Direct	**Indirect**	**Total**
OL				
	KM	0.45	-	0.45
OP				
(R^2= 0.59)	KM	0.53	0.17	0.70
	OL	0.37	-	0.37

Finally, H_5, states that firm age, size, and type of the company moderate the relationships among KM, OL, and OP in manufacturing food industry. To examine these moderating impacts, this study applies the two-group comparison of SEM. We divide the sample into two separate groups along the median of firm age and size (with the exception of firm type as this variable is dichotomous). One group includes food companies with the higher ranks of each moderator and the other group includes food companies with lower ranks. Then, the analysis contains a two-group

comparison to test the existence of any significant differences in structural parameters between low and high level food companies or public and private companies.

In order to test firm age, size, and type differences among the regression weights, the Critical Ratio (C.R.) test (> ±1.96, $p < .05$) can be employed to assess the critical ratio statistics for the differences between regression weights of higher and lower age subjects (Ho, 2006). According to Arbuckle and Wothke (1999), the critical ratio of an estimate pair tests the hypothesis to confirm the equality of the two parameters. This method in the analysis is repeated to investigate the three variables' possible moderating effects in the three relationships for research model.

Table 4 shows that, although the relationships among three main constructs are positive and significant for all the groups, the three variables studied influence how intense these relationships are. Therefore, the variable of firm age, size, and type act as moderators in the research model which supports the H_5 of this study.

Table-4. Moderating test for research model

Path	**Overall model**	**Low**	**High**	**C.R. (difference)**
Firm Size				
KM → OL	0.45***	0.33***	0.82***	10.21***
KM → OP	0.53***	0.25**	0.05	8.76***
OL → OP	0.37***	0.41***	0.29**	16.65***
Firm Age				
KM → OL	0.45***	0.41***	0.68***	11.43***
KM → OP	0.53***	0.34***	0.09	19.56***
OL → OP	0.37***	0.33***	0.54***	9.25***
Firm Type				
Path	**Overall model**	**Public**	**Private**	**C.R. (difference)**
KM → OL	0.45***	0.23**	0.59***	17.29***
KM → OP	0.53***	0.43***	0.21**	13.12***
OL → OP	0.37***	0.56***	0.34***	7.34***

*P < 0.05; **P < 0.01, ***P < .001

Based on our results in the food industry, the relationship between KM and OP is significant positive for all the groups but this relationship is stronger when organisations are bigger, older and belong to governmental companies, which is confirmed by former studies on organisational studies.

In contrast, the findings concerning the relationship between OL and OP indicate that this relation is always positive but stronger for smaller and younger organisations and also in governmental food manufacturing companies. Our results are only partially confirmed by earlier studies.

Finally, our findings confirm that in food industry, age, size, and type are vital moderators in the relationship between OL and OP but moderating effects are not always as expected in organisational studies. In particular, in organisational study, they show that the positive relationship between OL and OP is more intense in the group of organisations that are smaller, older, and belong to governmental food manufacturing companies.

9. DISCUSION

The purpose of this study is to find out the relationship among KM, OL, and OP in the food industry. We expected to illustrate a direct significant relationship between KM & OL, KM & OP, OL & OP, and for OL to mediate the relationship between KM and OP.

After the analysis, we got some results in the food industry different from organizational studies in the relationship among KM, OL, and OP.

The underlying motivation of this research is to discover and explain the significance of KM and OL behaviour in these challenges.

The findings of this study in the food industry provide additional perspective to previous literature in organizational behavior that KM has a positive effect on OL (Jerez-Gomez *et al.*, 2005; Ke and Wei, 2006; Liao and Wu, 2009).

Also, the findings present a positive significant relationship between KM and OP (Mills and Smith, 2011), and between OL and OP (Hult, 1997; Calantone *et al.*, 2002; Ussahawanitchakit, 2008; Jiménez-Jiménez and Sanz-Valle, 2010).

The achieved results are important findings for both managers and academics. Firstly, since KM is considered as an important antecedent, managers believe that firms should thoroughly implement KM. Practically, KM implementation signifies KM system construction. The current study considers KM implementation as organisational ability of a firm to obtain, converse and apply knowledge. Overall, implementation of system will not equal the implementation ability. Therefore, do managers need to consider application of only one system set up? Or does a firm have capability of setting up and exercising it appropriately?

Secondly, OL mediates the relationship between KM and OP. Managers need to take the required measures to develop OL to enable interrelationship of KM and OP, for instance: managerial commitment, team work, learning orientation, and openness to new ideas.

Thirdly, OL influences OP under some conditions, hence, managers should not widen the performance perspectives. OL directly affects the financial, marketing and partnership performances. Therefore, managers should take new measures into consideration to enhance them. These ways and considerations form the focal points of this study.

This study has some research limitations including self-reporting and single sourcing. This potential problem was checked using the one-factor test of Harman (Podsakoff and Organ, 1986). As expected, analysis of a ten vital variable un-rotated Factor resulted in a ten-factor solution, accounting for 84 percent of the total variance; and Factor 1 accounts for 16 percent of the variance.

Since a single factor does not appear and Factor 1 cannot explicate most of the variance, it is unlikely that common method bias can be a source of concern in the data set. Furthermore, when the common method bias deals with self-report, it causes overstatement of the perceptual data in the literature which can be unreal as per results of several researches (Spector, 2006).

Another limitation that this study encounters is using a cross-sectional design with questionnaires. An upcoming study strategy overcoming this limitation can be involved in longitudinal researches in which performance and knowledge flow is traceable over long time range.

Besides, utilising objective measures and archival data for some variables such as OP, can result in more objective outcomes. Moreover, the generalised sampling due to the nature of data, is a further restriction this study experienced.

The study is conducted in a specific national setting and in such a context the readers should be wary of generalisation of the results to other cultural environments. Lastly, the sample size selected for this study is relatively small and needs to be increased in future investigations.

This study supports organization's age moderating effect on relationship between OP and OL. The results confirm that the relationship of OL on OP is influenced by the time length the firm has been in active operation.

It is more likely that older companies utilize the acquired knowledge and apply it to their activities. Younger companies are advised to set up an efficient mechanism for rapid knowledge internalization.

The empirical experiments do not support a moderating organizational age effect on the relationships between OP and OL because learning knowledge in terms of organizational skills and resources (Hunt and Morgan, 1996) are important in the case of both young and old firms.

10. ACKNOWLEDGEMENT

This research was funded by the University of Malaya, Kuala Lumpur, Malaysia under project number: PS013-2012A and RP026-2012F.

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