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Validating Technology-Organization-Environment (TOE) Framework in Web 2.0 Adoption in Supply Chain Management

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ABSTRACT

The second stage of Internet revolution has started with Web 2.0, which allows users to generate and develop the content without code. Web 2.0 not only change the way individual use internet but also tremendously transformed business activities. The primary aims of this study are (a) to validate the TOE framework in understanding Web 2.0 adoption in an organizational context, and (b) measuring the importance of each variable from the different industry perspective. This study developed a conceptual model based on the Technology-Organization-Environment (TOE) framework. A Web-based structured questionnaire was developed to collect primary data. With three months effort, this study managed to get 205 respondents from Malaysian manufacturing and service industry. Multiple regression and Dominance analysis were applied to understand the effect of the TOE framework on Web 2.0 adoption and predicting the importance of each factor form different industries perspective respectively. Multiple regression results confirmed that all the factors are important for Web 2.0 adoption, however, the technological characteristic is the most important determinant for Web 2.0 adoption. Moreover, dominance analysis showed very interesting results that relative advantage is not important for the service industry but top management support is the utmost importance. Similarly, results also indicated that top management support plays important role in Web 2.0 adoption for the fewer experience companies pertaining to internet usage. This study is one of the very few that provides insightful information regarding the effect of the TOE on Web 2.0 adoption in the supply chain management system. This study would be the guideline for the managers of both the manufacturing and service industry in order to implement the Web 2.0 in their supply chain system.

Keywords: Web 2.0, Adoption, TOE Framework, Perceived Ease of Use, Perceived Usefulness, Competitive Pressure

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1. INTRODUCTION

Web 2 technology has dramatically transformed the way we do business, share information with suppliers and customers, managing inventory and so on (Ngah *et al.*, 2017). Therefore, this Web 2 technology becomes a pre-

dominant component of the business process in the 21st century. This technology continuously assists firms to extend their business by applying the new business model, gaining new market, improving understanding of their customers, which ultimately improves firms' performance and image (Singh *et al*., 2018). Many gigantic companies, Microsoft, Apple, Samsung, name of few, have reaped competitive advantages in the market by adopting Web 2 technology in their supply chain process (Castorena *et al*., 2014; Duru and Chibo, 2014; Purnama, 2014; Dim and Ezeabasili, 2015; Wang and Lu, 2016; Pillai and Sivathanu, 2018).

Supply Chain Management (SCM), one of the most complicated business process, includes several processes ranging from purchasing raw material from the right suppliers to deliver to the right customers with the aim of creating value for both business and customers (Sweeney *et al*., 2018; Haddud *et al.*, 2017; Beh *et al.* 2016). More specifically, SCM emphasizes lowering the operational cost by selecting and interacting with the right sources or suppliers and providing unparalleled benefit to the customers by improving services and facilitating flexible delivery system (Hussain *et al*., 2018; Iqbal *et al*., 2017; Salman *et al*., 2018; Shabbir, 2009, Shabbir and Kassim, 2018; Shabbir *et al.*, 2018). Though it is easy to design theoretically, however enabling such platform where both end users, suppliers and customers, work together with the firms is a difficult task. Web 2 technology, truly, has the most compatibility with such a complicated task (Singh *et al*., 2018). This technology is able to enhance real-time information sharing between many parties, which eventually improve the overall supply chain performance. In the case of Walmart, the biggest retail chain in the World reported that web 2 technology has improved their payment system, manage inventory better than ever, fulfil the customer order with zero error, and eventually gain more profit and market share. Not only Walmart, but there are also many gigantic companies across the world who has attuned with the Walmart. According to Tarofder *et al.* (2017), there is no doubt about the benefits of web 2 technology in managing the supply chain in the era of e-procurement and e-sourcing (Ali and Haseeb, 2019; Haseeb *et al*., 2018; Haseeb *et al*., 2019; Suryanto *et al*., 2018; Iravani and ShekarchiZade, 2014).

The Malaysian government utterly accept the importance of IT integration in the business process and propose an IT-friendly budget. According to Rudman and Bruwer (2018), Malaysian IT expenditure increased by 5.7 % in 2018 and reached 65.2 billion USD. Malaysian government vividly promote IT sector by offering many benefits. According to Maroofi *et al*. (2017), all these initiatives are the foundation of achieving the status of a developing country. Though the Malaysian government have taken many steps, however, the IT adoption rate is not at all fruitful. Kim and Galliers (2004) gloomily mentioned that less than 50 per cent of Malaysian organizations adopts IT extensively. He added that most of the Malaysian organizations adopt IT to operate the basic activities for instance e-mail, recording staff information. Very few organizations use IT for the collaboration and knowledge creating process. In line with this, Mahmood *et al.* (2008) explicitly mentioned that due to the lack of IT integration in the business process, Malaysian organizations are far lag behind to gain economies of scale. They strongly recommended investigating the reason for this reluctance (Santhi and Gurunathan, 2014; Anyanwu *et al.*, 2016; Adewale, 2016; Nazal, 2017; Tanoos, 2017; Khan and Ali, 2017; Osasuyi and Mwakipsile, 2017; Mosbah *et al*., 2017; Tarofder *et al*., 2017; Malarvizhi *et al*., 2018; Le *et al*., 2018; Chowdhury *et al*., 2018; Singh and Singha, 2016).

The implementation process of Web 2 technology in the traditional supply chain system is a challenging task in spite of immense benefits (Chaputula and Mutula, 2018; Hossain *et al*., 2017). Singh *et al*. (2018) postulated that successful implementation of web 2 technology requires smooth and effective integration of organizational, functional, and economic factors. In line with this, Tarofder *et al*. (2017) emphasized that technological compatibility of Web 2 with the existing system would be the main concern for the successful adoption of Web 2. Though there is an immense number of researches on the Web 2 technology, however, many questions regarding the effective adoption of Web 2 technology yet to be revealed, including, what are the important factors affecting the successful adoption of Web 2 technology? Does Technology-Environmental-Organizational theory validate for the successful adoption of Web 2 technology? What would be the appropriate managerial strategy for successful implementation of Web 2 technology in the SCM? Is there a difference in the importance of the factors affecting Web 2 technology implementation in different industries?

As a result, this study tries to unveil the unknown regarding the effecting adoption of Web 2 technology in the context of SCM. More specifically the predominant aims of this study are two-fold, (a) validating TOE theory in relation to explain the effective adoption of Web 2 technology in SCM; (b) understanding the impotence of TOE from the different industry perspective. Without a doubt, there is an immense number of researches in the area of adoption by applying the concept of TOE in a different technological context, such as IT (Arya *et al.*, 2017); EDI (Giannakis and Louis, 2016); ERP (Sasson and Johnson, 2016), however very few empirical research available in this context (Maurice, 2013; Chielotam, 2015; Castorena *et al*., 2014; Purnama, 2014; Luna-Maldonado *et al.*, 2016; Mowlaei, 2017; Albasu and Nyameh, 2017; Maroofi *et al*., 2017; Küçükkocaoğlu and Bozkurt, 2018; Maldonado-Guzman *et al*., 2018; Pu *et al.* 2018; Yuen

and Thai, 2017; Nze *et al.* 2016; Kimengsi and Gwan, 2017; Cheng *et al*., 2018; Le *et al*., 2018). Ranganathan *et al*. (2004), in their study, explicitly mentioned that vast amount of research is required to comprehend the knowledge of web technology adoption in the organizational context especially in the developing countries such as Malaysia. Hence, this study will fill this knowledge gap by applying quantitative techniques to understand the effect of TEO framework in Web 2 adoption.

This study is different than prior studies in several ways. For instance, primary rather than secondary adoption is the key issue in this study. There is a substantial difference between these two types of adoption. Primary adoption mainly describes the organizational adoption process, whereas the secondary focus on an individual. This study mainly emphasis on primary adoption. Secondly, this study not only identifying important factors but also compare the importance of those factors from the different industry perspective, which eventually guides the industries in IT adoption process.

2. THEORETICAL BACKGROUND AND RESEARCH MODEL

2.1 Technology-Organization-Environment Theory

Last two decades, many theories have been developing and articulating pertaining to technology adoption and diffusion. Diffusion of Innovation (DOI) (Rogers, 1995), Theory of Planned Behavior (Ajzen, 1985, 1991); Technology Acceptance Model (Davis *et al*., 1986), the TOE framework (Tornatzky *et al*., 1990) are the name of few. Among these theories, DOI, TAM and TOE are most popular among the IS researchers. Many scholars, however, argued that DOI and TAM do not include the environmental issues in their model, which is one of the main pitfalls of these theories. In their study, X (Awa *et al*., 2017) utterly argued that there must be more variable in Rogers and Davis model, which may give more comprehensive understudying of technological adoption. TOE, on the other hand, consist of three important components, technological; organizational and environmental; which enables researches to understand a holistic perspective of technological adoption. In their study, Awa *et al*. (2015), clearly mentioned that TOE is one of the very few theory that is able to explain the technology adoption process in 360 degrees (Ali and Haseeb, 2019). Hence this study used TOE as the foundation of the conceptual model. Additionally, this study used the theory of Technology Acceptance Model to understand the technological characteristic and its effect on technological adoption. Details about the conceptual model explain below:

2.2 Characteristics of New Technology

Attributes of the innovation play an utmost important role promoting the rate of adoption. All most all the prior studies vividly agreed with this association (Huda, 2019; Chhonker *et al.* 2018; Barhoumi, 2017). In their study, Jeyaraj *et al.* (2006) listed 100 different determinants of the technology adoption and broadly classified these variables into two main branches, namely individual and organizational domain. They added in their suggestions that perceived usefulness and perceived ease of the use are the two most used and the strongest influential variables or determinants for the technology adoption. These two variables were suggested by Davis et al in 1986 in their theory called Technology acceptance model and explained that both have a significant positive effect on technology adoption in the organizational setting. Therefore, this study includes both of them as characteristics of the technology (Haseeb et at 2018).

2.3 Perceived Usefulness

Without a doubt, organization use to invest promptly to that innovation which offers better benefits than the existing system, and the benefits that can be observed. In the context of Web 2 technology, perceived usefulness consider as the benefits associated with operational efficiency reaped from using Web 2 technology in supply chain context. In relation to benefits, Lee and Jung (2016) uttered that Web 2 technology is able to advocate organization not only in operational efficiency but also create an opportunity for being a strategic leader in the market. In their study, Verma and Bhattacharyya (2017) identified that Web 2 technology reduced more than 50 per cent of inventory cost for Walmart by managing inventory, subsequently, offered Walmart an unmatchable competitive advantage. Similarly, many prior studies, (Pillai and Sivathanu, 2018; Kumar *et al*., 2018) confirmed the positive relationship between perceived usefulness and the higher rate of technology adoption in the organizational setting (Haseeb *et al*., 2018; Kozhabergenova *et al*., 2018).

2.4 Perceived Ease of Use

Fundamentally, individual does not like to adopt technology that is difficult to understand or use. But it has a different effect in an organizational setting. Generally, however, there is a positive relationship between complexity and resistance to change. As a result, most of the adoption theorist agreed that complexity plays an adverse role in the innovation adoption process. In their theory, Davis *et al.* (1986) suggested that the organization shows a strong willingness to adopt those technologies that are easy to install and use (Osmonbekov and

Johnston, 2018; Du *et al*., 2018). In this study, perceived ease of use considers as to what extent web 2 technology ease the users to understand and apply in their daily life without significant destruction. In relation to this, many researchers agreed that Web 2 is one of the easiest innovation that can fit with existing organizational system with minimal intervention (Lai *et al*., 2018; Gorane and Kant, 2017). Hence, this study proposes the following hypothesis:

H1: There is a positive significant effect of perceived usefulness on the adoption of web technology in SCM.
H2: There is a significant positive effect of perceived ease of use on the adoption of web technology in SCM.

3. ENVIRONMENTAL FACTORS

Unlike the individual, environmental factor becomes one of the utmost important concern for technological adoption in the organizational setting. In this study, external pressure consider as the environmental factor for the adoption of Web 2 technology in SCM. Efficiency is the focal point in supply chain and business partners often pressurize each other to be efficient. In their study, Zhu *et al.* (2018) mentioned that generally, large manufacturer uses to put pressure on their partners to be efficient in their business process by adopting technologies so that they can meet the world standard. As a result, rapid adoption of Web 2 technology may observe in the market (Mandal, 2017; Yuen and Thai, 2017; Osman *et al.*, 2018). Similarly, many prior studies suggested that there is a strong association between the intensity of competition in the industry and Web 2 technology adoption rate. In other words, competitive environment demands maximum efficiency from all the actors, subsequently boost the technological adoption. Moreover, Beh *et al.*, (2016) identified that being affiliated with the group of firms, many organizations adopt the technology. They also added that trading partners' pressure plays important role in adopting innovation in the organizational context. Besides, being the pioneer in the industry, organization use to adopt technology to differentiate their product, service, or process. Hence this study considers competitive pressure as the most important determinant under environmental factor (Marakarkandy *et al*., 2017; Ramdani *et al*., 2013; Farzadnia *et al*., 2017; Carreto *et al*., 2018). It leads to the following hypothesis:

H3: There is a significant positive effect of competitive pressure on the adoption of web technology in SCM functions.

4. ORGANIZATIONAL CHARACTERISTICS

Based on the TEO theory, organizational factors greatly influence the adoption process of technology. Organizational factors mainly related with the internal policies, employees' skills, organizational objectives and so on. According to Hsu *et al.* (2017) alignment between organizational requirement and technological features determine the adoption rate of that particular technology. Almost every prior study agreed that top management support is an influential determinant for technological adoption (Gumel, 2017). Without getting full support from top management, technological adoption in the organizational setting is next to impossible. According to Jeyaraj *et al.* (2006), top management is the most popular determinant from the organizational context for the technological adoption. This factors can be considered as commitment, involvement, and support from the top management. Moreover, allocating adequate resources by top management also plays an important role in the successful adoption. Besides, top management provides the right direction for technological adoption (Rahi and Ghani, 2018; Hossain *et al*., 2017; Chatzoglou and Chatzoudes, 2016; Muhammad, 2018). Hence this study considers top management as an important determinant for web technology adoption and proposes the following hypothesis.

H4: There is a significant positive effect of top management support on the adoption of Web technology in SCM functions.

5. METHODOLOGY

5.1 Sampling and Respondents' Attributes

Pertaining to the sampling strategy, this study applied five steps, recommended by Sekaran and Bouge (2016). Based on the recommendation, this study identifies its population and selected Malaysian organizations who are using Web 2 technology in their supply chain. Indeed to identify these companies, this study assembles a sample frame combined the three most popular database in Malaysia, namely Federation of Malaysian Manufacturers (FMM), Malaysian Industrial Development Authority (MIDA), and Port Klang Shipping Agencies Association 2017. These three databases have comprehensive coverage the details regarding Malaysian manufacturing and service organizations, including total employees, annual turnover, email, address and so on. This study applied stratified random sampling by using a stratum that organization must use Web 2 technology for their business activities. After searching meticulously on the website, this study identified 2031 organizations as a

sample unit. Initially, this study sent an invitation to all these firms and data collection was completed in June 2018. With only 10.09 per cent response rate, this study managed to get 205 responses in three months. This number deemed adequate in the organizational context. Hence, this study continues final data analysis with 205 responses.

Demographic information regarding the organizations present in Table 1. Frequency results indicated that respondents from the manufacturing industry (59.02%) were slightly higher than the service industry. In relation to revenue, respondents had greater diversity. More specifically, 38.53 per cent respondents' revenue were between 1 to 5 million followed by 5 to 10 million (30.73%). Additionally, 10.24 per cent respondents' revenue was below 1 million, whereas 0.97 per cent respondents' revenue was more than 50 million. One of the important discovery is that 78.04 per cent claimed that they have been using Web 2 technology for SCM for more than 5 years. Regarding the number of employees, results indicated that 31.70 respondents have less than 500 employees, whereas, 41.46 per cent claimed more than 1000 employees. Majority of the respondents were operation managers and procurement managers.

5.2 Development of Instrument

A structured web-based questionnaire was employed for this study and sent to those organizations, who were willing to participate. Several steps were adopted to develop the questionnaire suggested by Sekaran and Bouige (2016). The first step of the questionnaire development started with conceptual and operational definitions of the variables, which subsequently helps in selecting the right set of constructs. Based on the definition, this study adopted items from prior studies pertaining to technology adoption in different perspective such as EDI, ERP and so on. This adoption, eventually, ensure face, content and construct validity. This questionnaire adhered the principles of wording and measurement, which includes the length of the questions, the sequence of the questions, and so on. A cover letter was attached along with the questionnaire, which explains the aim of the project and also boosts the confidence of the respondents. Although, this questionnaire avoided recall based questions but need to include questions regarding their experience in using web technology. This was inevitable because these questions give an idea regarding the respondents' experience. Simple English was applied in the construct. Pertaining to the collection, this study applied internet survey due to the three main reasons including (a) this method mitigate the problem of getting an appointment; (b) it reduces response error, inputting errors and interview bias. (c) It is a very cost-effective method when respondents are geographically fragmented. There were 3 sections in this questionnaire. The first section included demographic information regarding the respondents' organizations, including types of industry, annual revenue, and a number of employees and so on. The second section focused mainly on the conceptual model, including dependent and independent variables. Multiple items were used to measure the variables and all the items were adapted from prior studies. A pilot test was conducted to ensure the reliability of the scale.

Table 1. Summary of sample characteristics

Industry	No	%		No	%
Manufacturing	121	59.02	**Position**		
Service	84	40.98	CIO/CTO/Vice President for IS/Senior Vice President for IS	4	1.95
Annual Revenue			Senior Director/Director for IS	38	18.53
< 1 million	21	10.24	General Manager/Manager/Assistant Director	54	26.34
1-5 million	79	38.53	E-Business Manager	42	20.48
5-10 million	63	30.73	Project Manager	11	5.36
10-50 million	16	9.6	Operation & Production Manager	54	26.34
> 50 million	2	19.53	Other	2	0.97
No Employee			**Year of Using Internet**		
Less than 500	65	31.70	<1 year	2	0.97
500-1000	43	20.97	1 year	1	0.48
1000-2000	85	41.46	2 years	2	0.97
2000-3000	2	0.97	3 years	12	5.85
3000-4000	2	0.97	4 years	21	10.24
4000-5000	4	1.95	5 years	7	3.41
more than 5000	3	1.46	more than 5 years	160	78.04

Exploratory Factor Analysis (EFA) was employed to confirm the discriminant validity and resents the results in Table 2. Mainly two types of scales, nominal and interval, were used for this questionnaire. Four items were used to measure all the fours independent variables and adopted from prior studies (Mosbeh and Soliman, 2008; Nagi *et al*., 2007; Alam *et al*., 2007). EFA results confirmed five variable with eigenvalue more than 1. All these four independent variables explained 79.693 variances. Moreover, factor loading values were satisfactory, ranging from .790 to .857. Cronbach alpha value for the five variables presented in Table 3 and it shows satisfactory for all the five variables. Based on the results, this study can conclude that the data it effective for the hypothesis testing.

5.3 Testing of Hypothesis

Multiple Regression analysis was used to identify the effect of independent variables on the dependent variables. Table 5 presents the results of multiple regression. Results confirmed that 62.2 per cent variance of Web 2 technology adoption explained by these four factors. Results indicated the, 42.1 per cent variance of Web 2 adoption explained by perceived ease of use, followed by perceived usefulness (31.6%), top management support (28.2%), and competitive pressure (24.1%). Therefore, results accepted all the four hypothesis.

In their study, Ngah *et al*. (2017) utterly mentioned that perceived ease of use is the most important factors influencing Web 2 technology adoption. This study further proved the same. It means the Malaysian organizations emphasis on the perceived ease of use before implementing Web 2 technology in their supply chain management system. Besides, perceived usefulness also plays an important role in influencing the Web 2 adoption in Malaysian organizations. In this regard, Karahoca *et al*. (2018) suggested that none of the organization will embrace new

Table 2. Tests for unidimensionality or discriminant validity

	Egenvalue	Factors Loading	% of Variance
Factor 1 (Top Management Support)	7.644		47.775
Top management support 1		0.898	
Top management support 5		0.886	
Top management support 3		0.867	
Top management support 4		0.847	
Factor 2 (Perceived Ease of Use)	2.499		15.616
Perceived Ease of Use 2		0.833	
Perceived Ease of Use 1		0.826	
Perceived Ease of Use 3		0.813	
Perceived Ease of Use 4		0.791	
Factor 3 (Perceived Usefulness)	1.564		9.77
perceived usefulness 3		0.896	
perceived usefulness 1		0.887	
perceived usefulness 2		0.868	
perceived usefulness 4		0.854	
Factor 4 (Competitive Pressure)	1.044		6.525
Competitive Pressure 1		0.802	
Competitive Pressure 4		0.798	
Competitive Pressure 5		0.792	
Competitive Pressure 3		0.783	

Table 3. Reliability test

Composite factors	Alpha
Top Management Support	0.9134
Perceived Ease of Use	0.9063
Perceived Usefulness	0.8975
Competitive Pressure	0.9012
Adoption of Web Technologies	0.9210

Table 4. Test of collinearity

Variables	Tolerance	VIF
Top Management Support	0.234	5.912
Perceived Ease of Use	0.321	3.015
Perceived Usefulness	0.301	3.013
Competitive Pressure	0.438	2.018

Table 5. Hypothesis testing

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-6.301E-017	0.042		0.000	1.000
	PU	0.352	0.110	0.316	3.185	0.002
	PE	0.450	0.101	0.421	4.467	0.000
	TMS	0.303	0.064	0.282	4.716	0.000
	CP	0.257	0.069	0.241	3.721	0.000
a. Dependent Variable: Web 2 Adoption						
R^2 : 0794						
Adjusted R^2: 0.622						
F Value: 80.395						

technology unless it offers better service and facilities than the existing one. Similar results found in this study too. In relation with top management support, this became the third most influential in this study and similar results can be found in many previous studies (Corinna *et al*., 2017; Dey *et al*., 2016; Ahmadi *et al*., 2018; Sharif and Butt, 2017). In their study, Molinillo and Japutra (2017) utterly mentioned that top management support is one of the top most influential factors for the Web 2 adoption in the organizational setting. Last but not least, results also confirmed the significant positive effect of competitive pressure on the Web 2 technology adoption in Malaysian organization. In one study, Fuchs *et al.* (2018) mentioned that in order to compete with competitors' organizations willing to adopt cutting-edge technology. This study's results show similar findings and conclude that competitive pressure has a significant positive effect on the Web 2 technology adoption. Results of this study refinement and reconfirmed the findings of the prior studies.

5.4 Prediction of Importance

The second objective of this study is to identify the differences in the importance of these four factors in different industries (manufacturing and service), and different level of experience (more than and less than 5 years) of using Web 2 technology in their supply chain activities. In order to achieve this objective, this study applied the most popular technique name dominance analysis. This analysis originally developed by Budescu (1993), and have become popular in recent years among social science researches. The predominant features of this techniques are that this test is able to measure the relative importance of the predictor variables (Behson, 2002; Tu, 2018). In addition to this, this techniques is able to depict the contribution of each predictor variables on the dependent variables (Budescu and Azen, 2004). Table 6, presents the effect of each predictor variable on Web 2 technology adoption for both manufacturing and service industry. An interesting outcome can be identified from this dominance analysis.

From Table 6, it is clear that all the four independent variables are important for the manufacturing industry, on contrary, perceived usefulness is not significant in the service industry. Moreover, it is clear that both perceived ease of use and top management support are the most important determinants for Web 2 technology adoption in the manufacturing and service industry respectively. Unlike hospital, saloon, most of the service industry transform and deliver their service through online. Hence perceived usefulness became insignificant in this industry, however top management support becomes important determinants (Asare *et al*., 2016). On the other side of the coin, the manufacturing industry still focuses on the easiness of the new technology in terms of using, understanding and implementing in day-to-day life. Unlike the service industry, it is quite difficult to replace the entire existing system, hence manufacturing industry mainly focus on the perceived ease of use.

Similarly, Table 7 presents the effect of each predictor's effect on Web 2 technology adoption for two group of organization based on the experience of using Web 2 technology (more than 5 and less than 5 years). Though results showed that all four predictors are important for both groups, however, perceived ease of use is the most important predictors for those organizations who have more than 5 years of experience. On the other hand, top management support became the most important for those organizations who have less than 5 years of experience.

5.5 Discussions, Contributions and Managerial Implications

Based on the results, 'perceived ease of use' is the most important factor for the Web 2 technology adoption in the organizational setting for both industries. These results provide an in-depth understanding of this factor. In general, organizations always focus on those technologies which are easy to implement, understand and use with minimal disruption to the existing system. It is because a completely new system requires a huge investment in implementing and training. Hence, the organization likely to find a technology that can improvise an existing system with minimal disruption. Therefore, this result reconfirmed, theoretically and practically, that 'perceived ease of use' is important for Web 2 technology adoption in Malaysian organizational SCM system.

Secondly, this study confirmed that 'perceived usefulness' is the second most important factors influencing Web 2 adoption in Malaysian organizations. Doubtlessly, most of the prior studies and theory confirmed that organ-

Table 6. Impact of explanatory variables on adoption of web2 technology: Manufacturing sector vs service sector

Independent Variables		Manufacturing Sector ($\alpha = \beta + \beta'$)	Service Sector ($\beta = \alpha + \alpha'$)	Differential Effect ($\alpha' = -\beta'$)
Constant	1	0.031 (0.589)	-0.043 (-0.634)	0.074 (0.861)
Top Management Support	*X*2	0.425* (8.468)	0.557* (7.722)	- 0.132 (-1.506)
Perceived Usefulness	*X*3	0.168* (3.276)	0.021 (0.307)	0.147*** (1.724)
Perceived Ease of Use	*X*4	0.462* (8.848)	0.467* (6.880)	-0.006 (-0.064)
Competitive Pressure	*X*5	0.398* (7.650)	0.342* (5.160)	0.056 (0.665)
R^2			0.613	
N			205	
F			39.829*	

Table 7. Impact of explanatory variables on adoption of web 2 technology: firms with usage of W2T < 5 Yrs Vs firms with usage of W2T > 5 Yrs

Independent Variables		Usages of web technology < 5 years ($\alpha = \beta + \beta'$)	Usages of web technology > 5 years ($\beta = \alpha + \alpha'$)	Differential Effect ($\alpha' = -\beta'$)
Constant	1	0.006 (0.126)	0.002 (0.037)	0.004 (0.046)
Top Management Support	*X*2	0.561* (10.833)	0.367* (6.010)	0.194** (2.427)
Perceived Usefulness	*X*3	0.135** (2.617)	0.104*** (1.677)	0.031 (0.382)
Perceived Ease of Use	*X*4	0.387* (7.821)	0.613* (9.385)	-0.226* (-2754)
Competitive Pressure	*X*5	0.330* (6.672)	0.444* (6.853)	-0.114 (-1.395)
R^2			0.628	
n			205	
F			45.171*	

Note: i) *, **, *** indicates the regression coefficients are significant at 99%, 95% and 90% respectively, ii).

izations do not adopt any technology if it does offer allure benefits. However, the importance of this factor difference between manufacturing and service industry. Despite being highly significant, results indicated that perceived usefulness is not influential determinant to boost Web 2 technology adoption in the Malaysian service industry. Top management support plays the most important role in the service industry instead of perceived usefulness. Practically, service industry relatively more dynamic than manufacturing, hence response to the industry and environmental changes are key for any service organization rather emphasizing the benefits of the technology.

In relation to competitive pressure, results confirmed that it is more important than top management support in Malaysian organization. There is no doubt that every organization wants to secure a strong position in the market, as a results organization immediately respond to their competitors' technological initiatives. For instance, though there is very minimal students' engagement in the local universities web portal, however, every university is offering their service through their web portal. It is clear that organization want to, therefore, competitive pressure accelerate the adoption process of Web 2 technology in Malaysian organizations. However, technology developer must not ignore the part that top management also plays a significant role in accelerating the adoption process. In fact, they are the initiator, hence, convincing them with attractive benefits would the right strategy to diffuse the Web 2 technology in the SCM.

Empirically, this study validates the TOE framework for the Web 2 technology and confirmed that all three factors, technology, organization and environment, are important for the Web 2 adoption in the organizational setting. Additionally, results ensure that technological factors are the most important followed by environment and organization for technological adoption. Pertaining to the experience, dominance test showed that perceived ease of use is the most important for the more experienced organization followed by competitive pressure, top management support and perceived usefulness. On the contrary, top management support is the most important for less experience organization followed by competitive pressure. Therefore, it is wise to develop new technology which can easily be compatible with the existing system and convince top management to accelerate the adoption process.

6. CONCLUSIONS

Despite having significant contributions to this study, some inevitable limitations can't be avoided. Firstly, this study followed cross-sectional techniques which may help you understand the apparent perception of the respondents, however, it is wise to test the effect of all these variables by applying longitudinal research setting. Besides, this study included only four variables though it is the most important, this study significantly ignores the moderating effect of organizational size, number of employees name of few. It is because the primary aim of this study was to validate the TOE model to understanding Web 2 adoption in SCM context. Hence, it is worth testing this moderating effect on the proposed model of this study.

Despite having these limitations, this study indeed is one of the very few studies that validated TOE framework for the Web 2 adoption, especially in supply chain context. This study provides significant contributions in both knowledge and practice. This study, additionally, illustrated the difference in the importance of the TOE framework from both the manufacturing and service industry. With this knowledge, managers would have in-depth understating pertaining to web 2 technology adoption and will be the guideline for their further references.

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