



## DETERMINANT FACTORS OF INDUSTRIAL PURCHASING PERSONNEL'S ADOPTION OF INTERNET FOR BUSINESS PURCHASING RELATED ACTIVITIES

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**ABSTRACT. Background:** The purpose of this research is to examine a path model and the mediating effect of perceived communication convenience towards explaining industrial purchasing personnel's Internet adoption for business purchasing related activities. It involves sequencing paths examining the predictive effect of perceived Internet skills and supplier support on perceived communication convenience. Consequently, perceived communication convenience would influence Internet adoption as communication tools in a business-to-business context. It also examines the indirect effects of perceived Internet skills and supplier support on Internet adoption mediated by perceived communication convenience.

**Method:** A structured questionnaire was developed to carry out a cross-sectional survey. A business-to-business company's database consists of its current and potential customers was selected as the sampling frame. A total of 139 responses was collected and Partial Least Square – Structural Equation Modeling (PLS-SEM 3.0) was utilized in data processing and hypotheses testing.

**Results:** The findings of the study indicate that perceived Internet skills and supplier support have a significant effect on perceived communication convenience. Subsequently, perceived communication convenience have a direct impact on industrial purchasing personnel's adoption of the Internet for business purchasing related activities. Perceived communication convenience significantly mediates the effect of perceived Internet skills and supplier support on business Internet adoption.

**Conclusion:** This study contributes towards identifying significant predictors and mediator of adopting Internet for business purchasing related activities among purchasing personnel. Practitioners need to emphasize on Internet skills and support in order to enhance communication convenience, thus encourages industrial buyers to adopt the Internet in purchasing activities.

**Key words:** Internet adoption, perceived communication convenience, perceived Internet skills, supplier support.

### INTRODUCTION

During the past decade, the Internet has been developing rapidly. The Internet was primarily employed for content, information and transaction intentions [Celuch et al. 2014, Sheth, Sisoda 1999]. The internet enables purchasers and suppliers to have flexible, reliable, ease of use and inexpensive way of communication such as online chat system or email compared to conventional ways of communication, such as telephone, facsimile,

postal mail and the sales person. Moreover, utilizing the Internet for communication is much more favourable in cultivating closer purchaser-seller relationship [Nguyen, Barrett 2006]. Cheung Ronnie [2014] commented that the Internet allows users to communicate freely by sharing information with others. Traditional way of communications is found to be less favourable than discussion forums and chat sessions. The competency of the Internet to encourage better communication and information acquirement in a flexible, inexpensive and practical manner is very

desirable. There is a need to recognise the internet as an indispensable communication tools and information sources in order to compete adequately at a company's level in business-to-business manner

Setting a defined digital marketing strategy direction is essential in B2B environment in lieu of the increasing usage of Internet as communication and information tools in conveying marketing messages. According to Kennedy and Deeter-Schmelz [2001], devising a sound objective encompassed an understanding of the effect of how industrial purchasers perceived Internet benefits and communication convenience, the purchasers perceptions towards the usefulness and how the Internet plays the role in their work-related activities, how the Internet leverage on their purchase decision. Understanding these effects will then help a company to effectively target this group of purchasers by developing the industrial purchaser profiles. The information collected will be constructive to devise an effective marketing communication plan to entice new customers and attending to current customers. As a result, this research objective is to determine the factors influencing Internet adoption of purchasing personnel.

Academic research on the Internet adoption in Malaysia for Business-to-Business [B2B] purchasing personnel are scarce. Furthermore, most researchers had studied on Business-to-Consumer [Keinanen, Kulvalainen 2015, Kulviwat et al. 2004, Lim et al. 2010]. Fewer studies had investigated B2B customers' perceptions or view in terms of the Internet tool [Keinanen, Kulvalainen 2015]. The significance of organizational communication tools on firm buyers' in the USA was researched by Parasuraman in 1981. Deeter-Schmelz and Kennedy had examined the buyers' opinion of the Internet as a firm communication tool in the USA in 2002. Deeter-Schmelz and Kennedy's [2002] study was later extended by Talonen [2013] to study the buyers' information source preceding to Finland supplier selection in industrial capital goods. Further, sales person as the crucial sources of information and how it influenced purchasing decision was studied by Deeter-Schmelz and Kennedy [2002], Parasuraman [1981] and Talonen [2013]. However, the

impact of Internet tools on buying decision was widely overlooked. Moreover, there was less empirical evidence claiming that organizations in the US had increased the Internet usage contended by Mackenzie [2006]. Likewise, Internet skills, supplier support, and how perceived communication convenience of using the Internet would influence industrial purchasers' Internet adoption in business buying behaviour is yet to be confirmed in B2B context. Thus, to determine the factors influencing industrial buyers' Internet adoption as information sources and communication tool in purchasing-related activities in business buying decision, this research serve as one of the pioneer researches in Malaysia

A few of the local researchers, Hussin and Noor [2005], Shah Alam [2009] and Shah Alam et al. [2011] commented that Malaysian Small and Medium Enterprises (SMEs) have merest web presence with a low percentage of information technology adoption. Wong's [2013] finding further supported the finding by stating that 70% out of the 1 million Malaysia SMEs did not have an online presence. In fact, the Department of Statistics Malaysia (29 Jul 2016) had reported that only 41.5% of people at the workplace were Internet users and Internet users had risen by 14.1% in relative to 2013. Most of the Internet users' activity was using emails (68.4%) and the activity done by 79.6% of them was gathering information about goods and services. This implied that the Internet was not exhaustively utilized in the work place, but somehow played a vital role in determining the dynamic business environment in Malaysia. Companies which adopt the Internet as a source of information and communication tool will establish the competitive advantage in line with the acceleration usage of Internet. The main reason of why Malaysian companies were not ready in accepting Internet utilization provoked further study in order to mastermind the reason behind the poor rate of Internet adoption in the Malaysian workplace. It is vital to examine the factors which influence firms' Internet adoption decisions due to the reasons that it may help in generating information for decision maker to promote the Internet adoption as the main communication tools and treating the Internet as the main source

of information, in lieu of the tremendous progression of Internet users.

In summary, it is very enticing for this research to examine the elements which determine the Internet adoption in the Malaysian industrial environment. Thus, the main objectives of this research are (i) to examine the predictive effect of perceived Internet skills (PIS) and supplier support (SUS) on perceived communication convenience (PCC); (ii) to investigate the predictive effect of perceived communication convenience (PCC) on industrial purchasing personnel Internet adoption (IA) for business purchasing related activities; (iii) to assess the indirect effect, mediated by perceived communication convenience (PCC), of perceived Internet skills (PIS) and supplier support (SUS) on Internet adoption (IA) among the industrial purchasing personnel.

## LITERATURE REVIEWS AND HYPOTHESES

Perceived Internet Skills (PIS) is defined as the skill, knowledge and good searching techniques possessed by industrial buyers in using the Internet for work-related tasks. PIS had been defined by various researchers [Deeter-Schmelz et al. 2001, Deeter-Schmelz, Kennedy 2002, Giunipero et al. 2012, Kennedy, Deeter-Schmelz 2001, Novak et al. 2000] as skills and knowledge possessed by individuals and contended that PIS was related to Internet adoption as sources of information and communication tools. Purchasers with great Internet skill are perceived to appreciate the weights and the advantages of using the Internet in their daily work activities. Their perception on the convenience in using their know-how on utilising the Internet for their work-related activities will increase. In order to understand the usefulness and value of employing the Internet into trade operations if Malaysian enterprises would engage in online business activities, user's skills and education are the mandatory expertise, and this was supported by Saleh and Burgess [2009].

Supplier Support (SUS) has been defined as "the degree to which purchasing professionals

perceive that their suppliers are providing encouragement, guidance, and incentives for purchase via the Internet" by Deeter-Schmelz et al. [2001], Deeter-Schmelz and Kennedy [2002] and Kennedy and Deeter-Schmelz [2001]. As a result, considering the situation in these studies, SUS is defined as the degree to which industrial purchasing professionals perceive their suppliers in providing encouragement, effective guidance, and incentives for purchasing via the supplier's web site. SUS in the form of encouragement, guidance and stimulus to use the Internet alleviated the utilization of the Internet for information search and communication by the industrial purchasing personnel and this was empirically justified by Deeter-Schmelz et al. [2001], Deeter-Schmelz and Kennedy [2002], Giunipero et al. [2012], Kennedy and Deeter-Schmelz [2001]. According to Deeter-Schmelz et al. [2001], Igarria [1997] and Purchase & Dooley [2010], SUS intensified Internet as an accessible way of communication which brought value to users for daily purchasing activities.

Perceived communication convenience (PCC) was defined as "the extent to which purchasing professionals believe that the Internet is a more convenient information source when comparing to salespeople and other supplier representatives" by Deeter-Schmelz et al. [2001], Deeter-Schmelz & Kennedy [2002] and Kennedy & Deeter-Schmelz [2001]. In the current research, PCC is defined as the extent to which Internet is perceived to reduce the time spent with suppliers' sales personnel and the time required to get buyers' enquiries answered effectively in making their professional purchasing job much easier. Narayanasamy et al. [2008] and Tan et al. [2009] commented that the main reasons of poor Internet and web site adoption rate was mainly ignorance towards the usefulness of any internet and web. Hence, the construct was being taken on to be studied in this research. The perceivedness of the Internet to be more useful as a source of information and communication tool for business purchasing related routine was visibly shown in Deeter-Schmelz et al.'s [2001] and Kennedy and Deeter-Schmelz's [2001] academic research findings.

Deeter-Schmelz & Kennedy [2002] and Deeter-Schmelz et al. [2001] defined Industrial purchasing personnel's Internet adoption (IA) as "the degree to which purchasing professional decides to adopt this new method of purchasing earlier than other buyers". Adapting from Deeter-Schmelz et al.'s [2001] definition, IA assesses the extent of users' usage, whether individuals utilised the Internet for Industrial purchasing-related activities and the duration of their Internet utilization. This in fact demonstrated the duration of time the business buyers have been using the Internet for business purchasing-related activities. In addition IA emerges in information search stage in business buying behaviour, whereby buyers firm looks for product information and reputable suppliers via Internet search and uses email for communication purposes. Research done by Deeter-Schmelz et al. [2001] was to study the business-to-business online purchasing from the purchaser's perspective to evaluate the suppliers' effect on buyers' adoption and usage intent. They contended that to aid vendors in the development of efficient strategies targeted at enhancing online purchasing among professional purchasers, there was a need to research the buyers' adoption of the Internet for organization-related purchasing activities.

There is another interesting research by Deeter-Schmelz and Kennedy [2002] to explore Internet as an industrial communication tool to examine the business buyers' perceptions. They have found no empirical study previously on the business-to-business communication tools by using the Internet in the United States. They believed a detailed consideration on the effect of the Internet on industrial purchase decisions was essential for corporations to encompass the Internet in their comprehensive communication strategy. Their findings signified the relevance of the Internet as a communication tool and usefulness of it for gathering and sharing information via email at business-to-business level. Interestingly, they focused on the purchasing agents from a cross section of industries to explore the likelihood of industrial buyers to be influenced by the Internet as a communication tool. They found that 77.5% of their purchasing professionals

had some experience in adopting the Internet for industrial-related purchasing activities.

In the neighbouring country, Vietnam, Nguyen and Barrett [2006] had studied the adoption of the Internet by export firms in transitional markets. Rendering to the authors, those firms with no web presence may cause a competitive disadvantage and firms in advanced economies are determining their presence on the Internet. Conversely, this phenomenon was not happening in the transitional economies countries, especially in Vietnam, which they found less than 50% of the companies had used the Internet and 90% of the company personnel had no idea at all about e-commerce. This had led the authors to trigger a need to understand why the companies in transitional markets were not ready to utilize the Internet. They had empirically found out the few factors which contributed to the IA and one of them was perceived usefulness of the Internet.

At the local level, Shah Alam [2009] has studied the IA in the Malaysian SMEs perspective. The research tried to fill the research gaps on IA as Malaysia was viewed to have a good future for implementing e-commerce and being the role model for developing countries in the future in terms of ICT enactment and deployment. However, the paper found out that Malaysian SMEs had displayed modest rate of information technology adoption. Hence, the main objective was to examine the most prominent factor in IA in businesses among the SMEs. The authors had empirically found out that perceived benefits and technical competency were among the factors contributing to IA.

The conceptual model was established by referring to literature which suggesting the relationships among broader perceptual constructs which was depicted in Figure 1, the research model. The constructs, PIS, SUS, PCC and IA are the related variables which have been examined by previous researchers as factors and valid predictors of adoption behaviour in sequencing causer paths.

Past literatures had investigated the effect of PIS on IA, for instance Chatzoglou and Chatzoudes [2016], Deeter-Schmelz and

Kennedy [2002], Ndubisi and Jantan [2003]. Particularly, Chatzoglou and Chatzoudes [2016] had confirmed that the relationship exists between PIS and IA when they investigated the factors affecting e-business adoption in SMEs in Greek. They concluded that firms with whom the members possess superior Internet skills are more likely to adopt e-business. Similarly, Deeter-Schmelz and

Kennedy [2002] concluded that PIS have a direct effect on IA when they examined buyers' perceptions on adopting the Internet as industrial communication tools. Ndubisi and Jantan [2003] further supported that the relationship of computer skill of an SME user will strongly determine their usage of information systems.

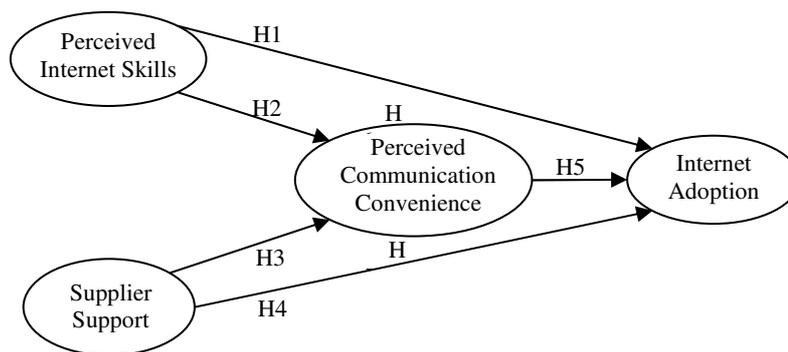


Fig. 1. The proposed Research Model  
Rys. 1. Proponowany model badawczy

On the other hand, Giunipero et al. [2012] and Wu et al. [2007a] found out that the relationship was not significant. Giunipero et al. [2012] contended that the supply manager's perceived level of Internet skill had no relation to firm's e-purchasing tools (EPTs) usage in supply management. They further commented that if EPTs allow the buyer manager's job to be managed in a more productive time, and allow information flow freely, the EPTs will be more readily preferred. Wu et al. [2007a] in Taiwan empirically found out that for those who were not in the Management Information System department, their computer self-efficacy had no direct effect on the actual use of end user computing. The controversial findings demanded a further investigation. However, it is believed that PIS would have a positive effect on IA, especially in the industrial purchasing related context and H1 is proposed for empirical testing.

*H1: Perceived Internet skills have a positive effect on Internet adoption.*

Researchers have researched the effect of skills upon Perceived Usefulness (PU) (described here as PCC). Ong et al.'s [2004] research examined the factors affecting engineers' acceptance of asynchronous e-learning systems in high-tech companies. They found out that the perceptions of engineers' ability and skills in engaging computers to perform a task have a positive effect on PU and therefore had effect on the behavioural intention to use the e-learning system. Likewise, findings by Rho et al. [2014] explained that self-efficacy [described here as PIS] was positively related to PU or PIC. On the other hand, when Wu et al. [2007b] investigated mobile computing acceptance factors in the healthcare industry, they confirmed that Medical Healthcare System self-efficacy had a significant effect on PU.

Nevertheless, when Wu et al.'s [2007a] in Taiwan gauged the reviewed version of end users' computing acceptance model which aimed at the users who were excluded in the Management Information System department,

their research indicated that computer self-efficacy (e.g. Internet skills) was non-predictor for usefulness (in other words, communication convenience) when they. No doubt, in a particular situation, PIS and PCC might not directly related. However, there was strong evidence suggesting that there was a potential direct effect of PIS on PCC. Therefore, H2 is developed for empirical testing in the industrial buyers' context in Malaysia.

*H2: Perceived Internet skills have a positive effect on perceived communication convenience.*

In Deeter-Schmelz et al. [2001], Igbaria [1997] and Purchase & Dooley [2010] research, supplier support was found to be able to encourage Internet acceptance as a convenient way of searching for information and communication that deliver benefits for online buying routine. Particularly, Deeter-Schmelz et al. [2001] found out that SUS influenced communication convenience directly by enforcing the convenience of online sourcing and communication benefits to industrial purchasing personnel. In New Zealand, Igbaria [1997] had studied on personal computing acceptance factors in a small firm, and the author empirically found out that external support has significantly influenced PU (here referred as PCC). The positive effect of SUS on PCC on the acceptance and usage of e-procurement systems of purchasing managers have empirically shown in Purchase and Dooley's research in Queensland, Australia.

Nevertheless, research by Wu et al. [2007b] showed no significant relationship between technical supports and training on perceived benefits, such as perceived convenience. The major failure in adopting the innovations was due to the incapability to motivate the users in utilizing the new Information Technology or Information System by the suppliers, poor resources allocated by suppliers, or no clear objectives and goals. Although other factors might influence PCC, supplier support is likely to be one of the key predictors of PCC. Thus, H3 is proposed for empirical confirmation.

*H3: Supplier support has a positive effect on perceived communication convenience.*

A firm will likely to adopt Internet as the main source of information during the information search stage in business buying behaviour and using it for communication if there is support from the vendor. This was seen in Deeter-Schmelz and Kennedy's [2002] study where they found out that SUS was having a positive relationship on IA as communication tool when examining the buyers' perceptions. Likewise, Ghobakhloo et al. [2011] studied on the factors influencing adoption of e-commerce applications in SMEs in Iran empirically supporting that technology vendors support was positively related to e-commerce adoption decision behaviour. Guinipero et al.'s [2012] study significantly proven the manager's perceptions of SUS were positively related to a firm's EPTs usage. Further, external support was positively having significant effect across all adoption levels, and this was declared by Thi & Lim [2011] in their study of the determinants of B2B e-commerce adoption among small & medium enterprises in Malaysia.

Conversely, a few studies indicated that SUS and IA were not related. For example, Deeter-Schmelz et al. [2001] and Ifinedo [2011] found out that there was no relationship between SUS and IA. Supplier support did not impact buyer adoption behaviour for B2B online purchasing in the USA. Additionally, Ifinedo [2011] found out that information system vendors support did not influence the acceptance of technologies by the SMEs in Canada. Due to inconsistent findings, it is worth to re-test this relationship, H4 is developed for further examination.

*H4: Supplier support has a positive effect on Internet adoption.*

Whenever the innovation is able to exhibit prominent results, users will tend to adopt a new idea or innovation. According to Deeter-Schmelz & Kennedy [2002], the Internet has been largely used by organization purchasers for electronic mail, and collecting suppliers, product and services as well as competitors' information. Most importantly Internet has been used widely to communicate with suppliers by providing information to suppliers. Theoretically, buyers who will be more likely to use the Internet for their

purchasing-related activities will perceive the great usefulness (e.g. PCC) by using the Internet. PCC had positively influenced industrial purchasing personnel IA, was found empirically supported by Deeter-Schmelz et al. [2001], Giuniperol et al. [2012], Hernandez et al. [2009], Igbaria [1997], Min. & Galle [2003], Shah Alam [2009], Shah Alam et al. [2011], Shah Alam et al. [2008], Wu et al. [2007a] and Yu & Tao [2009]. However, empirical results from Joo and Kim's [2004] research showed the reverse result which displayed insignificant impact of PCC on e-marketplace adoption. The security risk, resistance to change and lack of implementation experience were the main reasons causing the perception of benefits insignificantly contributing to manufacturing firms in South Korea in relative to e-marketplace adopters. In the meta-analysis of Hernandez et al. [2009] to study the suggested relationship between PU and Intensity of Use (described here as IA), 82% of the study result showed that PU and Intensity of Use had significant relationship. However, out of 22 studies, 18% showed otherwise. The following hypotheses are proposed to examine the relationship between PCC and IA in the suppliers' selection work in the Malaysian context to re-examine the likely positive influence of perceived communication convenience on Internet adoption.

*H5: Perceived communication convenience has a positive effect on industrial purchasing personnel's Internet adoption.*

Along with this, in Ong et al. [2004], Rho et al. [2014] and Wu et al. [2007b] studies, PIS was found to influence IA indirectly through PCC. First, PIS was found to have an impact on PCC. Consequently, in Deeter-Schmelz et al. [2001], Giunipero et al. [2012], Hernandez et al. [2009], Igbaria [1997], Min. & Galle [2003], Shah Alam [2009], Shah Alam et al. [2011], Shah Alam et al. [2008], Wu et al. [2007a] and Yu & Tao [2009] studies, PCC was said to have an impact on IA for business purchasing related activities in various literature. In fact, PIS does not only transfer into PCC, but, it enhances the IA via PCC which causes a mediating effect. In the literature, there was supportive evidence that PIS was directly or indirectly related to IA

[Ndubisi & Jantan 2003]. Thus, it is indeed valuable to test the mediating effect of PCC, although the mediation effect was insignificant in Wu et al.'s [2007a] research. With the objective reasoning, H6 is proposed, PCC positively mediates the path between PIS and industrial purchasing personnel's IA.

*H6: Perceived communication convenience has positively mediated the relationship between perceived Internet skills and industrial purchasing personnel's Internet adoption.*

Similarly, Igbaria [1997], Kwak et al. [2012] and Ndunisi et al. [2003] empirically found out that SUS influences IA indirectly through PCC. First, SUS was found to have an impact on PCC. Consequently, PCC was found to have an impact on IA for business purchasing related activities according to Deeter-Schmelz et al. [2001], Giuniperol et al. [2012], Hernandez et al. [2009], Igbaria [1997], Min. & Galle [2003], Shah Alam [2009], Shah Alam et al. [2011], Shah Alam et al. [2008], Wu et al. [2007a] and Yu & Tao [2009]. In fact, SUS does not only influence PCC, but, it enhances the IA via PCC, a mediating effect. In the literature, there is supportive evidence that SUS is directly or indirectly related to IA [Deeter-Schmelz et al. 2001; Igbaria 1997]. Only a few studies did not support the proposition [Wu et al. 2007a]. Thus, it is likely that PCC positively mediates the path between SUS and industrial purchasing personnel's IA, suggesting H7.

*H7: Perceived communication convenience has positively mediated the relationship between supplier support and industrial purchasing personnel's Internet adoption.*

## RESEARCH METHOD

In order to test the proposed research model, cross-sectional survey research design was developed. Structured online questionnaire was utilised by adopting and adapting scale of measurements from previous studies with a 6-points Likert scales (with 1, strongly disagree, to 6 strongly agree). PIS variable consisted of 4 measurement items adopted from Deeter-

Schmelz and Kennedy [2002]. SUS and PCC variables, each contained 3 measurement items that were adopted from Deeter-Schemelz et al. [2001]. Internet adoption was a single objective measure adopted from Deeter-Schmelz et al. [2001]. Demographic characteristics were included in the last part of the questionnaire.

Approximately 250 industrial purchasing personnel contacts from a customer database of a B2B company were utilized as a sampling frame in the current study. These purchasing personnel were located in all states of Malaysia consisting of the business purchasers and potential purchasers. Purchasing executives, purchasing managers, chief purchasing and other personnel related to business purchases were the potential respondents in this research.; However, the finding can only be generalized to the company's clients as the results of this study merely implied the perception of business-to-business purchasing managers and executives. A priori power analysis is a powerful method of regulating statistical power before a study is executed [Faul et al. 2009]. G Power Test was carried out and it indicated the sample size of 107 is deemed acceptable for medium (0.15) effect size and the probability of alpha error at 0.05. Therefore, 100-125 were the ideal target sample size to achieve the response rate of 40% to 50%. To encourage a favourable response from the respondents, reminder emails were sent one week after the initial email was sent out. Besides, the respondents were offered to participate in the lucky draw for the prizes of free customized industry training session sponsored by the collaborative company in order to promote participation, A total of 139 usable questionnaires was collected.

## RESEARCH FINDINGS AND DISCUSSION

Descriptive analysis was used to screen and examine the data collected. Most of the respondents were female (55%) and males represented 45% of the total respondents. The respondents with great experienced in purchasing had 12-20 years experiences (15.1%), followed by 45.3% of the respondents who had 6-12 years of purchasing experience, and 35.3% of the respondents had 1-6 years. The rest of the respondents had more than 20 years (4.3%). The respondents who held a Master degree comprised about 2.8%, 83.5% of the respondents possessed a degree qualification and only 13.7% respondents had a Diploma. The majority of the respondents (44.6%) were from age 30-39, 25.2% were from the age of 20 to 29. 22.3% of the respondent were from the age of 40 to 49 and respondents who were in the age of above 50 made up merely 7.9%.

The internal consistency reliability measurement was verified by Cronbach's alpha value and composite reliability with the recommended minimum of 0.70 was the threshold value [Hair et al. 2017]. All the latent variables were acknowledged as reliable across the items within the instrument as shown in the table 1. In order to examine the convergent validity of construct validity, the average variance extracted (AVE) were utilized. As tabulated in table 1, the latent constructs' AVE values were greater than the threshold value of 0.5, indicating more than half of the variance of the items was described by its latent constructs.

Table 1. Composite reliability, Cronbach's alpha for internal consistency and AVE for convergent validity  
Tabela 1. Wartości parametrów: niezawodność, współczynnik Cronbacha Ralpha dla wewnętrznej spójności oraz AVE dla korelacji mierników

Latent variable	Composite reliability	Cronbach's alpha	AVE
PIS	0.901	0.848	0.708
SUS	0.853	0.774	0.662
PCC	0.866	0.772	0.685
IA	NA	NA	NA

PIS=Perceived Internet Skills, SUS=Supplier Support, PCC=Perceived Communication Convenience, IA=Internet Adoption, NA= Not applicable

Next, the discriminant validity was assessed. At the indicator level, cross-loadings assessment was examined. Whereas for the construct level, HTMT ratio was utilised. Table 2 indicates the results of the items cross-loadings of the studied variables. As shown each item outer loading was at greater value compared to the cross-loadings of other constructs. Thus, the discriminant validity did appear at the indicator level. Here in this research, the majority of the outer loadings were above 0.70 indicating all of the items were reliable.

Table 2. Cross-loadings of indicators for discriminant validity

Tabela 2. Krzyżowe wskaźniki dla trafności różnicowej

	PIS	SUS	PCC	IA
PIS1	0.949	0.329	0.623	0.338
PIS2	0.906	0.384	0.349	0.205
PIS3	0.867	0.001	0.138	0.169
PIS4	0.944	0.247	0.449	0.155
SUS1	0.136	0.754	0.242	0.038
SUS2	0.332	0.938	0.614	-0.020
SUS3	0.261	0.733	0.212	-0.190
PCC1	0.247	0.493	0.707	-0.010
PCC2	0.456	0.423	0.865	0.419
PCC3	0.535	0.427	0.899	0.314
IA	0.272	-0.051	0.333	1.000

PIS=Perceived Internet Skills, SUS=Supplier Support, PCC=Perceived Communication Convenience, IA=Internet Adoption

HTMT was used to assess the discriminant validity at the construct level. Table 3 illustrated the result of HTMT of this research. As suggested by Henseler et al. [2015], for the threshold of constructs to establish the discriminant validity, the values needed to be less than 0.85. Hence, the results of the research indicated the suggested threshold value was met.

Table 3. HTMT analysis for discriminant validity  
Tabela 3. Analiza HTMT dla trafności różnicowej

	IA	PCC	PIS
IA			
PCC	0.340		
PIS	0.284	0.553	
SUS	0.114	0.578	0.339

PIS=Perceived Internet Skills, SUS=Supplier Support, Perceived Communication Convenience, IA=Internet Adoption. Threshold value: <0.85 [Hair et al. 2017]

This can be concluded that the measurement scales in the constructs were valid and reliable to proceed to the structural model assessment as the results implied most of the constructs were valid measures of their

own respective construct. Further, the reflective measurement model in this research had met the internal consistency, convergent validity and discriminant validity requirements.

Inner model variance inflation factor (VIF) was used to assess multicollinearity. The results illustrated here have no multicollinearity issue among the predictors constructs so nothing was needed to be reviewed or removed as the inner VIF were lower than 5.00 and higher than 0.20 [Hair et al. 2017]. In structural model analysis, the R<sup>2</sup> for PCC was 0.413 indicating substantial levels and IA (R<sup>2</sup>=0.198) shown moderate level [Cohen 1988]. The coefficient of determination referred to the model's predictive accuracy and was a combined effect of exogenous latent constructs on endogenous latent constructs. The path coefficients were computed to test the relationships. Bootstrapping with 5000 subsamples from 139 cases, one tailed test at significance level at 0.05 was used to obtain the path coefficients and their related t-values. Table 4 summarizes the results of the structural model and confirmed that H1, H2, H3, H4 and H5 had been supported in this study.

All the five hypotheses were empirically proven to have a positive relationship. H1, PIS has a positive effect on IA ( $\beta=0.157$ , p-value = 0.064). This is in line with the previous study carried out by various researchers Chatzoglou & Chatzoudes [2016], Deeter-Schmelz & Kennedy [2002], Ndubisi & Jantan [2003] who had proven that PIS was one of the key factors in ascertaining the PCC in the purchaser daily routine.

H2, PIS positively influences PCC ( $\beta=0.393$ , p-value = 0.000). These are in agreement with findings from Ong et al. [2004], Rho et al. [2014] and Wu et al. [2007b]. The earlier findings are confirmed in this research, indicating PIS as one of the main elements in ascertaining the usefulness (PCC) in employing the supplier's web site for managing firm buyers' daily work which related to B2B purchasing activities.

Table 4. Results of path coefficients and hypotheses testing  
Tabela 4. Wyniki testów współczynników ścieżek i hipotez

Hypotheses	Relationship	Path Coefficients [ $\beta$ ]	Standard Deviation [STDEV]	t Values	p Values	Significance
H1	PIS $\rightarrow$ IA	0.157	0.103	1.525	0.064*	Yes
H2	PIS $\rightarrow$ PCC	0.393	0.071	5.525	0.000**	Yes
H3	SUS $\rightarrow$ PCC	0.397	0.056	7.052	0.000**	Yes
H4	SUS $\rightarrow$ IA	0.320	0.089	3.589	0.000**	Yes
H5	PCC $\rightarrow$ IA	0.419	0.085	4.903	0.000**	Yes

Threshold value: one-tailed test, \*t-value > 1.290, p < 0.10, \*\*t-value > 1.645, p < 0.05 [Hair et al. 2017]

The statistical analysis shows that H3 ( $\beta=0.397$ , p-value = 0.000) and H4 ( $\beta=0.320$ , p-value=0.000) were supported. This reflects SUS in the form of training, guidance, encouragement and incentives will enhance industrial buyers' recognition of the Internet as a convenient approach of searching or communicating with the suppliers, such as interaction via the suppliers' web sites. This is consistent with the literature in studies carried out by Deeter-Schmelz et al. [2001], Igbaria [1997], Kwak et al. [2003], Ndunisi et al. [2003], Purchase and Dooley [2010]. These studies had generally shown that SUS had a positive influence on the PCC and IA.

H4, SUS was found to positively influence IA, similar to the previous findings by Deeter-Schmelz and Kennedy [2002], Ghobakhloo et al. [2011], Guinipero et al. [2012] and Thi & Lim [2011]. The finding in this study shows that SUS ( $\beta=0.320$ , p-value = 0.000) has positive direct effects on IA. It further

indicates that SUS is one of the key predictors for industrial purchasing personnel to adopt the Internet as the main source of information and as the main communication tools.

Finally, H5 is in line with the results of numerous studies completed by Deeter-Schmelz et al. [2001], Guinipero et al. [2012], Hernandez et al. [2009], Igbaria [1997], Min & Galle [2003], Shah Alam [2009], Shah Alam et al. [2011], Shah Alam et al. [2008], Wu et al. [2009a] and Yu & Tao [2009]. The findings show that PCC ( $\beta=0.419$ , p-value = 0.000) has positive effects on IA. This is implying PCC is a significant predictor of industrial purchasing personnel adopting the Internet as a source of information and communication tools. The greater the benefits and value gained by employing the supplier's web site to finish their communication and searching tasks, the higher the intention of using the Internet in the near future.

Table 5. Results of mediation test  
Tabela 5. Wyniki testu mediacyjnego

Relationship	Path Coefficients [ $\beta$ ]	Standard Deviation [STDEV]	t Values	p Values	Significance
<b>Indirect effect [indirect path a*b]:</b>					
H6: PIS $\rightarrow$ PCC $\rightarrow$ IA	0.165	0.051	3.236	0.001*	Yes
<b>Direct effect:</b>					
PIS $\rightarrow$ IA	0.157	0.103	1.525	0.064**	Yes
<b>Indirect effect [indirect path a*b]:</b>					
H7: SUS $\rightarrow$ PCC $\rightarrow$ IA	0.165	0.036	4.601	0.000*	Yes
<b>Direct effect:</b>					
SUS $\rightarrow$ IA	0.320	0.089	3.589	0.000*	Yes

Threshold value: one-tailed test, t-value > 1.290, \*p < 0.10, t-value > 1.645, \*\*p < 0.05 [Hair et al. 2017]

As for H6 and H7, the mediating effect analysis was carried out. Bootstrapping, a non-parametric resampling procedure, has been known to be one of the methods for assessing the mediating effect [Hair et al. 2017]. Table 5 shows the results of bootstrapping, based on

the structural model. The indirect paths [a\*b] for H6 and H7 were significant ( $\beta=0.165$ , p-value = 0.001), and at the same time the direct paths were significant too. Therefore, these were considered as complementary or partial mediation that point in the same positive

direction, whereby both direct and indirect effects were significant [Hair et al. 2017].

It can be concluded that PCC positively mediates the path between PIS and IA as well as between SUS and IA. These findings are in line with previous studies indicating that PIS has an impact on PCC as well as SUS has an impact on PCC, and at the same time that PCC has an impact on IA [Igbaria 1997, Deeter-Schmelz et al. 2001, Ndubisi, Jantan 2003].

## CONCLUSIONS

In a nutshell, the current research catered an understanding of a path model in regards to Internet adoption by industrial purchasing personnel for business purchasing related activities. In sequencing, PIS and SUS have a positive effect on PCC. Consequently, PCC would increase industrial purchasing personnel IA for business purchasing related activities in the future. Theoretically, this study enriches the literature on B2B buyer behaviour. In particular, the industrial purchasing personnel adoption of the Internet for business purchasing related activities could be explained in a sequencing path. First, professional B2B buyers would perceive themselves as having a certain level of Internet skills and expecting essential support from their suppliers, in order to consider the Internet as a source of information and convenient communication method to assist them in B2B purchasing routines. With these positive perceptions, they would likely to accept suppliers' proposition of adopting the Internet, thus to enhance productivity in B2B purchasing information search and communication.

Practically, this study indicated that purchasing personnel who have the skills and knowledge of using the Internet as source of searching for information and communication tools indeed reckon the benefits of using the Internet in their daily routines. These groups of user will lead to a high tendency to employ the Internet as communication convenient tools. Suppliers should provide considerable support for their industrial purchasing personnel in terms of training or online lessons/videos with regards to steps and processes of using the web

site. This type of support would lead to a positive perception (i.e. PCC) among existing and potential industrial purchasing personnel, thus, increase their intention to adopt the Internet as a source of information and communication tools. In fact, the unavoidably B2B industry has to adopt the Internet in order to enhance effectiveness and efficiency in business procurement. Therefore, this study provides some insight for B2B practitioners to get ready with the implementation of Internet-based web site and communication tools such as online chat system.

Similar to other studies, this study also has its limitations. The sample of this study only included the customer database of a scientific instrument company. Therefore, the results cannot be generalized for all the industrial purchasing personnel in Malaysia. Future studies might enlarge the scope of studies across different B2B industries. Nonetheless, this study is useful to enlighten industrial suppliers, especially in a Malaysia context in gaining acceptance of web presence and understanding that they must invest in certain support mechanism to ease the online communication processes from the purchaser's perspective.

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## CZYNNIKI WARUNKUJĄCE PRZYSWOJENIE UŻYTKOWNIA INTERNETU PRZEZ PRACOWNIKÓW DZIAŁU ZAKUPU DLA BIZNESOWYCH AKTYWNOŚCI ZAKUPOWYCH

**STRESZCZENIE. Wstęp:** Celem pracy jest zbadanie modelu ścieżki oraz efektu mediacyjnego postrzeganej wygody w komunikacji dla przybliżenia pracownikom działu zakupu użytkownika Internetu dla biznesowych aktywności zakupowych. Obejmuje analizę sekwencyjnych ścieżek przewidywanego efektu postrzeganych umiejętności użytkownika Internetu oraz wsparcia dostawcy w postrzeganej wygodzie w komunikacji. W konsekwencji, postrzegana wyгода w komunikacji wpływa na zaakceptowanie Internetu, jako narzędzia komunikacji w kontekście biznes-biznes. Obejmuje również niebezpośrednie efekty postrzeganych umiejętności używania Internetu oraz wsparcia dostawcy na akceptację Internetu poprzez postrzeganą wygodę komunikacji.

**Metody:** Została przygotowana ustrukturyzowana ankieta w celu przeprowadzenia badania. Baza danych firmy o strukturze biznes-biznes, składająca się z obecnych i potencjalnych klientów została wybrana, jako przykładowa baza dla przeprowadzenia badania. Zebrano 139 wypełnionych ankiet, z których dane poddano analizie statystycznej przy zastosowaniu modelu PLS-SEM 3.0 (Partial Least Square – Structural Equation Modeling).

**Wyniki:** Uzyskane wyniki wskazują, że postrzegane umiejętności użytkownika Internetu i wsparcia dla dostawcy mają istotny wpływ na postrzeganą wygodę komunikacji. Z kolei postrzegana wyгода komunikacji ma bezpośredni wpływ na użytkownika Internetu przez pracowników działu zakupu dla celów biznesowych zakupów. Postrzegana wyгода komunikacji istotnie określa efekt postrzeganych umiejętności użytkownika komputera oraz wsparcia dostawcy na biznesowe użytkowanie Internetu.

**Wnioski:** Praca przyczynia się do zidentyfikowania istotnych predyktorów oraz mediatorów dla użytkownikom Internetu dla celów biznesowych związanych z aktywnością zakupową wśród pracowników działu zakupu. Należy położyć większy nacisk na umiejętności użytkownika Internetu w celu zwiększenia wygody komunikacji, aby zachęcić biznesowych kupców do stosowania Internetu w ich codziennej pracy.

**Słowa kluczowe:** użytkowanie Internetu, postrzegana wygoda komunikacji, postrzegane umiejętności użytkownika Internetu, wsparcie dla dostawcy.

## DIE VORAUSSETZENDEN FAKTOREN BEI DER INANSPRUCHNAHME DES INTERNETS VON MITARBEITERN DER EINKAUFABTEILUNGEN IN HINSICHT AUF DEREN BUSINESS-EINKAUFSAKTIVITÄTEN

**ZUSAMMENFASSUNG. Einleitung:** Das Ziel der Arbeit ist es, das Verfahrensmodell und das Mediationsverfahren von der wahrgenommenen Kommunikationsbequemlichkeit hinsichtlich der Annäherung der Inanspruchnahme des Internets zwecks der Ausführung von Business-Einkaufsaktivitäten durch die Mitarbeiter der Einkaufsabteilungen zu erforschen. Sie umfasst Analyse von Sequenzverläufen des vorgesehenen Effektes bei der wahrgenommenen Fähigkeit der Inanspruchnahme des Internets zwecks der Unterstützung des Lieferanten bei seiner Wahrnehmung der Kommunikationsbequemlichkeit. Die von den Anwendern wahrgenommene Kommunikationsbequemlichkeit beeinflusst weitgehend positiv die Akzeptanz für die Inanspruchnahme des Internets als eines der Kommunikationstools im Kontext: Business-Business. Sie umfasst auch indirekte Effekte der wahrgenommenen Fähigkeiten der Anwendung des Internets und die Unterstützung des Lieferanten bei seiner Akzeptanz des Internets angesichts der von ihm wahrgenommenen Kommunikationsbequemlichkeit.

**Methoden:** Zwecks der Durchführung der betreffenden Erforschung wurde ein strukturierter Umfragebogen ausgearbeitet. Als beispielweise Datenbank für die Durchführung der Forschungen wurde die Datenbank einer Firma von der Struktur Business-Business, die sich aus gegenwärtigen und zukünftigen Kunden zusammensetzt, ausgewählt. Es wurden dabei 139 ausgefüllte Umfragebögen gewonnen, deren Daten man dann einer statistischen Analyse unter Anwendung des Modells PLS-SEM 3.0 (Partial Least Square – Structural Equation Modeling) unterzog.

**Ergebnisse:** Die der Analyse entnommenen Forschungsergebnisse weisen darauf hin, dass die wahrgenommenen Fähigkeiten der Anwendung des Internets und die davon bedingte Unterstützung des Lieferanten einen wesentlichen Einfluss auf die wahrgenommene Kommunikationsbequemlichkeit ausüben. Demzufolge beeinflusst die wahrgenommene Kommunikationsbequemlichkeit wieder direkt die Inanspruchnahme des Internets seitens der Mitarbeiter der Einkaufsabteilungen bei den von ihnen betätigten Business-Einkäufen. Die wahrgenommene Kommunikationsbequemlichkeit bestimmt in relevanter Weise den Effekt der in Anspruch genommenen Fähigkeiten zur Rechneranwendung und die Unterstützung des Lieferanten bei dessen businessartigen Inanspruchnahme des Internets.

**Fazit:** Die vorliegende Arbeit trägt zur Ermittlung von relevanten Prädiktoren und Mediatoren zur Inanspruchnahme des Internets für die Business-Zwecke, die mit den von Mitarbeitern der Einkaufsabteilungen betätigten Einkaufsaktivitäten verbunden sind, bei. Daher soll ein größerer Druck auf die Kompetenzen der Mitarbeiter hinsichtlich der Anwendung des Internets zwecks der Erhöhung der Kommunikationsbequemlichkeit gelegt werden, um die Business-Einkäufer zur Anwendung des Internets in ihrer täglichen Arbeit zu verleiten.

**Codewörter:** Anwendung des Internets, wahrgenommene Kommunikationsbequemlichkeit, wahrgenommene Fähigkeiten zur Anwendung des Internets, Unterstützung für Lieferanten.

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