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Notebook Computer Brand Choice Intention and Use Behavior of College Students Majoring in Computer Science in Chengdu, Sichuan, China

Lei Wang¹
Isaree Suwannasri^{2*}
Jin Zhang³
Chompu Nuangjamnong⁴

^{1,2,3,4} Innovative Technology Management Program
Graduate School of Business and Advanced Technology Management
Assumption University of Thailand

*Corresponding author

¹20014151@qq.com

²patnara@hotmail.com

³82435538@qq.com

⁴chompunng@au.edu

Abstract

This study investigates key factors influencing of notebook computer brand choice intention and use behavior among computer science major students in Chengdu, Sichuan, China. Perceived ease of use, perceived usefulness, behavioral intention, and use behavior were associated in a conceptual framework. The researchers used a quantitative approach for survey distribution to 878 participants. The sampling techniques involved the multi-stage sampling techniques of probability sampling, namely random sampling and stratified sampling to collect data. Item Objective Congruence (IOC) Index at 0.67 and Cronbach's Alpha reliability at 0.70 test were approved prior to the data collection period. Confirmatory Factor Analysis (CFA) and Structural Equation Model (SEM) were used to test models' goodness of fit, validity, and reliability. The results reveal that perceived usefulness has the strongest significant impact on behavioral intention, followed by perceived ease of use. Furthermore, behavioral intention strongly and significantly influences the use behavior. The findings indicate that using notebook computer brands has gained potential and popularity among students majoring in computer science in Chengdu and Sichuan districts, for learning effectiveness. Therefore, computer brand companies may need to prepare a variety of notebooks with appropriate design and technical specifications for students in computer science in support of their learning performance

Keywords: *perceived ease of use, perceived usefulness, behavioral intention, use behavior, notebook computer brand intention*

1. Rationale and Purposes of the Study

In today's age of rapid industrialization and globalization, the expansion of information technology has influenced practically every facet of human existence, including education. Especially in computer-related colleges, where notebook computers have become a crucial study tool for college students, the rapid growth and introduction of technology has posed new requirements for students' education and learning tools. Many laptop manufacturers have gone to considerable lengths to set themselves apart from one another by offering cutting-edge

innovations and superior quality. Students majoring in computing will use these considerations to guide their decision on which laptop brand to purchase. Students majoring in computer science typically decide on notebook manufacturers based on perceived ease of use and utility, search for information prior to purchasing, and assess product trust. In the decision-making process, behavior and intent play a vital role. People rely on social pressure and the use of a product to mitigate the risk associated with each buying decision. Olson & Jacoby (1972) separated brand selection into internal and external variables. According to Pananond & Zeithaml (1998), the internal and external determinants of brand selection are of equal importance, and brand is an important consideration for consumers when evaluating items. But there are more elements, such as utility and usability, which are inherent to the product and not necessarily straightforward to locate. Many previous studies only focus on two variables: trust and the social impact of brand, which may effectively explain the purchase intention of products (Lin & Chen, 2006; Udo et al., 2010; Jalilvand & Samiei, 2012; Bhakar et al., 2013). Nevertheless, it does not necessarily reflect actuality. A few researchers have examined the influence of behavioral intention, ease of use and usefulness on user behavior. Therefore, in this study, the researchers took behavioral intention as the moderating variable, and select two variables of internal product cues--usefulness and ease of use--as independent variables. The objective of this study was to investigate the brand choice intention and use behavior of Chengdu computer major students under study.

1.1 Introduction of computer major in Chengdu Universities

During 2017, the Ministry of Education presented the engineering construction education reform and growth strategy. New engineering refers mostly to the rising sectors represented by computer-related disciplines like artificial intelligence and computer science (Mu & Wang, 2020). The new engineering, according to Cabedo et al. (2018), is to update the curriculum of traditional engineering majors in higher education and reform education to accommodate the rapid development of emerging businesses. In the development strategy for computer science and other new engineering fields, it is emphasized that local colleges and universities should play a supportive role in regional economic development and industrial transformation, as well as upgrading and strengthening the link between theory and practice. New engineering focuses on new structures and systems, which must be founded on the development and reform of low-level disciplines like computer science. The fundamental courses of the computer major cover the internal workings of computers and the operational processes of computers (Dong et al., 2019).

1.2 Objectives of this Research

(1) To identify the causal relationship between perceived ease of use and perceived usefulness in behavioral intention to select and use notebook computer brand among computer science students in Chengdu and Sichuan, China.

(2) To illustrate the causal relationship between behavioral intention on use behavior among computer science students under study in selecting and using notebook computer brands.

(3) To make recommendations to computer brand companies and computer science students computer specifications required in computer science programs for learning performance optimization.

1.3 Research Questions

(a) Do perceived ease of use and perceived usefulness have significant impact on behavioral intention to select and use notebook computer brand among computer science students in Chengdu and Sichuan, China?

(b) Does behavioral intention have a significant impact on use behavior in selecting and using notebook computer brand among computer science students under study?

(c) What are recommendations for computer brand companies and computer science students regarding computer specifications required in computer science programs for students' learning performance optimization?

1.4 Significance of the Study

This study provided theoretical and practical information regarding college students' notebook computer brand intentions, particularly computer majors to help marketers understand brand personality traits and factors influencing college students' notebook computer brand decision intention, particularly those majoring in computer science across age groups. It was expected that the obtained findings should help computer developers to deliver products for students' needs and preferences for notebook computer brand choice. In addition, notebook computer manufacturers can supply effective equipment information before students' courses. The results of this research can also help notebook computer users to understand perceived ease of use, perceived utility, trust, social influence, convenience, behavior intention, and usage behavior as factors affecting consumers' brand choice and purchase intention.

2. Literature Review

2.1 Perceived Ease of Use

The perception of a system's technology's usability is known as perceived ease of use. It also describes how confident individuals are to utilize specific technologies (Chauhan, 2015). The perception of usability is a major predictor of future behavior (Davis, 1989). Multiple studies have demonstrated that this perspective influences an individual's behavior and motivation to utilize the target system (Venkatesh, 2000). Perceived usability predicts site and usage intention and will impact the uptake of mobile technology, particularly applications (Kim et al., 2016). The usability of the retrieval is regarded as the premise of its utility. In particular, perceived ease of use relates to "people's assumption that using a particular system is free" (Davis, 1989). This perceived ease of use is expressed by the extent to which individuals believe using technology is simple (Davis, 1989). The TAM suggests that perceived ease of use affects perceived utility (Davis, 1989). However, Koufaris (2002) noted that certain

research findings imply that perceived usefulness is a more reliable predictor than perceived usability. Moreover, Kucukusta et al. (2015) verified the influence of perceived ease of use and perceived usefulness on usage intention in various IT scenarios (including online reservations). Gaur & Kumar (2018) postulated that perceived usability influences perceived utility. People who can acquire and master new technology with minimal effort will value it more. Benamati et al. (2010) examined the impact of technical insights, such as perceived ease of use and perceived usefulness, on initial credibility. Thereby, the hypothesis is constructed as follows:

Hypothesis 1 (H1): Perceived ease of use has a significant impact on behavioral intention to select and use notebook computer brand among computer science students in Chengdu and Sichuan, China.

2.2 Perceived Usefulness

Perceived usefulness is described as a person's belief that using a certain technology would increase their productivity. It is also characterized as a user's willingness to adopt new technologies (Davis, 1989). According to other researchers, perceived usefulness identifies the users' anticipation that the system technology would help them enhance their job performance, which is an important factor in determining whether to employ it (Bhattacharjee & Sanford, 2006). Majdalawi et al. (2014) used Technology Acceptance Model (TAM) with its core dimensions of perceived usefulness and perceived ease of use. The possibility that a user would engage in the intended activity is referred to behavioral intention (Ajzen, 1991). Although discovering practicability sectors are a critical predictor of behavioral intention, subjective pleasure can demonstrate a substantial variety in action transcending intentions that rely on perceived usefulness distinctiveness (Davis et al., 1992). The perception of system quality is necessary for perceived usefulness and perceived ease of use, but the subjective measurement of information system availability is essential for perceived availability (Lederer et al., 2000). Perceived utility implies that people are willing to believe that a technical skill might improve their work performance (Davis, 1989). The Technology Acceptance Model (TAM) states that perceived ease of use influences perceived utility (Davis, 1989). Moon & Kim (2001) found that perceived playfulness positively correlates with the intention to use websites for work and entertainment purposes. In contrast, perceived usefulness as focus attention, thirst for knowledge, and pleasure only influence behavioral intention for the meaning and purpose of work. Subsequently, a hypothesis is derived:

Hypothesis 2 (H2): Perceived usefulness has a significant impact on behavioral intention to select and use notebook computer brands among computer science students in Chengdu and Sichuan, China.

2.3 Behavioral Intention and Use Behavior

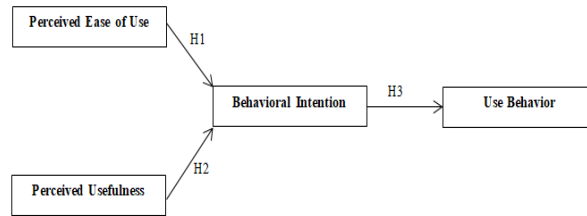
Behavioral intention is taken from a psychology theory that focuses on complete action and explains why people adopt a certain system (Chauhan, 2015). Behavioral intention describes how much effort/desire a person must carry out a specific activity (Fishbein & Ajzen,

1975). The stronger desire of an individual to do something, the more likely they will perform an action (Ajzen, 1991). The actual frequency of technology use was a standard metric for measuring usage patterns (Venkatesh et al., 2003). Regarding usage behavior, it is the frequency with which a person employs technological resources. In most situations, usage behavior may also be determined by the frequency with which the technology is employed (Venkatesh et al., 2003). Several studies have indicated that user behavior can enhance mobile phone payment and purchasing power as a result of the constant evolution and transformation of the social environment (Hubert et al., 2017). Convenience and purpose in behavior have a considerable beneficial effect on the usage of online question-and-answer services (Deng et al., 2011). Suggestions for correct Information and Communication Technology (ICT) usage as a solution for identified improper use (Abaidoo & Arkorful, 2014). Alkhasawneh & Alanazy (2015) asserted that responsible usage of technology will result in superior academic achievement. Also, based on this study, Venkatesh et al. (2003) argued that enabling situations may block or increase the positivity or negativity of use behavior, and that the inhibition of convenience conditions would have a negative effect on user behavior. On the other hand, appropriate and sufficient enabling circumstances may have a beneficial effect on behavior. Consequently, a hypothesis is derived:

Hypothesis 3 (H3): Behavioral intention have a significant impact on use behavior of selecting and using notebook computer brand among computer science students in Chengdu and Sichuan, China.

3. Conceptual Framework

The three significant theories provide the following: perfect ease of use, perfect use effectiveness, behavioral intention, and use behavior. For the previous research framework, Zhou et al. (2010) hosted the first research framework. The second research framework, the variables, such as performed ease of use, performed usefulness, came from Christian et al. (2020). This study aimed at verifying the impact of perceived usefulness on the behavior intention of an autopilot. Ukut & Krairit (2019) proposed the third framework. The results pointed to promotion conditions, social influence, and voluntariness directly and significantly affecting students' academic performance and teachers' views. The variables behavioral intention, and use behavior came from this article. Figure 1 summarizes the proposed hypotheses.

Figure 1: Conceptual Framework

H1: Perceived ease of use has a significant impact on behavioral intention to select and use notebook computer brand among computer science students in Chengdu and Sichuan, China.

H2: Perceived usefulness has a significant impact on behavioral intention to select and use notebook computer brands among computer science students in Chengdu and Sichuan, China.

H3: Behavioral intention have a significant impact on use behavior of selecting and using notebook computer brand among computer science students in Chengdu and Sichuan, China.

4. Research Methods and Materials

This quantitative study applied probability sampling in distributing questionnaire copies to undergraduate students in computer science programs who owned notebook computer brands in Chengdu and Sichuan, China. The students in Computer and Software Engineering at the College of Chengdu Neusoft University and the School of information and business management voluntarily participated in the study and responded to the questionnaire.

The questionnaire contains three sections. First, screening questions were designed to identify valid respondents with the appropriate criteria (Voß et al., 2020). Demographic information, such as gender, year of study, computer brands, and majors, was collected for descriptive analysis. The researchers used a five-point Likert scale to evaluate the questionnaire items (Salkind, 2017).

Prior to data collection, the item-objective congruence (IOC) index was used to invite three marketing experts and educational professionals to assess content validity. The IOC of all items was pegged at 0.67 or above. Clark-Carter (2010) determined through pilot testing that 30 respondents were sufficient. Cronbach's Alpha coefficient values were tested to establish internal consistency dependability of at least 0.70 (Nunnally & Bernstein, 1994).

The data were collected from 878 voluntary undergraduates in early 2023. The researchers analyzed the data using the statistical applications SPSS and AMOS. In addition, confirmatory factor analysis (CFA) was performed to assess factor loading, t-value, composite reliability (CR), average variance extracted (AVE), and discriminant validity. Subsequently, the structural equation model (SEM) was used to assess the hypotheses and the significance level of each association.

5. Results and Discussion

5.1 Demographic Information

The demographic data of 878 respondents were:

Gender: Males 21.48%, Females 78.52%

College education: Internet of things engineering 65.4%, Software engineering 23.4%, Computer science and technology 11.2%.

Year of study: First year 24.37%, Second year, 25.21%, Third year 25.42%, and Fourth year 25%.

Notebook computer brand: Lenovo 24.5%, ASUS 21.8%, Dell 9.3%, Huawei 20.2%, and Acer 24.2%

5.2 Confirmatory Factor Analysis (CFA)

CFA was performed to confirm the number of constructs and factor loadings among the observed variables (Malhotra et al., 2004). Initially, a measurement model was developed to assess the adequacy of fit. Table 1 shows that the goodness of CFA fits, as measured by CMIN/DF, GFI, AGFI, NFI, CFI, TLI, and RMSEA, was adequate.

According to the statistical findings reported in Table 2, Cronbach's Alpha values of more than 0.70 are acceptable. In addition, acceptable values are indicated by factor loadings greater than 0.50, t-values greater than 1.98, p-values smaller than 0.50, composite reliability (CR) greater than 0.70, and average variance extracted (AVE) greater than 0.50. (Hair et al., 2006). CFA was therefore authorized to certify convergent and discriminant validity.

Table 1: Goodness-of-Fit for Measurement Model

Fit Index	Acceptable Criteria	Source	Before Adjustment Values	After Adjustment Values
CMIN/DF	< 5.00	Awang (2012); Al-Mamary and Shamsuddin (2015)	5.928	2.716
GFI	≥ 0.85	Sica and Ghisi (2007)	0.803	0.877
AGFI	≥ 0.80	Sica and Ghisi (2007)	0.746	0.871
NFI	≥ 0.80	Wu and Wang (2006)	0.754	0.884
CFI	≥ 0.80	Bentler (1990)	0.946	0.923
TLI	≥ 0.80	Sharma et al. (2005)	0.943	0.913
RMSEA	< 0.08	Pedroso et. al. (2016)	0.068	0.059

Note: CMIN/DF = the ratio of the chi-square value to degree of freedom, GFI = Goodness-of-fit index, AGFI = Adjusted goodness-of-fit index,

NFI = Normed fit index, CFI = Comparative fit index, TLI = Tucker-Lewis index, and RMSEA = Root mean square error of approximation

Table 2: Confirmatory Factor Analysis Result, Composite Reliability (CR) and Average Variance Extracted (AVE)

Latent Variables	Source of Questionnaire	No. of Items	Cronbach's Alpha	Factors Loading	CR	AVE
Perceived Ease of Use (PEOU)	Davis (1989); Pipitwanichakarn and Wongtada (2020)	4	0.847	0.626-0.877	0.855	0.548
Perceived Usefulness (PU)	Tao et al. (2011); Alam et al. (2018)	5	0.876	0.659-0.920	0.884	0.661
Behavioral Intention (BI)	Hsiao et al. (2016); Rai (2020)	3	0.857	0.568-0.898	0.867	0.626
Use Behavior (UB)	Alam et al. (2018)	3	0.868	0.642-0.874	0.873	0.582

Source: Wang et al. (2023)

The convergent validity was determined when the value of CR is larger than AVE, while the AVE is higher than 0.50 (Hair et al., 2006). The values of the discriminant validity were examined and found exceeding the critical point values as demonstrated in Table 3. Consequently, the convergent validity and the discriminant validity of this research were adequate.

Table 3: Discriminant Validity

	PEOU	PU	BI	UB
PEOU	0.740			
PU	0.367	0.813		
BI	0.388	0.354	0.806	
UB	0.290	0.212	0.294	0.766

Note: The diagonally listed value is the AVE square roots of the variables.

Source: Wang et al. (2023)

5.4 Structural Equation Model (SEM)

After the CFA process, the structural equation model (SEM) was conducted to estimate a linear equation and verify a structural model fit. Additionally, SEM determines the causal relationship among the variables (Suwannasri & Nuangjamnong, 2022; Jin & Nuangjamnong, 2022). The results were shown in Table 4, adjusted by SPSS AMOS. CMIN/DF, GFI, AGFI, CFI, TLI and the RMSEA are all approved. Consequently, each indicator of the goodness of fits in SEM verification for this research was acceptable.

Table 4: Goodness of Fit for Structural Model

Fit Index	Acceptable Criteria	Source	Before Adjustment Values	After Adjustment Values
CMIN/DF	< 5.00	Awang (2012); Al-Mamary and Shamsuddin (2015)	5.820	2.911
GFI	≥ 0.85	Sica and Ghisi (2007)	0.758	0.851
AGFI	≥ 0.80	Sica and Ghisi (2007)	0.727	0.821
NFI	≥ 0.80	Wu and Wang (2006)	0.942	0.876
CFI	≥ 0.80	Bentler (1990)	0.934	0.914
TLI	≥ 0.80	Sharma et al. (2005)	0.931	0.903
RMSEA	< 0.08	Pedroso et. al. (2016)	0.096	0.062

Note: CMIN/DF = the ratio of the chi-square value to degree of freedom, GFI = Goodness-of-fit index, AGFI = Adjusted goodness-of-fit index,

NFI = Normed fit index, CFI = Comparative fit index, TLI = Tucker-Lewis index, and RMSEA = Root mean square error of approximation

5.5 Research Hypothesis Testing Result

The significance of each variable is determined by regression weights and R^2 variance. Based on the results in Table 5, the support relationship has p-values less than 0.05. The strongest effect is presented in the relationship between perceived ease of use and behavioral intention with a standardized path coefficient (β) of 0.393 (t-value = 5.677***). Perceived usefulness also has a significant impact on behavioral intention at (β) of 0.296 (t-value = 3.951***), then, behavioral intention on use behavior at (β) of 0.278 (t-value = 3.619***).

Table 5: Hypothesis Results of the Structural Equation Modeling

Hypothesis	(β)	S.E.	t-value	Result
H1: PEOU→BI	0.393	0.063	5.677***	Supported
H2: PU→BI	0.296	0.061	3.951***	Supported
H3: BI→UB	0.278	0.075	3.619***	Supported

Note: *** p<0.001, ** p<0.01, * p<0.05

Source: Wang et al. (2023)

H1 confirms that perceived ease of use is one of the strongest factors of behavioral intention, with a standardized path coefficient value of 0.393 in the structural pathway. The assumption is that students in computer science programs at the College of Chengdu Neusoft University and the School of information and business management are more likely to admit having notebook computer brands for their study, learning, doing workshops and projects rather than using computers provided by the college laboratory (Roschelle et al., 2005).

H2 clarifies that the relationship between perceived usefulness and behavioral intention is supported, with a standardized coefficient value of 0.296. Perceived usefulness identifies the students in computer science programs at the College of Chengdu Neusoft University and the School of information and business management anticipating that obtained notebook computer brands for their study to enhance their learning performance (Tschang & Xue, 2005; Bian, 2005).

H3 reveals that behavioral intention significantly impacts use behavior, with a standard coefficient value of 0.278. Krekel et al. (2014) and Dong (2022) found that when students can easily use innovative technology, they tend to have a behavioral intention for creative learning activities.

6. Conclusions and Recommendation

6.1. Conclusion

The purpose of this study was to identify the factors that influence the notebook computer brand purchasing intention and use behavior of computer science majoring college students in Chengdu, Sichuan, China. A conceptual framework was provided for the presentation of the hypotheses. There was a total of 878 undergraduate students with experience in using different notebook computer brands who responded to the questionnaire. A structural equation model (SEM) was used to validate the hypothesized factors that significantly impact behavioral intention and use behavior. Statistical analyses were carried out through confirmatory factor analysis (CFA) to check the validity and reliability, and a structural equation model (SEM) was used to validate the factors.

The obtained findings pointed to the factors that impact the students' choice for various notebook computer brands. The perceived ease of use has the most significant and biggest influence on the individual's purchasing intention. The participating students tended to use notebook computer brands perceived as user-friendly and beneficial to their study (Roschelle et al., 2005). The significant association between perceived usefulness and behavioral intention indicates that the students' use of certain notebook computer brands would help them improve

their learning performance. This was found earlier by previous researchers (Tschang & Xue, 2005; Bian, 2005). It was confirmed in this study that behavioral intention has a substantial impact on use behavior for the students enrolled in computer science programs because they anticipate their brand choice of notebook computers to make their lives easier in their study as well as projects (Krekel et al., 2014; Dong, 2022).

6.2 Recommendation

In this study, the researchers identified the major factors that impact notebook computer brand choice intention and use behavior of college students majoring in computer science in Chengdu, Sichuan, China. The results on notebook computer brand choice are to guide students in computer science programs to select a tool to reach their desirable learning outcomes. Notebook brand companies, and universities in computer science programs, should be aware of brand preferences among computer science students and those in related fields regarding notebook technical specifications relevant to computer science programs. Thus, students' behavioral intentions can help improve their learning outcomes and performances.

The computer science programs could support students with new information technology, and suggestions on notebook computers suitable for practical and active learning skills. These can encourage students' interests and desire for a good learning outcome on the target competencies and skills needed in the technology market. The point on perceived ease of use as the strongest impact on behavioral intention could help brand companies to produce suitable notebook systems that are user-friendly and universities could plan for the hardware specification list known to all stakeholders. The hardware specification lists can also help students to be flexible in their choice of specific notebook computer brands.

Perceived usefulness has a significant impact on behavioral intention, and behavioral intention has a significant impact on use behavior. Such obtained findings could support universities to recommended suitable notebook computer brands with all technical specifications pertinent to the target learning outcomes and performances. A survey could be conducted with students for their feedback on learning improvements from the ease of use of the selected brands. As for product feedback from consumers, both teaching programs and notebook brand companies should update, recommend, and customize hardware specifications in support of computer science courses and students' efficient learning.

6.3 Limitation and Further Study

The researchers of this study were well aware of drawbacks in sampling and the scope of a case study. The participants were restricted to those graduates in Computer Science at Chengdu Neusoft University's College of Chengdu and the School of Information and Business Management in China. As a result, the obtained findings can be confined to computer science students in Chengdu, but not generalized to other local or international contexts in China. This case study was a pioneering effort on consumer-based product marketing and the researchers hope that future research should cover larger provincial groups and a national scope of the

study. Other potential factors, such as levels of trust, perceived interaction, performance expectations, and the conditions of facilitation could also be considered for inclusion in pursuing future research from both quantitative and qualitative perspectives.

7. The Authors

Lei Wang is Dean of the Faculty of Computer Science, Chengdu Neusoft University, Dujiangyan City, Chengdu, Sichuan, China. The three co-authors are: Issaree Suwannasri is working for Human Resource Department, Royal Thai Air Force, Wing 41 Base, Bangkok, Thailand; Zhang Jin is a lecturer at Southwest Minzu University, Chengdu, Sichuan Province, China; and Chompu Nuangjamnong, Lecturer, Graduate School of Business and Advanced Technology Management, Assumption University of Thailand. The four authors share their research interest in the areas of marketing management, digital marketing, consumer behavior, and current issues in production and branding.

8. References

- Abaidoo, N. & Arkorful, V. (2014). Adoption and effective integration of ICT in teaching and learning in higher institutions in Ghana. *International Journal of Education and Research*, 2(12), 411-422.
- Ajzen, I. (1991). The Theory of Planned Behavior. *Organizational Behavior and Human Decision Processes*, 1991, 50(2), 179-211.
- Al-Mamary, Y. H. & Shamsuddin, A. (2015) Testing of the technology acceptance model in context of Yemen. *Mediterranean Journal of Social Sciences*, 2015, 6(4), 268-273.
- Alam, M. I., Khan, T. S. & Haider, M. A. (2018). Alternate biobased route to produce δ -Decalactone: elucidating the role of solvent and hydrogen evolution in catalytic transfer hydrogenation. *ACS Sustainable Chemistry & Engineering*, 2018, 7(3), 2894-2898.
- Alkhasawneh, S. & Alanazy, S. (2015). Adopt ICT among academic staff in Aljouf University: Using UTAUT model. *Mediterranean Journal of Social Sciences*, 2015, 6(1), 490.
- Awang, Z. (2012). *A Handbook on SEM Structural Equation Modelling: SEM Using AMOS Graphic*. Fifth edition. Universiti Teknologi Mara Kelantan.
- Benamati, J. H., Ozdemir, Z. D. & Smith, H. J. (2010). Aligning undergraduate IS curricula with industry needs. *Communications of the ACM*, 2010, 53(3), 152-156.
- Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin*, 1990, 107(2), 238–246. <https://doi.org/10.1037/0033-2909.107.2.238>
- Bhakar, S., Agrawal, A. K., Suthar, B. K., Verma, S., Verma, A., Singhal, K. & Singh, P. (2013). Impact of service quality, physical environment, and employee behavior on consumer perception. *Prestige International Journal of Management & IT-Sanchayan*, 2013, 2(2), 117.
- Bhattacharjee, A. & Sanford, C. (2006). Influence processes for information technology acceptance: An elaboration likelihood model. *MIS Quarterly*, 2006, 30(4), 805-825.

- Bian, L. (2005). The China advantage: A competitive analysis of Chinese high-tech industries. A Doctoral Dissertation. Massachusetts Institute of Technology.
- Cabedo, L., Royo, M., Moliner, L. & Guraya, T. (2018). University social responsibility towards engineering undergraduates: The effect of methodology on a service-learning experience. *Sustainability*, 2018, 10(6), 1823.
- Chauhan, S. (2015). Acceptance of mobile money by poor citizens of India: Integrating trust into the technology acceptance model. *Info*, 2015, 17(3), 58-68. <https://doi.org/10.1108/info-02-2015-0018>
- Christian, H., Wenden, E.J., Ng, M. & Maitland, C. (2020). Association between preschooler movement behaviours, family dog ownership, dog play and dog walking: Findings from the PLAYCE study. *Preventive Medicine Reports*, 2020, 26, 101753. <https://doi.org/10.1016/j.pmedr.2022.101753>
- Clark-Carter, D. (2010). *Quantitative Psychological Research: The Complete Student's Companion*. Third edition. Milton Park, Abingdon-on-Thames, Oxfordshire, UK: Taylor & Francis.
- Davis, F. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 1989, 13(3), 319-340.
- Davis, F. D. (1986). *A Technology Acceptance Model for Empirically Testing New End-User Information Systems: Theory and Results*. First edition. Sloan School of Management, Massachusetts Institute of Technology.
- Davis, F. D., Bagozzi, R. P. & Warshaw, P. R. (1992). Extrinsic and intrinsic motivation to use computers in the workplace 1. *Journal of applied social psychology*, 1992, 22(14), 1111-1132.
- Deng, L., Babbitt, C. W. & Williams, E. D. (2011). Economic-balance hybrid LCA extended with uncertainty analysis: case study of a laptop computer. *Journal of Cleaner Production*, 2011, 19(11), 1198-1206.
- Dong, W. (2022). The application and practice of data mining technology in the integrated teaching of psychology and computer. In *International Conference on Signal And Information Processing, Networking and Computers*, Springer, Singapore, 923-932.
- Dong, Q. W., Wang, S. M., Han, F. J. & Zhang, R. D. (2019). Innovative research and practice of teachers' teaching quality evaluation under the guidance of 'innovation and entrepreneurship'. *Procedia Computer Science*, 2019, 154, 770-776.
- Fishbein, M. & Ajzen, I. (1975). *Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research*. First edition. Boston, USA: Addison-Wesley.
- Gaur, A. & Kumar, M. (2018). A systematic approach to conducting review studies: An assessment of content analysis in 25 years of IB research. *Journal of World Business*, 2018, 53(2), 280-289.
- Hair, J., Black, W., Babin, B., Anderson, R. & Tatham, R. (2006). *Multivariate Data Analysis*. Sixth edition. Boston, USA: Pearson Education.

- Hubert, M., Blut, M., Brock, C., Backhaus, C. & Eberhardt, T. (2017). Acceptance of smartphone-based mobile shopping: Mobile benefits, customer characteristics, perceived risks, and the impact of application context. *Psychology & Marketing*, 2017, 34(2), 175-194.
- Hsiao, C. H., Chang, J. J. & Tang, K. Y. (2016). Exploring the influential factors in continuance usage of mobile social Apps: Satisfaction, habit, and customer value perspectives. *Telematics and Informatics*, 2016, 33(2), 342-355.
- Jalilvand, M. R. & Samiei, N. (2012). The effect of electronic word of mouth on brand image and purchase intention: An empirical study in the automobile industry in Iran. *Marketing Intelligence & Planning*, 2012, 30(4), 460-476. <https://doi.org/10.1108/02634501211231946>
- Jin, Z. & Nuangjamnong, C. (2022). An Empirical Study of Purchase Intention a Ticket Watching Movies at a Cinema in Chengdu, China during COVID-19. *Journal of Administrative and Management Innovation*, 2022, 10(2 (May-August2022)), 23–42. <https://so02.tci-thaijo.org/index.php/RCIM/article/view/254631/173356>
- Kim, T., Kim, S. & Lee, B. (2016). Effects of action observational training plus brain–computer interface-based functional electrical stimulation on paretic arm motor recovery in patient with stroke: A randomized controlled trial. *Occupational therapy international*, 2016, 23(1), 39-47.
- Krekel, B., Adams, P. & Bakos, G. (2014). Occupying the information high ground: Chinese capabilities for computer network operations and cyber espionage. *International Journal of Computer Research*, 2014, 21(4), 333.
- Kucukusta, D., Law, R., Besbes, A. & Legoh  rel, P. (2015). Re-examining perceived usefulness and ease of use in online booking: The case of Hong Kong online users. *International Journal of Contemporary Hospitality Management*, 2015, 27(2), 185-198. <https://doi.org/10.1108/IJCHM-09-2013-0413>
- Lederer, A. L., Maupin, D. J., Sena, M. P. & Zhuang, Y. (2000). The technology acceptance model and the World Wide Web. *Decision support systems*, 2000, 29(3), 269-282.
- Lin, L. Y., & Chen, C. S. (2006). The influence of the country-of-origin image, product knowledge and product involvement on consumer purchase decisions: An empirical study of insurance and catering services in Taiwan. *Journal of Consumer Marketing*, 2006, 23(5), 248-265. <https://doi.org/10.1108/07363760610681655>
- Majdalawi, Y., Almarabeh, T. & Mohammad, H. (2014). Factors affecting students' usage of learning management system at the University of Jordan. *Life Science Journal*, 2014, 11(6), 666-671.
- Malhotra, N. K., Kim, S. S. & Agarwal, J. (2004). Internet users' information privacy concerns (IUIPC): The construct, the scale, and a causal model. *Information systems research*, 2004, 15(4), 336-355.
- Moon, J. W. & Kim, Y. G. (2001). Extending the TAM for a World-Wide-Web context. *Information & management*, 2001, 38(4), 217-230.
- Mu, G. & Wang, X. (2020). Practical exploration of university-enterprise collaborative talent cultivation based on “Excellent Engineer Education and Training Program.” *Proceedings of the 2020 4th International Seminar on Education, Management and Social Sciences (ISEMSS 2020)*, 7-11. <https://www.atlantis-press.com/proceedings/isemss-20/125944016>

- Nunnally, J. C. & Bernstein, I. H. (1994). *Psychometric theory*. Third edition. New York, USA: McGraw-Hill.
- Olson, J. C. & Jacoby, J. (1972). Cue utilization in the quality perception process in SV. *Proceedings of the Third Annual Conference of the Association for Consumer Research*. Association for Consumer Research, ACR Special Volumes, 167-179.
- Pananond, P. & Zeithaml, C. P. (1998). The international expansion process of MNEs from developing countries: case study of Thailand's CP Group. *Asia Pacific Journal of Management*, 1998, 15(2), 163-184.
- Pedroso, R., Zanetello, L., Guimaraes, L., Pettenon, M., Goncalves, V., Scherer, J., Kessler, F. & Pechansky, F. (2016). Confirmatory factor analysis (CFA) of the crack use relapse scale (CURS). *Archives of Clinical Psychiatry*, 2016, 43(3), 37-40.
- Pipitwanichakarn, T. & Wongtada, N. (2020). The role online review on mobile commerce adoption: an inclusive growth context. *Journal of Asia Business Studies*, 2020, 14(5), 759-778.
- Rai, A. (2020). Explainable AI: From black box to glass box. *Journal of the Academy of Marketing Science*, 2020, 48(1), 137-141.
- Roschelle, J., Penuel, W. R., Yarnall, L., Shechtman, N. & Tatar, D. (2005). Handheld tools that 'Informate' assessment of student learning in science: A requirements analysis. *Journal of Computer Assisted Learning*, 2005, 21(3), 190-203.
- Salkind, J. (2017). *Exploring Research*. Ninth edition. London, UK: Pearson Press.
- Sharma, G. P., Verma, R. C. & Pathare, P. (2005). Mathematical modeling of infrared radiation thin layer drying of onion slices. *Journal of Food Engineering*, 2005, 71(3), 282-286.
- Sica, C. & Ghisi, M. (2007). The Italian versions of the Beck Anxiety Inventory and the Beck Depression Inventory-II: Psychometric properties and discriminant power. In M. A. Lange (Ed.), *Leading - Edge Psychological Tests and Testing Research*, 27-50. Paris, France: Nova Press.
- Suwannasri, I. & Nuangjamnong, C. (2022). Determinants for open innovation and innovation performance towards value creation and organization performance for bureaucratic personnel development. *ABAC ODI JOURNAL Vision. Action. Outcome*, 2022, 10(1), 153-170. <https://doi.org/10.14456/abacodijournal.2022.22>
- Tao, F., Zhang, L., Venkatesh, V. C., Luo, Y. & Cheng, Y. (2011). Cloud manufacturing: A computing and service-oriented manufacturing model. *Proceedings of the Institution of Mechanical Engineers, Part B. Journal of Engineering Manufacture*, 2011, 225(10), 1969-1976.
- Tschang, T. & Xue, L. (2005). The Chinese software industry. *From Underdogs to Tigers: The Rise and Growth of the Software Industry in Brazil, China, India, Ireland, and Israel*, 171-206.
- Udo, G. J., Bagchi, K. K. & Kirs, P. J. (2010). An assessment of customers' e-service quality perception, satisfaction, and intention. *International Journal of Information Management*, 2010, 30(6), 481-492.

Ukut, I. I. T. & Krairit, D. (2019). Justifying students' performance: a comparative study of both ICT students' and instructors' perspectives. *Interactive Technology and Smart Education*, 2019, 16(1), 18-35. <https://doi.org/10.1108/ITSE-05-2018-0028>

Venkatesh, V. (2000). Determinants of perceived ease of use: Integrating perceived behavioral control, computer anxiety and enjoyment into the Technology Acceptance Model. *Information Systems Research*, 2000, 11(4), 342-365.

Venkatesh, V., Morris, M. G., Hall, M., Davis, G. B., Davis, F. D. & Walton, S. M. (2003). User acceptance of information technology: Toward a unified view 1. *MIS Quarterly*, 2003, 27(3), 425-478.

Voß, H., Scholz-Kreisel, P., Richter, C., Ringel, F., Singer, S. & Renovanz, M. (2021). Development of screening questions for doctor-patient consultation assessing the quality of life and psychosocial burden of glioma patients: An explorative study. *Quality of Life Research*, 2021, 4(1), 1513-1522.

Wu, J. H. & Wang, Y. M. (2006). Measuring KMS success: A respecification of the DeLone and McLean's model. *Information and Management*, 2006, 43(6), 728-739. <https://doi.org/10.1016/j.im.2006.05.002>

Zhou, L., Yang, Z. & Hui, M. K. (2010). Non-local or local brands? A multi-level investigation into confidence in brand origin identification and its strategic implications. *Journal of the Academy of Marketing Science*, 2010, 38(2), 202-218.