

5-2018

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Recommended Citation

Rahaman, Shafeeq Ur; Badugula, Noel Merwyn; Wang, Te-Wei; and Somarajan, Neethu Chithralekha, "The Current Development of Technology Model in E-Commerce and Suggestion for Future Research" (2018). *MWAIS 2018 Proceedings*. 27.

<http://aisel.aisnet.org/mwais2018/27>

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ABSTRACT

The importance of customer behavior has grown exponentially in the past decade. The level of time and money that organizations are willing to invest explains the impact of customers' perceptions toward an (e-commerce) business. In this paper, we have analyzed different models used to explain customers' adoption behavior and its implications for e-commerce. There are numerous researches which were conducted on understanding the customer acceptance towards technology. We have studied these models and have created a consolidated report about customer acceptance and various constructs which potentially impact the customers' behavior in an e-commerce business. We have seen the significant growth in the effort that was made towards this topic and concluded that the customer behavior analysis is a continuous process which every organization must adapt to.

Keywords

Customer behavior, e-commerce, technology acceptance, perception

INTRODUCTION

E-commerce and its advancement through the last ten years have been impeccable. It has changed the face and strategy of the business. There are many factors that impact an e-commerce business out of which customer behavior is one of the most significant one (Gefen, 2000). It's quite challenging to comprehend the path the customer behavior takes the business (Ashraf, Tongapapanl, and Stavroula, 2016). The technological trend is inclining towards social commerce, where businesses are taking advantage of social media such as Twitter or Facebook to initiate an online purchase (O'Leary, 2016). The concept deals with linking the users who have access to the social networking sites and made purchases on the e-commerce websites. Bridging this gap will bring noticeable changes in the technology industry and business strategies (Zhao, Li, He, Chang, Wen and Li 2016). Social commerce platforms function differently in terms of online shopping when compared with orthodox electronic commerce websites. Research has been conducted on various aspects of customer behavior on a wide array of constraints. Uncertainty is one of a major drawback in virtual business. Considering the physical distance that's established between the buyer and the seller, organizations put all their efforts towards establishing trust and observing customer behavior which keeps changing over time (Pavlou, Liang, and Xue, 2014).

Background

The users' acceptance of computer technology in today's world is changing as time passes by. Usually, the attitude that a user carries towards technology is based on a certain measure of intentions (Fred, Richard, and Paul, 1989). Different theories have been established which help in determining the intentions users' have towards technology or internet. Regardless of which geolocations the research has been conducted, it can be observed that the importance of understanding the drivers behind technology adoption remains competitive globally (Dajani, 2016). The users' opinion about e-commerce and online shopping depends on users' technology acceptance.

LITERATURE REVIEW

Online shopping has gained a lot of attention in the recent past. It has revolutionized the customers shopping preferences. From the business perspective, we have seen the change in the business type from brick and mortar to click and mortar and only click strategies. The only click or click and mortar business are companies which invest in conducting its businesses

online (Bahn and Fischer, 2001). While there are considerable challenges that online shopping has when compared with the traditional physical presence business, the advantages it has is relatively high. The insights that we have gathered by considering the various studies conducted are significant. Looking at the number of theories utilized for understanding customer behavior explains the importance it has in e-business. (Hernandez, Jimenez, and Martin, 2010) talks about the influence the internet have towards users and its impact on online shopping correlates. Customers who tend to use the internet more often are inclined toward making online purchases and relying on electronic commerce. We have moved on from analyzing customers’ opinions about e-commerce (Hernandez et al., 2010) to understanding the perception of the user and their decision making (Ashraf et al., 2016; Chiu, Wang, Fang, and Huang, 2014).

MODEL AND THEORY DISCUSSION

The theory is a set of statements that are intended to explain and predict a phenomenon by providing an explanation to it whereas the model is a purposeful representation of reality or system in particular (Bhattacharjee, 2012). As there had been an advancement in mankind’s learning and understanding there have been several theories and models to better understand and explore the acceptance and use of technologies (Samaradiwakara and Gunawardena, 2014). Even though the theories and models studied over here are limited but the list isn’t exhaustive and as the mankind keeps on advancing in quest of knowledge we tend to come up with new theories and models or extend the present theories and models to include even more constructs to better understand and judge the technology acceptance.

Technology Acceptance Model 3 (TAM3)

Pin-pointing the reasons or factors to understand the process involved in person’s technology acceptance has always been one of the raging questions of Information Technology (King and He, 2006). TAM hypothesized that voluntary intention of a person determines the acceptance of technology and the intention itself is determined by the attitude of a person towards the technology (Yousafzai, Foxall, and Pallister, 2010). Goals of a work and the consequences that carry when using the system are the basis for the mental portrayal of the user to form a judgment about perceived usefulness (Li, 2008). Perceived Usefulness (PU) provides a belief to the user that using a particular system would enhance their productivity at particular task and in the same way Perceived Ease of Use (PEU) is the extent to which a user believes that making use of particular system would make the task free of effort (Davis, 1989; Ha and Stoel, 2009; Yousafzai et al., 2010). (Venkatesh and Davis, 2000) developed the Extended Technology Acceptance Model (TAM2), which has additional constructs integrated, which would explain 60 percent of user adoption in both voluntary and mandatory settings (Park, 2009), unlike TAM which only explained 40 percent of user adoption.

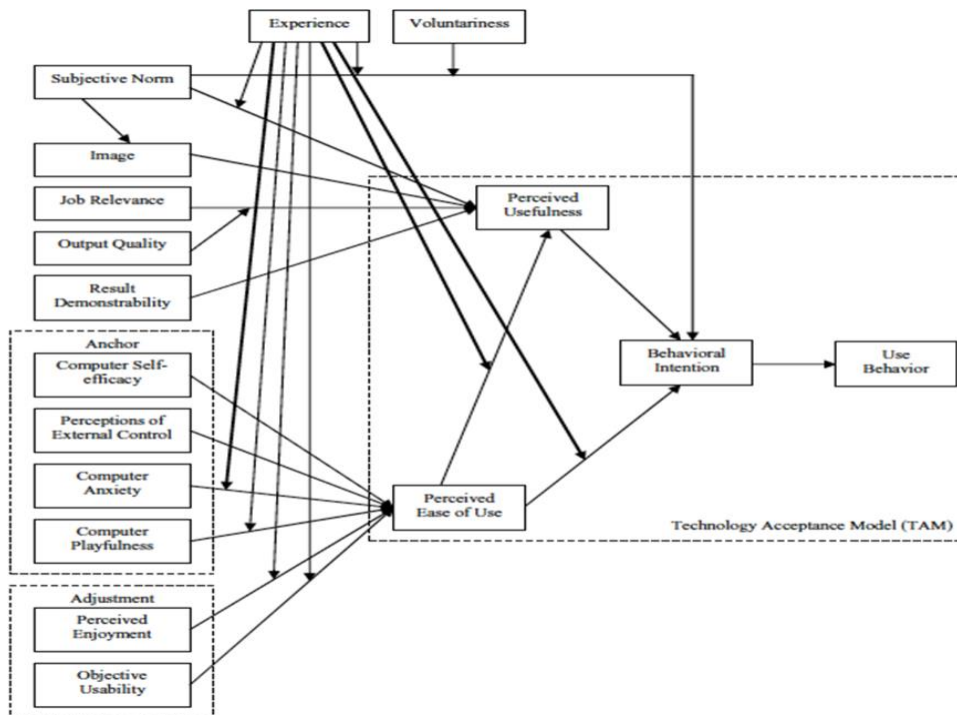


Figure 1. Technology Acceptance Model 3 (TAM3) (Venkatesh and Bala, 2008)

A synthesis of previous TAM research by combining TAM2 and the model of determinants of perceived ease of use resulted in TAM3 which has four categories: Individual differences (Computer Self Efficacy, Computer Anxiety, Computer Playfulness), System Characteristics (Job Relevance, Output Quality, Result Demonstrability, Perceived Enjoyment, Objective Usability), Social Influence (Subjective Norm, Image) and facilitating conditions (Perception of External Control) where based on PU and PEOU are made up of their own external variables (Al-Gahtani, 2016; Al-Mamary, Al-nashmi, Hassan, and Shamsuddin, 2016; Venkatesh & Davis, 2000; Venkatesh and Bala, 2008; Viswanath, 2000;)). Individual differences include traits that affect the perceptions of individuals with respect to PU and PEOU (Al-Gahtani, 2016), System Characteristics can be considered as a factor based on which an individual would develop an opinion regarding ease of use of a system, (Al-Mamary et al., 2016) Social Influence conveys social processes available for an individual to form an opinion of a particular aspect of IT, and Facilitating Conditions showcases the conditions that make it possible for the use of IT (Tang and Chen, 2011).

Unified Theory of Acceptance and Use of Technology (UTAUT)

UTAUT was theorized as an advancement to existing theories by integrating the constructs of all the theories to develop a unified view as there were several constructs in common (Dwivedi, Rana, Chen, and Williams, 2011; Venkatesh, Morris, Davis, and Davis, 2003) such that the new model addresses the variance in IT acceptance and user behavior better than previous models (Kijasanayotina, Pannarunothai, and Speedie, 2009). UTAUT has been extensively studied to apply to a variety of technologies and also as a baseline at both organizational and non-organizational environments (Venkatesh, Thong, and Xu, 2012). UTAUT tends to about 70% of variance around user usage intention than any of technology acceptance models (Kaba and Touré, 2014; Kijasanayotina et al., 2009).

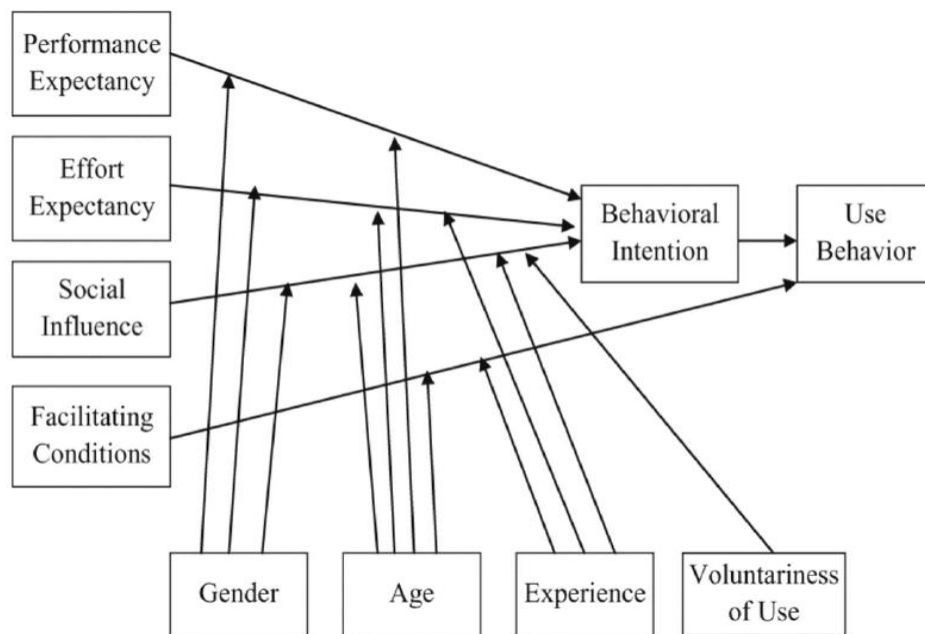


Figure 2. Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh, Morris, Davis, and Davis, 2003)

The four constructs are Performance Expectancy – level of expectation user has about using a system contributes towards improving job performance, Effort Expectancy – degree of ease with system usage, Social Influence – perception an individual has about how important others believe that the individual should use the system, and Facilitating Conditions – belief an individual has about how strong is the infrastructure of a system (Al-Mamary et al., 2016; Li, 2008; Samaradiwakara and Gunawardena, 2014)). UTAUT considering to be robust fails to capture the effects of external factors that hamper the behavior performance as the model performs in different ways in other environments (Kijasanayotina et al., 2009; Lin & Bhattacharjee, 2008; Venkatesh & Zhang, 2010).

Comparative Study Style

The table provided discusses the various technology acceptance theories that have been come along the research of this paper. The intention of this comparative study is to consolidate and present the constructs of all the theories together. The table also puts an emphasis on the strengths and weakness of the various technology acceptance models and theories.

Theory	Constructs	Strengths	Weakness
Cognitive Dissonance Theory	<ol style="list-style-type: none"> 1. Cognitive discrepancy 2. Dissonance 3. Motivation 4. Discrepancy Reduction 	CDT can integrate with other theories and (Hinojosa, Gardner, Walker, Cogliser, and Gullifor, 2016)	It doesn't consider the nature of the persuasive message. (Benoit)
Innovation Diffusion Theory	<ol style="list-style-type: none"> 1. Innovation 	This theory could successfully explain the technology acceptance from an individualistic and organizational perspective (Hong and Zhu, 2006)	This theory doesn't consider an individual's resources or social support to adopt the new behavior (or innovation) (LaMorte, 2016)
Task-Technology Fit Model (TTF)	<ol style="list-style-type: none"> 1. Task Characteristics 2. Technology Functionality 3. Technology Utilization 	The concept of fit has been specifically defined and linked to a criterion variable of group performance (Zigurs & Buckland, 1998).	(Goodhue and Thompson, 1995) say that there needs to an effort to identify distinct components if TTF in order to provide a meaningful diagnostic tool for practice.
Expectation Disconfirmation Theory (EDT)	<ol style="list-style-type: none"> 1. Expectation 2. Perceived Performance 3. Disconfirmation 4. Satisfaction 	EDT has been a dominant marketing standard to study customer satisfaction in many products and services (Lankton and McKnight, 2012)	This theory has not been researched in various contexts in technology acceptance (Samaradiwakara and Gunawardena, 2014)
Theory of Reasoned Action (TRA)	<ol style="list-style-type: none"> 1. Beliefs 2. Intentions 3. Attitudes 4. Subjective Norm 	TRA is adapted for use in many fields and widely used in academia and business (Samaradiwakara et al., 2014)	Significant risk of confounding between attitudes and norms since attitudes can often be reframed as norms and vice-versa. (Samaradiwakara et al., 2014)
Theory of Planned Behavior (TPB)	<ol style="list-style-type: none"> 1. Behavior 2. Subjective Norm 3. Perceived Behavioral Control 	This theory considers an additional factor individuals perception of control behavior which wasn't a part of the previous models (such as TRA) (Khan and Woolsley, 2011)	While there is a certain relation between the variables such as subjective norm and perceived behavioral control, the exact form of relationship is still uncertain. (Ajzen, 1991)
Technology Acceptance Model (TAM)	<ol style="list-style-type: none"> 1. Perceived Ease of Use 2. Perceived Usefulness 3. Attitude 4. Behavioral Intention 	TAM is the robust and valid model that has been widely used (King and He, 2006)	Most of the research conducted on TAM were by students. This theory has relatively less business environment that was involved (Khan and Woolsley, 2011)
The Extended Technology Acceptance Model (TAM2)	<ol style="list-style-type: none"> 1. Subjective Norm 2. Voluntariness 3. Image 4. Job relevance 5. Output quality 6. Result Demonstrability 	TAM 2 is the improved version of TAM with additional constructs included. It can explain 60% of user adoption (as opposed to 40% by TAM) (Park,	The studies on TAM2 are relatively limited (Wu, Chou, Weng, and Huang, 2011)

	7. Perceived ease of use	2009)	
Technology Acceptance Model 3 (TAM3)	1. Individual differences 2. Computer Self Efficacy 3. Computer Anxiety 4. Computer Playfulness 5. Job Relevance 6. Output Quality 7. Result Demonstrability 8. Perceived Enjoyment 9. Objective Usability	TAM3 consisted of added determinants of PEOU which anchored and adjusted the human behavior is a more better way (Tang and Chen, 2011)	More empirical researches are supposed to be conducted on this theory to test its practical use (Tang et al., 2011)
Unified Theory of Acceptance and Use of Technology	1. Performance Expectancy 2. Effort Expectancy 3. Social Influence 4. Facilitating Conditions	UTAUT served as a baseline model that has been applied to various studies on both organizational and non-organizational settings (Venkatesh, Thong, and Xu, 2012)	In the consumer technology context where price is an important factor, an additional theoretical mechanism needs to be added to the existing model (Venkatesh et al., 2012)

Table 1. Comparison of Technology Acceptance Models and Theories

CONCLUSION

There are many researchers in the Information Systems field that are interested to know the customers' perception and behavior towards online shopping, e-commerce. We have seen different researchers use different theories that explain the role customers' acceptance towards technology has on online shopping. Most researches have analysed that the customers' acceptance towards technology has an impact on the shopping behavior on e-commerce websites. We have cumulated the theories that dealt with customers' acceptance towards technology. While we were able to cover the most important theories based on the research method that we have mentioned, there are still certain theories which we haven't included in this paper. This gives the opportunity for further researchers to summarize the other theories that were used in measuring customers' behavior in e-commerce business. We have also noticed the increasing importance of social factors that have been included in more recent. We would continue to exploit more social media related factors that could have impact on the well-known TAM model.

REFERENCES

1. Ajzen, I. (1991). The Theory of Planned Behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179-211.
2. Al-Gahtani, S. S. (2016). Empirical investigation of e-learning acceptance and assimilation: A structural equation model. *Applied Computing and Informatics*, 12, 27-50.
3. Al-Mamary, Y. H., Al-nashmi, M., Hassan, Y. A., & Shamsuddin, A. (2016). A Critical Review of Models and Theories in Field of Individual Acceptance of Technology. *International Journal of Hybrid Information Technology*, 9(6), 143-158.
4. Ashraf, A. R., Tongapapanl, N. T., & Stavroula, S. (2016). The connection and disconnection between e-commerce businesses and their customers: Exploring the role of engagement, perceived usefulness and perceived ease-of-use. *Electronic Commerce Research Applications*, 20, 69-86.
5. Bahn, D., & Fischer, P. (2001). Click and Mortar: Redefining Brick and Mortar Business through Auxiliary E-commerce. *Seventh Americas Conference on Information Systems*. AMCIS 2001 Proceedings.
6. Benoit, W. (n.d.). *Persuasion*. Retrieved from cios: http://www.cios.org/encyclopedia/persuasion/Ccongruity_theory_2heidlers.htm
7. Bhattacharjee, A. (2012). *Social Science Research: Principles, Methods and Practices*. Tampa: Creative Commons Attribution.
8. Chiu, C.-M., Wang, E. T., Fang, Y.-H., & Huang, H.-Y. (2014, January). Understanding customers repeat purchase intentions in B2C e-commerce: The role of utilitarian value, hedonic value and perceived risk. *Information Systems Journal*, 24(1), 85-114.

9. Dajani, D. (2016, April). Using the Unified Theory of Acceptance and Use of Technology to Explain E-commerce Acceptance by Jordanian Travel Agencies. *Journal of Comparative International Management*, 19(1), 121-144.
10. Davis, F. D. (1989, September). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly*, 13(3), 319-340.
11. Dwivedi, Y. K., Rana, N. P., Chen, H., & Williams, M. D. (2011). A Meta-analysis of the Unified Theory of Acceptance and Use of Technology (UTAUT). *Governance and Sustainability in Information Systems* (pp. 155-170). Hamburg, Germany: IFIP AICT.
12. Fred, D., Richard, B., & Paul, W. (1989, August). User acceptance of computer technology: A comparison of two theoretical models. *Management Science*, 35(8), 982 - 1003.
13. Gefen, D. (2000). E-commerce: the role of familiarity and trust. *The International Journal of Management Science*, 725-737.
14. Goodhue, D., & Thompson, R. (1995, June). Task-Technology Fit and Individual Performance. *MIS Quarterly*, 19(2), 213-236.
15. Ha, S., & Stoel, L. (2009, May). Consumer e-shopping acceptance: Antecedents in a technology acceptance model. *Journal of Business Research*, 62(5), 565–571.
16. Hernandez, B., Jimenez, J., & Martin, M. (2010, September-October). Customer behavior in electronic commerce: The moderation effect of e-purchasing experience. *Journal of Business research*, 63(9-10), 964–971.
17. Hinojosa, A. S., Gardner, W. L., Walker, J. H., Coglisier, C., & Gullifor, D. (2016, September). A Review of Cognitive Dissonance Theory in Management Research: Opportunities for Further Development. *Journal of Management*, 43(1), 170-199.
18. Hong, W., & Zhu, K. (2006, March). Migrating to internet-based e-commerce: Factors affecting e-commerce adoption and migration at the firm level. *Information & Management*, 43(2), 204–221.
19. Kaba, B., & Touré, B. (2014). Understanding Information and Communication Technology Behavioral Intention to Use: Applying the UTAUT Model to Social Networking Site Adoption by Young People in a Least Developed Country. *Journal of the Association for Information Science and Technology*, 65(8), 1662–1674.
20. Khan, A., & Woosley, J. (2011, December). Comparison of Contemporary Technology Acceptance Models and Evaluation of the Best Fit for the Health Industry. *International Journal of Computer Science Engineering & Technology*, 1(11), 709-717.
21. Kijisanayotina, B., Pannarunothai, S., & Speedie, S. M. (2009, June). Factors influencing health information technology adoption in Thailand's community health centers: Applying the UTAUT model. *International Journal of Medical Informatics*, 78(6), 404–416.
22. King, W. R., & He, J. (2006, September). A meta-analysis of the technology acceptance model. *Information & Management*, 43(6), 740–755.
23. LaMorte, W. (2016). *Behavior Change Theories*. Retrieved from sphweb: <http://sphweb.bumc.bu.edu/otlt/MPH-Modules/SB/BehavioralChangeTheories/BehavioralChangeTheories4.html>
24. Lankton, N. K., & McKnight, H. D. (2012, February). Examining Two Expectation Disconfirmation Theory Models: Assimilation and Asymmetry Effects. *Journal of the Association for Information Systems*, 13(2), 88-115.
25. Li, L. (2008). *A Critical Review of Technology Acceptance Literature*. Grambling State University, Department of Accounting, Economics and Information Systems, Grambling.
26. Lin, C.-P., & Bhattacharjee, A. (2008, June). Learning online social support: An investigation of network information technology based on UTAUT. *CyberPsychology & Behavior*, 11(3), 268–272.
27. O'Leary, D. E. (2016). Social and Hashtag Commerce: Order by tweet. *Thirty Seventh International Conference on Information Systems* (pp. 1-15). Dublin: Thirty Seventh International Conference on Information Systems.
28. Park, S. Y. (2009). An Analysis of the Technology Acceptance Model in Understanding University Students' Behavioral Intention to Use e-Learning. *Educational Technology & Society*, 12(3), 150–162.

29. Pavlou, P., Liang, H., & Xue, Y. (2014, January 18). Understanding and Mitigating Uncertainty in Online Environments: A Principal-Agent Perspective . *MIS Quarterly*, 31(1), 105-136.
30. Samaradiwakara, G., & Gunawardena, C. (2014, June). Comparison of Existing Technology Acceptance Theories and Models to suggest a well improved theory/model. *International Technical Sciences Journal*, 1(1), 21-36.
31. Tang, D., & Chen, L. (2011). A Review of the Evolution of Research on Information Technology Acceptance Model. *Business Management and Electronic Information (BMEI), 2011 International Conference on.* 5, pp. 588-591. Guangzhou, China: IEEE.
32. Venkatesh, V., & Bala, H. (2008, May 9). Technology Acceptance Model 3 and a Research Agenda on Interventions. *Decision Sciences*, 39(2), 273-315.
33. Venkatesh, V., & Davis, F. D. (2000, February 1). A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies. *Management Science*, 46(2), 186-204.
34. Venkatesh, V., & Zhang, X. (2010). Unified theory of acceptance and use of technology: U.S. vs. China. *Journal of Global Information Technology Management*, 13(1), 5–27.
35. Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003, September). User acceptance of Information Technology: Toward a unified view. *MIS Quarterly*, 27(3), 425-478.
36. Venkatesh, V., Thong, J. Y., & Xu, X. (2012, March). Consumer Acceptance And Use of Information Technology: Extending the Unified Theory of Acceptance and Use of Technology. *MIS Quarterly*, 36(1), 157-178.
37. Viswanath, V. (2000, December). Determinants of perceived ease of use: Integrating perceived behavioral control, computer anxiety and enjoyment into the technology acceptance model. *Information Systems Research*, 11(4), 342–365.
38. Wu, M.-Y., Chou, H.-P., Weng, Y.-C., & Huang, Y.-H. (2011, October). TAM2-based Study of Website User Behavior—Using Web 2.0 Websites as an Example. *WSEAS Transactions on Business and Economics*, 8(4), 133-151.
39. Yousafzai, S. Y., Foxall, G. R., & Pallister, J. G. (2010, May). Explaining Internet Banking Behavior: Theory of Reasoned Action, Theory of Planned Behavior, or Technology Acceptance Model? *Journal of Applied Social Psychology*, 40(5), 1172–1202.
40. Zhao, W. X., Li, S., He, Y., Y.Chang, E., Wen, J.-R., & Li, X. (2016, May). Connecting Social Media to E-commerce: Cold Start Product Recommendation Using Microblogging Information. *IEEE transactions on knowledge and data engineering*, 28(5), 1147-1159 .
41. Ziguers, I., & Buckland, B. K. (1998, September). A Theory of Task/Technology Fit and Group Support Systems Effectiveness. *MIS Quarterly*, 22(3), 313-334.