WHICEB 2019 Proceedings   Wuhan International Conference on e-Business

Summer 6-26-2019

A Conceptual Model of Trust Influencing Factors in Robo-Advisor Products: A Qualitative Study

Fei Guo
Department of Information, University of International Business and Economics, Beijing, 100029, China

Xusen Cheng
Department of Information, University of International Business and Economics, Beijing, 100029, China,
xusen.cheng@uibe.edu.cn

Yihui Zhang
Department of Information, University of International Business and Economics, Beijing, 100029, China

Follow this and additional works at: https://aisel.aisnet.org/whiceb2019

Recommended Citation

A Conceptual Model of Trust Influencing Factors in Robo-Advisor Products: A Qualitative Study

Fei Guo, Xusen Cheng[*]*, Yihui Zhang*

Department of Information, University of International Business and Economics,
Beijing, 100029, China

Abstract: As an integration of e-commerce and traditional financial service, robo-advisor is a promising product that recommends portfolios to individual investors based on modern technologies. However, this industry faces many challenges such as slow adoption and distrust from customers. This paper extends prior literatures in robo-advisor by exploring trust influencing factors and their detailed sub-factors from the perspective of five dimensions of trust. In this study, we not only validated previous factors of trust in the context of robo-advisor, but also found several new factors influencing customers' feelings. A conceptual model is further proposed. The data analysis is based on semi-structured interviews with 27 investors. Understanding trust factors of robo-advisor helps the service vendors provide a better product for individual investors and facilitates faster adoption behavior from customers, which promotes further development of the industry.

Keywords: robo-advisor, trust, e-commerce, investment product

1. INTRODUCTION

Robo-advisor refers to *"automated investment solution to guide customer through a self-assessment process and shape their investment behavior towards rudimentary goal-based decision-making"* [1]. Based on the raising of machine learning and rapid development in artificial intelligence, the robo-advisor takes advantage of powerful algorithms to provide valuable financial advice for investors [2]. Since the first appearance of a start-up robo-advisor company in 2010, many capitals have been absorbed into this market for its significant potential [3]. In academic, robo-advisor also gained a favorable popularity. Many studies believed that the emergence of robo-advisor would reshape the industry [4]. Addtionally, robo-advisor generally provides lower charges compared with human advisory service, making the promising technical application extremely accessible.

However, customers adoption process of robo-advisor has been pretty slow so far [5]. Despite of the advantages mentioned above, robo-advisor still faces many challenges. Specifically, besides the issue of privacy, security, technology and regulation, the customer acquisition to service vendors should be highly concerned [6]. To promote customer adoption, the primary task is to change the distrusted situation of robo-advisor. However, the features of robo-advisor make it harder to obtain trust from customers, such as high risk of investment, long-term return and online transaction [7]. Although previous study has explored the trust building process of this new service [8], a systematic framework of trust influencing factors of robo-advisor has not been established yet. Therefore, we conducted an empirical research to investigate what factors influence individual investors' trust toward robo-advisor.

The remainder of our study is organized as follows. The next section presents previous studies of robo-advisor and trust, followed by research method, data collection, and data analysis process. The results are discussed afterwards and a research model is established according to the analysis. Finally, the findings of this study, implications, and future research are discussed.

---

[*] Corresponding author. E-mail address: xusen.cheng@uibe.edu.cn (Xusen Cheng).

2. LITERATURE REVIEW

2.1 Robo-advisor

Robo-advisor takes advantages of many modern technologies to recommend a set of suitable portfolios to individual investors. Generally speaking, it takes three steps to complete assets allocation for customers, which can be explained as collecting information from customers, recommending portfolio based on AI algorithm and then tracking performance of the investments.

Previous research has shown a highly concern of robo-advisor. For example, fundamentally conceptual works such as definition and characteristics [1,5] have been discussed, along with many practical works concerning algorithm efficiency [6], government regulation [9] and so on. Additionally, several studies have also explored trust in this promising service. For example, there is research examined the relationship between trust and the adoption decision process of robo-advisor, and it identified several antecedents of trust in the implementation strategies of robo-advisor [8]. Another research focused on three factors of trust, including information security, information quality, and interface quality, to explore trust in the implementation of robo-advisor [10]. However, a comprehensive model which develops from a systematic trust theory in the context of e-commerce has not been established.

2.2 Trust factors and trust in e-commerce

Trust plays an important role in e-commerce [11]. As an online financial service, robo-advisor has specific features that differentiate it from other e-commerce productions. The high risk of investment, long-term return and online transaction [7] make trust more vital to robo-advisor. Understanding trust factors contributes to the comprehension of trust building process. Accordingly, we aim to explore trust influence factors of robo-advisor and revalidate the factors in e-commerce. There are many trust factors have been identified such as risk, benefit, interest, and reputation [12]. What's more, the sub-factors including habitual behavior, information integration are mentioned in the process of trust development [13]. As the similarity between trust in people and trust in artificial intelligence (AI), we assume these factors also having impacts on trust in robo-advisor.

It is commonly believed that trust can be divided into five dimensions, including personality-based trust, knowledge-based trust, cognition-based trust, calculative-based trust and institution-based trust [14]. To be specific, personality-based trust is a propensity of personality of the trustor. Secondly, knowledge-based trust bases on familiarity with the trusted party. Thirdly, cognition-based trust depends on the trust of a first impression. It can be affected by the customer's beliefs such as competence, benevolence and integrity of the trustees [15]. Moreover, calculative-based trust is based on rational assessment of benefits or costs, so the cost/benefit calculation positively affects trusting intention [16]. Institution-based trust is established through some systems and guarantees of the company or institution. Institution based trust can be influenced by privacy, regulation, security, etc. [14].

3. METHODOLOGY

3.1 Research method

Following qualitative research method, we interviewed 27 investors in this study. Considering the diversity of our sample, we chose the participants with different investment experiences and various occupations and conducted semi-structured interviews with them. All of them have learnt robo-advisor before the study. Based on the investment experiences of the participants, we divided them into three groups – novice investors, junior investors and senior investors – to observe the differences of their opinions. Each group consisted of 9

interviewees. The interviews were recorded and transcribed into texts afterwards.

3.2 Data analysis

We numbered the interviewees ID from I1 to I27. After coding of the interviews, we selected the keywords that commonly identified by interviewees and categorized them into trust influencing factors which have been validated in the literature. This process is conducted by 2 researchers simultaneously in case of ambiguities.

In order to compare different opinions of the investors, we use a trust traffic light model [12] to present data analysis results. In this model, each ball stands for a factor, while color represents appearance frequency. As presented in Figure1, a red ball represents a factor identified by the interviewees with high frequency, yellow ball represents medium frequency and green ball represents low frequency. We regard 7-9 times for each group as high frequency, 4-6 times as medium frequency, and 0-3 times stand for low frequency in this study.
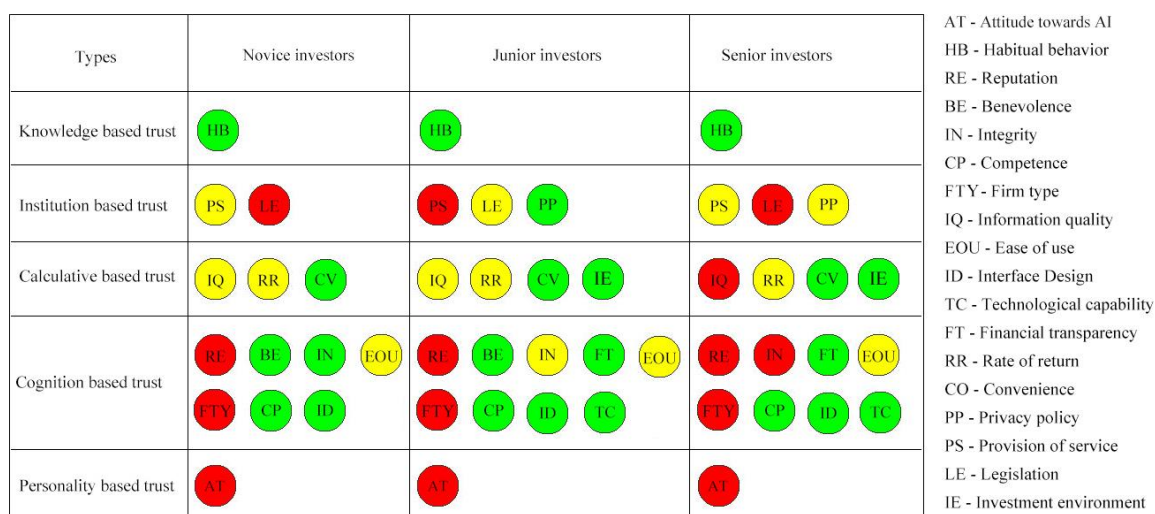

Figure 1.   Traffic light model of the factors

4.   DISCUSSION

We have identified the factors mentioned by interviewees in last section, then we conceptualized them into six constructs including characteristic of customers, characteristic of vendors, service quality, benefits, regulations and external factors. As presented in Table 1, we developed sub-factors of each construct and provided detail introductions below.

Table 1.   The description of sub-factors

Factor	Sub-factor	Description of sub-factor
Characteristic of customers	Attitude towards AI	Tendency to believe or suspect on artificial intelligence (AI).
	Habitual behavior	Tendency to use familiar applications instead of new products.
Characteristic of vendors	Reputation	Positive feedbacks from media and other customers.
	Benevolence	Caring about their customers and acting in their interest.
	Integrity	Keeping agreements and acting ethically.
	Competence	Ability to provide professional investment and technical algorithm,
	Firm type	The service originates in a technology company, financial company or start-up SME.
Service quality	Information quality	The accuracy and completeness of customized investment information.
	Ease of use	Process of customization is easy to understand and approved.
	Interface design	Comfortable interface design.
	Technical capability	Ability to use better algorithm and technology.
	Financial transparency	Ensuring transparency in the use of capitals from investors.

Factor	Sub-factor	Description of sub-factor
Benefits	Rate of return	The interests promised by the recommended investment portfolio.
	Convenience	Efforts which can be saved by using robo-advisor service.
Regulations	Privacy policy	Protecting customers against privacy information leakage.
	Provisions of service	Readability of the service provisions.
	Legislation	Establishing a suitable regulatory policy for robo-advisor from the government.
External Factor	Investment environment	Macroeconomic condition which influence credit, investment and so on.

4.1 Characteristics of customers

Personality-based and knowledge-based are two antecedents of trust emerged in initial trust period [15]. According to previous studies, customers with different characteristic have different thresholds on a same product [17], so it is reasonable to assume customer characteristic as an influencing factor. In our research, we find characteristics of customers impact the trust in robo-advisor from the two dimensions simultaneously. Attitude towards AI (AT) and Habitual behaviors (HB) are two sub-factors. To be specific, investors with positive AT are more likely to put faith in robo-advisor and try this service, while investors with negative AT are more cautious. On another hand, HB is the tendency of customers to use familiar applications instead of new products. It is mentioned by all kinds of interviewees with a relatively low frequency.

4.2 Characteristics of vendors

Trust in e-commerce relies heavily on service vendors, which has been proved by studies such as Solo [18]. This factor is also validated in our study and we further find several subfactors of it. Reputation (RE) is a powerful influencing factor that most of interviewees directly mention in the interview, which means that the reputation of a service vendor is a critical reference for customers. Moreover, the Firm type (FTY) is another significant factor revealed by all kinds of the investors. We explain FTY as the robo-advisor service originates in a technology company, financial company or start-up SME. Investors commonly attach importance on FTY because it can be a reflection of expertise. As one interviewee said: "*Different types of service vendor has different backgrounds, which also leads to my different trust feelings. I assume that companies that famous for hi-tech have more advantages over algorithm, while traditional finance companies may have more diversity in their asset portfolios (I23).*"

Other subfactors with less importance are Benevolence (BE), Integrity (IN) and Competence (CP). To be specific, CP is a less important influencing factor for all kinds of interviewees. BE is mentioned by novice and junior investors with low frequency while none of senior investors mentioning it. Moreover, it is notable that IN is getting more importance with the increasing experience of investors. We assume that senior investors attach higher value on the ability of fulfilling their duties of service vendor.

4.3 Service quality

There are lots of evidence supporting a positive correlation between trust and service quality. For example, Ribbink et al. developed a model relative to service quality, satisfaction and trust in e-commerce [19]. We validate service quality is a trust influencing factor and identify several subfactors in the context of robo-advisor, including Information quality (IQ), Ease of use (EOU), Interface design (ID), Technological capability (TC) and Financial transparency (FT).

One obvious function of robo-advisor is to provide effective investment information for customers, so IQ is categorized as a sub-factor of service quality. In decision supporting applications, calculative reasons can be the source of calculative-based trust [20], accordingly we take IQ as a factor functioning in calculative-based way. As Figure 1 shows, senior investors pay high attention to IQ than the others, illustrating that investors with more

experience value more on IQ. Besides, EOU is a subfactor mentioned by all kinds of investors with a medium frequency, while ID with low frequency. TC and FT are recognized by junior and senior investors with limited attention. We find that experienced investors care about if the service vendor uses their money in the way they want, which means that experienced investors need more autonomy. They need robo-advisor vendors provide more information about their company, finance, and technology. As one interviewee put it, "*I think experienced investors want to know how things work. It refers to explanations about somethings such as the way product runs, where capital goes and how to be sure that my money is put in exactly where I want. It is unacceptable using my money in somewhere I don't know (I04).*"

4.4 Benefits

Trust can be rational assessed by benefits and costs, which is in accordance with the dimension of calculative-based trust [16]. Two subfactors are identified in our research: Rate of return (RR) and Convenience (CV). All kinds of investors of robo-advisor would like to take RR into their consideration for the purpose of investment. Investors can be motivated by moderate interests, which means that, investors would doubt the rationality of the product when RR is incredibly high, while not be attracted when RR is low. CV is another subfactor relevant to benefits. However, all investors pay limited attention to the role of RR and CV.

4.5 Regulations

Prior research has categorized regulation as a factor of institution-based trust [14]. We find this factor also important in robo-advisor. Considering robo-advisor is a raising service applied with new technology, customers generally are cautious and want more regulations at their back. As an investor said: "*Robo-advisor is a jumped-up service, I think it is hard to be trusted unless there are some other assurances behind me. (I10)*"

Three subfactors of regulations are identified. To begin with, Privacy policy (PP) is a less important factor with a low mention frequency in junior investors and medium mention frequency in senior investors. It should be noted that lots of investors don't really care about PP under specific environment where people have barely privacy. However, Provisions of service (PS) and Legislation (LE) get higher attention among investors. For PS, novice and senior investors mention it with medium frequency, while junior investors with high frequency. As for LE, all investors give high value on it except junior investors.

4.6 External factors

A subfactor of external factor is identified in our research, which is investment environment (IE). Some experienced investors mentioned that IE is one of references to decide whether to buy robo-advisor products. As one interviewee said: "*IE is a main investment influencing factor. Considering there are lots of loss among other investors, especially, a great mount of them invest through mobile apps, I won't try it. (I02).*" This factor acts on the condition that investors rationally count IE as one of their benefits, so we consider it affect trust from the calculation-based dimension.

5. CONCLUSION

Robo-advisor is considered as an alternative of traditional investment tool for its revolutionary technology advance. However, it has not commonly reached to the public so far. Exploring the relationship between robo-advisor and trust would benefit adoption behaviors from customers. Taking the perspective of five dimensions of trust, our research explores six salient trust influencing factors in robo-advisor and develops a conceptual model. The findings, contribution, limitation and future work are as follows.

5.1 Summary of findings

(1) We have found trust influencing factors and their subfactors in robo-advisor.

Firstly, we have found six salient factors including characteristic of customers, characteristic of vendors, service quality, benefits, regulations and external environment that influence customers' trust from five trust dimension in our study.

A total amount of 18 subfactors are also founded. Specifically, FTY is a distinct sub-factor of characteristics of vendors which is rarely mentioned in the previous studies. Robo-advisor is a combination of finance service and technique product, consequently traditional financial company or technique company have natural advantages on developing this service. However, new star-up companies lack the reputation as traditional companies have, which leads to low trust from customers.

The trust influencing factors have general applicability in our study. Although the factors we conceptualized from each interviewee are diverse, we select the factors and subfactors that widely recognized. For example, there is an investor regarding the promotion style of this product as an influencing factor (I12), while another mentioning investment entry barrier (I24). However, only the factor which is given attention by two or three kinds of investors can be selected in our conceptual model.

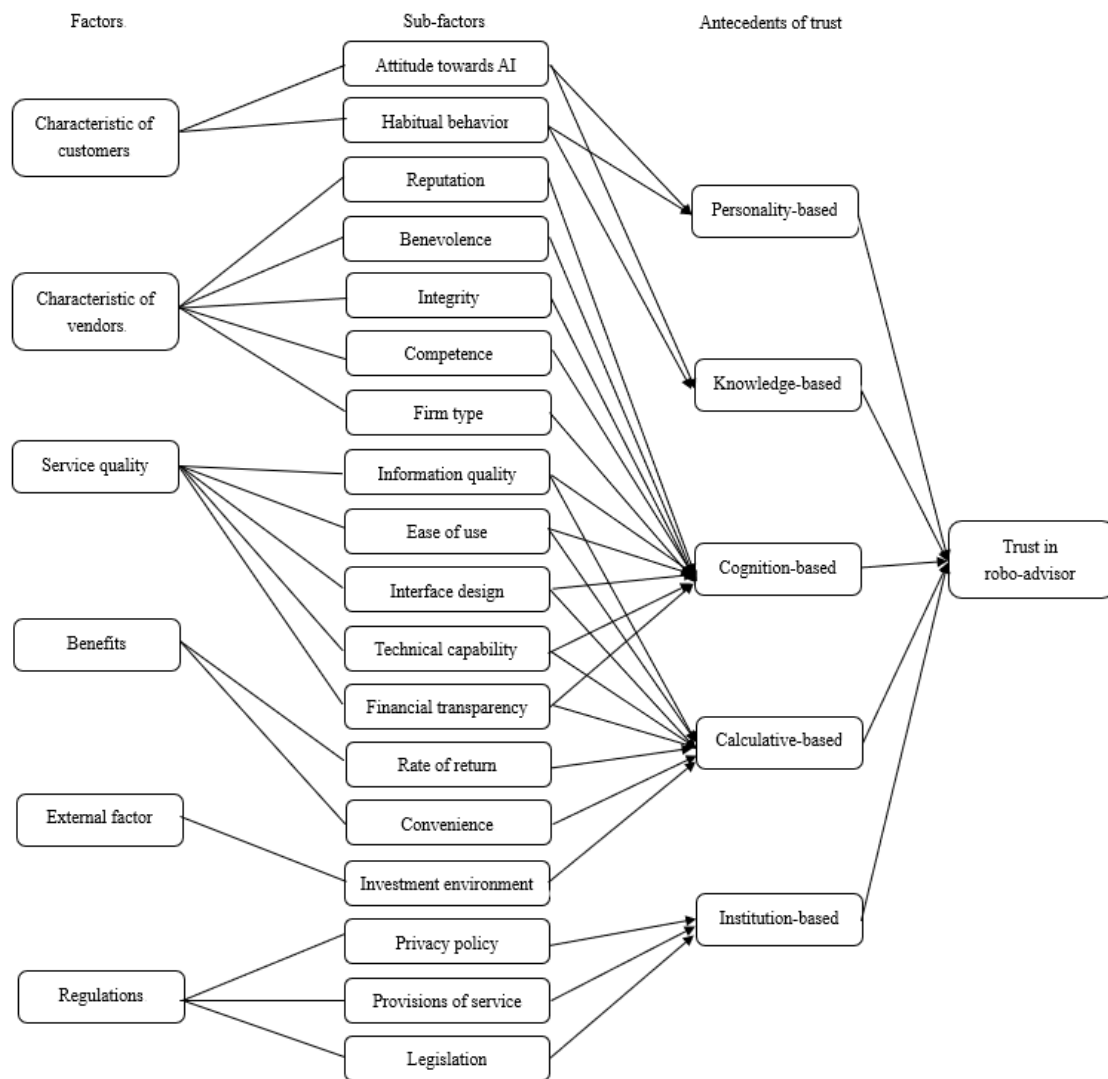(2) We proposed a conceptual model of trust influencing factor in robo-advisor.

Figure 2.   The conceptual model of trust influencing factors in robo-advisor

The trust influencing factors of robo-advisor are generalized constructs of sub-factors that can affect customer's trust from different trust dimensions. According to the factors we have identified, we organized them into an integrated conceptual model to better explain the relationship among these factors (see Figure 2).

(3) We have found the similarities and differences among novice, junior and senior investors.

The trust building process among novice, junior and senior investors has no obvious difference. Although experienced investors normally consider more when choosing a new investment product, they have similarly focused on the salient influencing factors. For example, junior and senior investors pay extra attention to privacy protection, but it has no influence on the fact that all investors take regulation as a trust influencing factor.

However, experienced investors generally choose their investment product with more care and consideration. It can be inferred from the behaviors of experienced investors that they would like to have more autonomy on their own money. To be specific, they highly value the information quality of robo-advisor recommended and integrity of the service vendor. Additionally, a number of experienced investors regard investment environment as a critical reference, which give us the clue that they treat robo-advisor more as a venture investment.

5.2 Contribution

This paper makes several contributions to theory and practice. Theoretically, this research extends trust research in robo-dvisor. Prior studies have divided trust into five dimensions [14]. Based on this, we established connection between trust and robo-advisor to better recognize this raising service, which enriches research in this field. Moreover, compared with previous study which explores the antecedents of trust in robo-advisor [8,10], we propose a more comprehensive model regarding to six salient trust influencing factors and their subfactors, which extends prior literature in current development situation of robo-advisor. Furthermore, the traffic light model [12] is proposed to observe the development of factors, we extend the application of this model in the new context of robo-advisor.

Practically, our proposed model of the trust in robo-advisor helps the service vendors understand customers' need, which facilitates them provide a better product and better service. For example, Firm Type can be a distinct factor that the service vendors highly pay attention to. Additionally, the similarities and differences of three types of investors, which are novice, junior and senior investors, have been discussed. This can be a reference for the service vendors of robo-advisor to re-positioning themselves. What's more, understanding trust factors is helpful to improve customers' awareness and open up the market for robo-advisor.

5.3 Limitation and future work

However, some limitations need to be considered in our research. The quantity of research sample is not enough. In future work, we will enlarge the sample size to better validate this conceptual model and give more explicit explanations about internal causality of each trust influencing factor on robo-advisor. Another point of view is that we will make further efforts on proposing a scientific evaluate procedure to support our model. It is suggested to conduct further research through mix methods such as experiments and surveys. Moreover, whether this model is suitable for other contexts should also be tested in the future research.

ACKNOWLEDGEMENT

REFERENCES

[1] Sironi P. (2016). FinTech Innovation: From Robo-advisors to Goal Based Investing and Gamification. John Wiley & Sons.

[2] Lightbourne J. (2017). Algorithms & Fiduciaries: Existing and Proposed Regulatory Approaches to Artificially Intelligent Financial Planners. Duke Law Journal, 67(3): 651-680

[3] Ji M. (2017). Are Robots Good Fiduciaries? Regulating Robo-advisors under the Investment Advisers Act of 1940. Columbia Law Review, 117(6): 1543-1583

[4] Lopez J C, Babcic S, & Andres D L O. (2015). Advice Goes Virtual: How New Digital Investment Services are Changing the Wealth Management Landscape. Journal of Financial Perspectives, 3(3):156-164

[5] Jung D, Dorner V, Weinhardt C, & Pusmaz H. (2018). Designing a Robo-advisor for Risk-averse, Low-budget Consumers. Electronic Markets, 28(3): 367-380

[6] Lee I, & Shin Y J. (2018). Fintech: Ecosystem, Business Models, Investment Decisions, and Challenges. Business Horizons, 61(1): 35-46

[7] Greiner M, Wang H. (2007). Building Consumer-to-consumer Trust in E-finance Marketplaces. AMCIS 2007 Proceedings, 211

[8] Lee S, Choi J, Ngo-Ye T L, & Cummings M. (2018). Modeling Trust in the Adoption Decision Process of Robo-Advisors: An Agent-Based Simulation Approach. MWAIS 2018 Proceedings.

[9] Baker T, & Dellaert B. (2017). Regulating Robo Advice across the Financial Services Industry. Erim Report, 103(2):713-750

[10] Ngo-Ye T L, Choi J J, & Cummings M. (2018). Modeling the Robo-advisor Ecosystem: Insights from a Simulation Study. Issues in Information Systems, 19(1): 128-138

[11] Gefen D. (2000). E-commerce: The Role of Familiarity and Trust. Omega, 28(6): 725-737

[12] Cheng X, & Macaulay L. (2014). Exploring Individual Trust Factors in Computer Mediated Group Collaboration: A Case Study Approach. Group Decision and Negotiation, 23:533–560

[13] Cheng X, Fu S, & Druckenmiller D. (2016). Trust Development in Globally Distributed Collaboration: A Case of U.S. and Chinese Mixed Teams. Journal of Management Information Systems, 33(4):978-1007

[14] Gefen D, Karahanna E, & Straub D W. (2003). Trust and TAM in Online Shopping: An Integrated Model. MIS Quarterly, 27(1): 51-90

[15] McKnight D H, Cummings L L, & Chervany N L. (1998). Initial Trust Formation in New Organizational Relationships. Academy of Management Review, 23(3): 473-490

[16] Li X, Hess T J, & Valacich J S. (2008). Why do We Trust New Technology? A Study of Initial Trust Formation with Organizational Information Systems. The Journal of Strategic Information Systems, 17(1): 39-71

[17] Mittal V, & Kamakura W A. (2001). Satisfaction, Repurchase Intent, and Repurchase Behavior: Investigating the Moderating Effect of Customer Characteristics. Journal of Marketing Research, 38(1): 131-142

[18] Salo J, & Karjaluoto H. (2007). A Conceptual Model of Trust in the Online Environment. Online Information Review, 31(5): 604-621

[19] Ribbink D, Van Riel A C, Liljander V, & Streukens S. (2004). Comfort Your Online Customer: Quality, Trust and Loyalty on the Internet. Managing Service Quality: An International Journal, 14(6): 446-456

[20] Wang W, Benbasat I. (2008). Attributions of Trust in Decision Support Technologies: A Study of Recommendation Agents for E-commerce. Journal of Management Information Systems, 24(4): 249-273