

# The Role of Perceived Usefulness and Perceived Ease-of-Use Toward Satisfaction and Trust which Influence Computer Consumers' Loyalty in China

*Nicholas Wilson<sup>a</sup>, Keni Keni<sup>b</sup>, Pauline Henriette Pattyranie Tan<sup>c</sup>*

<sup>a</sup>Universitas Bunda Mulia, Indonesia

<sup>b</sup>Universitas Tarumanagara, Indonesia

<sup>c</sup>Universitas Pelita Harapan, Indonesia

**Abstract:** This study was commenced in order to examine the impact that both perceived usefulness and perceived ease-of-use had toward consumers' loyalty within the computer industry in China, either directly or indirectly through satisfaction and trust. This current study utilized the survey method; questionnaires were selected as the instrument which would be used to collect all of the data from the respondents. All of the questionnaires were electronically distributed through an online survey site to a total of 400 respondents, who originated from, or were living in, five cities in China. After gathering and assessing all of the collected data, a total of 346 items of data were deemed usable, thus enabling these sets of data to be further analyzed by this study. All of these data were further analyzed using the partial least squares-structural equation modeling (PLS-SEM) method using SmartPLS 3.3.2 software. Based on the results obtained through the data's analyses, the authors would like to conclude that both perceived usefulness and perceived ease-of-use had a positive and significant impact on customer satisfaction, trust and customer loyalty within China's computer industry. Furthermore, in this study, both customer satisfaction and trust have been found to positively mediate the impact of perceived usefulness and perceived ease-of-use toward customer loyalty; trust serves as a better mediator compared to satisfaction. Meanwhile, this study contributed to the expansion and the enrichment of the literature in the field of marketing by thoroughly examining the implementation of the technology acceptance model (TAM) in predicting customer loyalty within China's computer industry.

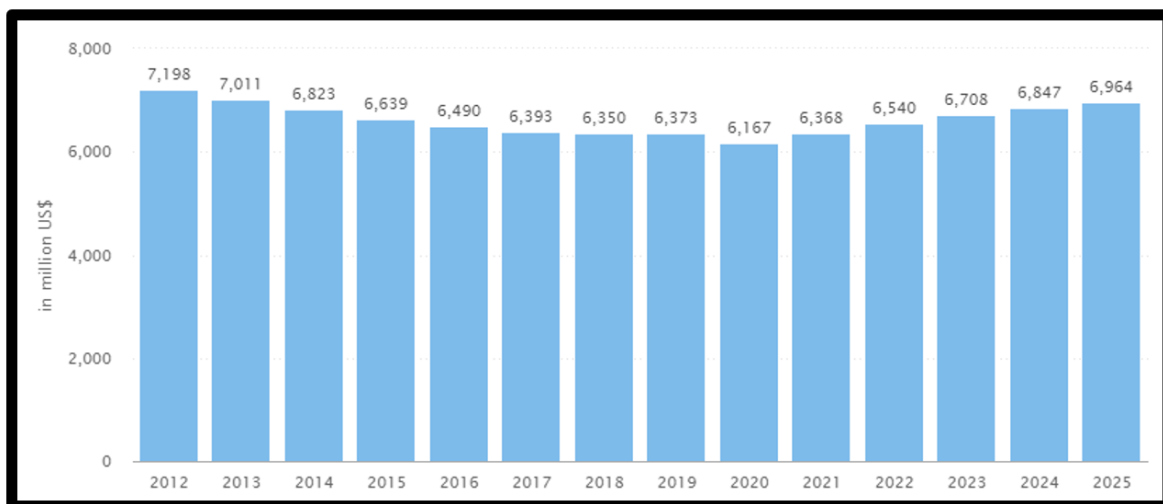
**Keywords:** China's computer industry, customer loyalty, customer satisfaction, perceived usefulness, perceived ease-of-use, trust.

**JEL Classification:** M150, M310

## Introduction

The computer industry has become one of the industries which have served as the backbone for the economic growth in China in recent years. This sector has made a vast contribution to China's economy, which led many people and experts to argue that this industry is one of the main contributors to China's rapid economic growth. In line with the rapid development of technology, combined with the rapid growth of globalization which had swept all over China during the past 5 to 10 years, technology had now become an important and inseparable aspect of many people's lives in China; such a phenomenon has led to the increasing usage of smartphones,

the desktop PC sector in the world. However, despite growing in a stable manner for the past years, the amount of revenue generated from this sector is decreasing (as shown in Figure 1), which presents a significant problem as to why the amount of revenue has been decreasing over the past years. Therefore, such a trend presents a significant or interesting problem, which serves as the reason for why this study looked into the Chinese computer industry. This study would like to further understand why this trend happened, and whether or not enhancing consumers' loyalty toward certain computer brands sold in China in this industry could help increase the revenue generated from this sector in the upcoming years.



**Figure 1.** Amount of Revenue Generated from the Chinese Desktop PC Sector

Source: Statista (2020)

tablets, PCs, laptops, and the other types of digital gadgets among people living in China. According to the recent data published by Statista (2020), the amount of revenue generated from the desktop PC sector in China has shown a consistent and stable trend in recent years, from 2012 to 2019 the total revenue generated from this industry in China ranged between around US\$6,000,000,000 to around US\$7,000,000,000; such figures are among the highest revenues generated from

Loyalty has been stressed by several authors as being one of the most important factors which determine the success of a company (Wilson et al., 2019; Kartika et al., 2020; Latif et al., 2021; Anser et al., 2021; Guan et al., 2021). In terms of these findings, it is important for a company to be able to instill loyalty in its consumers' minds in a consistent manner, in order to prevent them from buying products from competitors. Furthermore, loyalty has been proven to be

one of the factors which could help increase a company's market share and position in the industry. In this case, a company's success in increasing its number of loyal consumers will be advantageous for the company itself, since loyal consumers have a tendency not to buy or use products sold or manufactured by the company's competitors. Therefore, when this scenario happens, companies could increase their sales and profitability, thus increasing their strength, market share, and position in the market and outperform their competitors in the same industry. Therefore, the concept and the importance of loyalty should be well understood by each and every company, not only in order to maintain and improve their position in the market, but also to ensure that they will not be outperformed or "defeated" by their competitors.

The importance that loyalty has in helping a company to retain consumers may be more significantly felt in the computer industry, due to the uniqueness that this industry has compared to other industries. Such a uniqueness could be characterized by several criteria, such as the limited number of companies doing business in this industry, the identity of the products sold by each company compared to their competitors, and also the constant updates (in line with the rapid evolution of technology) needed to be done on the hardware and software of the computers sold by the companies, in order to make sure that they did not fall behind their competitors. It can happen when companies fail to follow a trend, their products will be deemed "old-fashioned" by the public, thus causing them to slip behind their competitors. Once this scenario happens, it is hard for a company to catch up with its competitors, since they have been one step ahead of the company since the beginning. This is the reason why so many companies fail and are

forced to retreat from this industry, despite being superior and seemingly "untouchable" by the competitors in the past. Therefore, it is important for companies doing business in this industry to work extra hard and to constantly update the technologies that they use in their products, so they stay in line with the current technology and the public's demand, in order to achieve success in this industry, so they won't be left behind by their competitors.

In terms of the factors which might affect loyalty, several studies have pointed out that there are so many factors which might affect consumers' loyalty to a company. One of these factors is perceived usefulness. Defined as the extent to which consumers assess whether or not a product will have a positive impact on their activities, or make their life better (Amin et al., 2014), perceived usefulness could impact consumers' loyalty toward a company. As computers evolved and were being constantly updated with new technologies, aimed at making human activities faster and more efficient, not all the people were pleased with these updates, as they felt that the differences between the old technologies and the new technologies installed on the new computers were not very much. Therefore, consumers felt that buying a newly-updated computer might not cause a significant change in their activities, since the older one was still working well, thus causing them to continue using their old computer and refusing to buy a new one, even if both the new and the old computer was manufactured by the same company. This could cause a problem for the company, since companies always hope that their consumers would always follow the trend and constantly change their current computer for the new version, which has been updated with the latest technologies. Therefore, it is important for a company to

always make sure that the newly-developed technologies that they install in their new computers have many differences and could significantly “changes people’s lives and improve their performance” (Chen et al., 2007; Al-Hawari & Mouakket, 2010); such technologies might encourage people to buy the new computer to replace their old one.

Other than perceived usefulness, perceived ease-of-use could also become a factor which might affect consumers’ loyalties toward a company. Perceived ease-of-use could be defined as people’s perceptions regarding a product or service, where they will make an assessment of the product or service regarding how easy and quick it is to learn and use the new product/service without encountering any difficulties (Amin et al., 2014; Usman et al., 2020). Furthermore, perceived ease-of-use could also be defined as the public’s assessment regarding the time and effort needed to learn and use a new product. In terms of the connection between perceived ease-of-use and loyalty, the consumers’ loyalties toward a product or company will increase if they feel that they don’t need to spend too much effort, cost, and time to learn to use a new product. On the other hand, consumers have a tendency to look for an alternative by investigating similar products manufactured and sold by the company’s competitors, which may have a shorter learning time and lower level of cost, if the consumers’ perceive that the time, cost, and effort that they spend learning to operate a new product sold by the company was not worth the value that they would get from the product itself. Therefore, based on these arguments, companies should fully understand the importance of creating or manufacturing a product which could be deemed as effortless by consumers; this perception will increase the consumers’ intention to purchase the product from the company.

Previous studies conducted by Wilson (2019) and Keni (2020) tried to understand perceived usefulness and perceived ease-of-use in the Indonesian e-commerce sector, while Wu et al., (2017) tried to understand the role that both perceived risk and perceived usefulness had toward people’s acceptance intentions in the Chinese mobile payment sector. Furthermore, another study by Baccarella et al., (2020) also tried to understand the role of both perceived usefulness and perceived ease-of-use toward using cars equipped with self-driving technology. However, none of these studies tried to understand the role of perceived usefulness and perceived ease-of-use in affecting consumers’ intentions to buy and use a computer or laptop in the computer sector, where it is important to understand how people’s or consumers’ thoughts and beliefs regarding the practicality and the ease of learning and understanding a new system (perceived ease-of-use), together with the consumers’ deep beliefs that the new technologies installed in the newest computers, PCs or laptops sold in the market could bring such advantageous benefits that they would greatly enhance the users’ daily work and lives (perceived usefulness) and could eventually enhance their satisfaction and trust toward the system, which further could ultimately affect their loyalties toward the new systems or computers.

Therefore, this study was conducted in order to empirically analyze the impact of perceived usefulness and perceived ease-of-use toward consumers’ loyalties in the Chinese computer industry. Furthermore, this research was also conducted in order to determine whether customer satisfaction and trust could mediate the impact of perceived usefulness and perceived ease-of-use toward consumers’ loyalties.

## Literature Review

### *Technology Acceptance Model (TAM)*

The technology acceptance model (TAM) is a theory which was first formulated by Davis (1989) in order to explain the factors which affect people's intentions (or refusal) to adopt a certain technology. In this case, this theory was developed in order to further understand why there are some people who are willing to adopt, use or implement certain technologies into their lives, and why there are also some people who refuse to use or adopt the same technologies. In this case, through this theory, Davis (1989) successfully identified two main factors which could predict or determine people's behavior or intentions to adopt a certain technology, namely perceived usefulness (PU) and perceived ease-of-use (PEOU). Perceived usefulness itself could be defined as people's judgements about whether or not their decision to adopt a certain technology could enhance their work performance, while on the other hand, perceived ease-of-use could be understood as people's judgements regarding whether or not learning, adopting or using a certain technology will be effortless (Davis, 1989; Lindsay et al., 2011)

### *Perceived Usefulness*

Perceived usefulness could be understood as people's perceptions of whether a new technology could change the way they do business, and whether it could make their performance better (Ajzen, 1991; Eriksson et al., 2005; Jahangir and Begum, 2008; Rahman et al., 2017). Similarly, both Davis et al., (1989) and Doll et al., (1998) have also defined perceived usefulness as consumers' feelings about whether or not the new tech-

nologies that they are currently using will increase the effectivity and the performance of the tasks that they are doing. Perceived usefulness plays a great role in helping a company to achieve success, particularly those companies whose businesses are heavily reliant on the development of the technology, since customers' perceptions that "the new product or technology will not improve my performance, or will not give me any additional value compared to the technology or product that I'm currently using" could lead to customers' unwillingness to buy or use a new product (which has the new technologies installed) developed by the company. In this scenario, customers' unwillingness to try and use the new product could halt the company's effort to develop the product with more advanced technologies, since customers do not think that the new technologies could improve their performance in doing their tasks. In other words, it could also be stated that customers will only use the new technology or product if they believe that there is some added value that they could get from using the product or technology (Tan and Teo, 2000; Polatoglu and Ekin, 2001; Rouibah et al., 2011). Therefore, perceived usefulness could play a great role in determining whether a company will success or fail in a market.

### *Perceived Ease-of-Use*

Perceived ease-of-use could be defined as people's perceptions of how much effort they need to expend in order to learn a new technology or product (Doll et al., 1998; Rouibah et al., 2011; Amin et al., 2014; Okpala et al., 2021). According to Deshpande and Zatman (1987), perceived ease-of-use could affect a customer's perception toward a product, in which the customer would pre-



fer to buy a product which was standardized compared to buying a product which may differ across regions. This is mainly because customers have the tendency to learn the specifications and features of a standardized product more easily and quickly than when they are learning products which differ across regions. In the case of a standardized product, the customers could learn from their colleagues who are already using the same product or technology since they're basically using the same product, while in the case of modified or specialized products, customers cannot just merely asked their colleagues about how to use the technology or product, since the one that their colleagues are using might be different from the one that they will use. Therefore, each company should try their best to create or manufacture a product which basically has similar specifications across countries, in order to make the customer's efforts to learn the product easier. When customers think and have some perceptions that the product or technology will be difficult to learn, and also will take a long time to learn, they will not buy that product or technology, but would search for other alternatives which basically performed the same functions, but were easier to learn (Usman et al., 2021).

### *Customer Satisfaction*

Customer satisfaction could be defined as the customers' assessments regarding the products or services that they use, in which the customers have a tendency to assess whether the performance of a product or service exceeded their expectations (Halstead et al., 1994; Hansemark and Albinsson, 2004; Velotsou et al., 2005; Christodoulides and Michaelidou, 2011; Velotsou, 2015; Wilson, 2020). Furthermore, Yap et al., (2012)

define satisfaction as the perception that customers have toward a company regarding the service that they have experienced. Regarding the importance of satisfaction, Velotsou et al., (2005), Yap et al., (2012) and Wilson & Christella (2019) stated that making customers satisfied was the main thing that a company should focus on, in order to help the company achieve success in the industry. In regard to this statement, the level of satisfaction that customers feel toward a company could determine whether or not the customers would buy a product or service from the company in the future. For example, when the quality of the product that the customers were using was deemed as "bad," they would be disappointed, thus encouraging them to buy products manufactured by other companies. On the other hand, when the quality of a product sold by the company was deemed as "good" or even "perfect" by its customers, they have a tendency to re-buy the product from the company. Based on the literature above, companies should thoroughly understand the importance of satisfying customers needs and exceeding their expectations regarding the quality of a product or service, in order to increase the company's chance of satisfying them and ultimately increase the chance of retaining them, since the cost of retaining existing customers is lower than the cost needed to recruit new customers (Lam and Burton, 2006; Juliana et al., 2021; Kumar et al., 2021; Wangwacharakul et al., 2021).

### *Trust*

Trust could be defined as the customers' assessments regarding a company's integrity and honesty, and deals with the customers' perceptions and beliefs that companies will not disappoint them and will work hard to fulfill their interests (Morgan and Hunt,

1994; Delgado-Ballester et al., 2003; Aydin and Ozer, 2005; Velotsou, 2015; Wilson and Keni, 2018). Similarly, trust could also be defined as the customers' assessments regarding the vulnerability of the situation when they are making transactions with a company (Han et al., 2008), while Velotsou (2015) defined trust as a company's ability to fulfill the promises that the company has made to its customers. Instilling trust in consumers' minds is an important thing that a company should do in order to expand its market and retain its consumers. When consumers have put their trust in a company, the chance of them buying or using a product sold or manufactured by the company's competitors will be low, or even not exist. However, when companies do certain unacceptable acts, such as leaking customers' personal data, manufacturing low quality products despite advertising them as high quality products, etc, this will cause the trust that consumers' had in the company to be diminished, or even lost completely. Therefore, companies not only need to instill trust in their consumers' minds, but are also required to keep the trust that consumers have in the company so that it won't diminish, which could cause the customers to move and buy the products or services they want from the company's competitors (Wilson & Makmud, 2018).

### *Customer Loyalty*

Customer loyalty could be defined as the consumers' tendencies and commitments to make another purchasing activity from the same company in the future (Oliver, 1997; Ehigie, 2006; Wilson, 2018). Customer loyalty has long been believed by many people to be an important factor in determining a company's success, not only from the financial perspective, but also in the overall man-

ner (Mittal and Lassar, 1998; Duncan and Elliot, 2002; Yap et al., 2012; Wilson et al., 2021; Bhat et al., 2021). Therefore, keeping and retaining customers so that they will not "move away" from the company is an important strategy which every company should do, in order to outperformed their competitors.

### *Impact of Perceived Usefulness on Customer Satisfaction*

A previous study from Park et al., (2013) showed that customer satisfaction was positively impacted by perceived usefulness. Similarly, another piece of research by Lee and Jun (2007) also found out that satisfaction is positively impacted by perceived usefulness. Further research by Amin et al., (2014) also proved that the perceived usefulness of a mobile website had a positive and significant impact on customer satisfaction, while other research by Ariff et al., (2014) in Malaysia also found out that perceived usefulness positively affected satisfaction. Further research conducted by Sibona and Choi (2012) among facebook users found out that perceived usefulness positively affected satisfaction. With regard to all of these previous studies concerning the relationship between perceived usefulness and satisfaction, it is important to note that within the field of technology, consumers' or people's personal perceptions regarding whether or not a certain technology could improve or enhance the quality of their work performance may well play an important role in affecting the consumers' levels of satisfaction with the technology. It is mainly because consumers' dissatisfaction could arise if they think or feel that using a certain technology-related product would not make any difference concerning their job performance; in this case, there is a small chance that the consumers will eventually adopt or

buy the technology. Therefore, it should be noted that the consumers' understanding regarding the usefulness of a certain technology installed in the laptops or computers sold or offered by the companies could eventually affect their level of satisfaction toward the products; in the end, this will eventually affect the consumers' intentions to purchase or re-purchase the laptops or computers offered by the companies. Based on these explanations, the authors would like to posit the first hypothesis (H1) as follows:

**H1: Perceived usefulness has a positive impact on customer satisfaction**

*Impact of Perceived Usefulness on Trust*

Previous research by Amin et al., (2014) found out that other than it positively affecting satisfaction, perceived usefulness also had a positive impact on trust. As customers felt that the new system or product would give some added values to them, the customers would put their trust in the new product or technology. Another study conducted by Lee and Jun (2007) also found out that trust was positively affected by perceived usefulness. Horst et al., (2007) further stated that trust was revealed to be the main determinant of perceived usefulness. Further research by Chinomona (2013) also found out that perceived usefulness positively affected trust. Similar to the basic concept of satisfaction, the consumers' thorough understanding and belief that certain technologies installed in computers or laptops sold by certain companies could eventually affect their level of trust toward these products, but when consumers felt that they did not believe that any kinds of technologies installed within the new laptops or computers offered by the companies

would make any difference with regard to enhancing their job or work performance, then it will eventually affect their trust toward the products. Such a scenario will eventually lower the consumers' intentions to buy the products (either laptops or computers) marketed by the companies. Therefore, it is important that every brand or company should market or communicate the benefits of the new technologies installed within the laptops or computers available to the consumers, in order to enhance the consumers' intentions to buy the laptops or computers offered by the companies. Based on these explanations, the authors would like to posit the second hypothesis (H2) as follows:

**H2: Perceived usefulness has a positive impact on trust**

*Impact of Perceived Ease-of-use on Customer Satisfaction*

Previous research by Rezaei and Amin (2013) found out that perceived ease-of-use had a positive impact on customer satisfaction. With regard to this result, the customers' levels of satisfaction with rise when they believe that the new technology or product that they are using is effortless and easy to learn and understand. Another study by Amin et al., (2014) further strengthened this finding, in which perceived ease-of-use had a positive impact on customer satisfaction. Another piece of research by Tu et al., (2012) in the e-auction marketplace also found out that perceived ease-of-use had a positive impact on customer satisfaction. Additionally, other studies by Sibona and Choi (2012) and Ariff et al., (2014) found out that perceived ease-of-use had a positive impact on customer satisfaction. Perceived ease-of-use deals with the consumers' perceptions with



regard to whether or not they will spend too much time (or will encounter any kind of difficulties) when they try to learn about certain technologies. In this case, every time consumers want to purchase or buy any kind of laptop or computer, there is a high chance that the consumers will first assess whether or not it will be difficult for them to learn the new kinds of technology or features installed within the laptop or computer. When consumers feel that it will be difficult and take a lot of time to learn or study these kinds of technologies or features, then dissatisfaction could occur, in which case the consumers will shift their attention to other types or brands of laptops (or computers) which were installed with the kind of features or technologies which the consumers feel would be “easier” to learn. Therefore, it is important for companies to ensure not only that any kind of new technology or features installed in their laptops or computers are sophisticated enough, but also that the technology or features will be easy (and won't take much time) for the consumers to learn, not only in order to boost their satisfaction toward the products, but also in order to boost the consumers' chances of eventually buying the products. Based on these results, the authors would like to posit the third hypothesis (H3) as follows:

**H3: Perceived ease-of-use has a positive impact on customer satisfaction**

*Impact of Perceived Ease-of-use on Trust*

Previous research by Aghdaie et al., (2011) found out that perceived ease-of-use had a positive impact on trust. Furthermore, several researchers have also found the positive relationship between perceived ease-of-

use and trust (Koufaris et al., 2001; Pavlou, 2003; Tang and Chi, 2005). Moreover, a study conducted by Chinomona (2013), Wilson (2019) and Keni (2020) also discovered the positive effect which was given by perceived ease-of-use toward trust within the Indonesian e-commerce industry. Similar to the relationship between perceived ease-of-use and satisfaction, consumers' perceptions regarding how easy and how simple it is to learn and use any kind of new technology installed or used in the laptops or computers marketed by the companies could also eventually affect the consumers' trust toward the products (and the companies themselves). Since consumers tend to believe that newer technologies could bring some additional benefits to the products that they will buy, then it is safe to say that consumers will also expect these kinds of technologies to be easy to learn and simple to use. However, if it turns out that these technologies are complicated and take up too much of the consumers' time when they are trying to learn these technologies, then it will slowly erode the consumers' beliefs and trust that all of the technologies installed within the products would eventually bring benefits to the consumers. In this scenario, the loss of the consumers' trust toward the products could eventually lower their intentions to buy the products, which in turn will have a negative effect on the companies. Based on the results of these previous studies, the authors would like to posit the fourth hypothesis (H4) as follows:

**H4: Perceived ease-of-use has a positive impact on trust**

*Impact of Customer Satisfaction on Customer Loyalty*

Fornell (1992) stated that one of the most important factors which could positive-

ly affect loyalty was customer satisfaction. In this case, customers tend to be more loyal to a company when their level of satisfaction regarding the product or service offered by the company also increases. Furthermore, several researchers have pointed out the relationship between customer satisfaction and loyalty, in which satisfaction was revealed to be the antecedent of customer loyalty (Seiders et al., 2005; Cooil et al., 2007; García and Caro, 2009). Moreover, studies conducted by Yi and La (2004) and Sreeram et al., (2017) also found out that customer satisfaction had a positive impact on loyalty. Further research by Lam and Barton (2006), Ball et al., (2006), Yap et al., (2012) and Garepasha et al., (2021) also found out that in the mobile banking industry, satisfaction positively impacted customer loyalty. The basic concept regarding the relationships between customer satisfaction and loyalty has been one of the most studied and discussed concepts within the modern marketing context in the 21st century. In this case, consumers' levels of satisfaction were determined by how far companies could fulfill all of the wishes or expectations that the consumers had, so satisfaction would eventually occur when the consumers' levels of expectation have been exceeded by what the companies were offering. Later on, when consumers' levels of satisfaction rise and grow stronger over time, this condition or scenario will eventually lead to the growing urge for the consumers to purchase the products, which, in the long term, will also increase or enhance the consumers' intentions to eventually re-buy the same products from the same company. Therefore, in all industries or sectors across the globe, building and enhancing consumers' levels of satisfaction should become the main priority for all companies, in order to maintain and increase their consumers' levels of loyalty. Based on

these results, the authors would like to posit the fifth hypothesis (H5) as follows:

**H5: Customer satisfaction has a positive impact on customer loyalty**

### *Impact of Trust on Customer Loyalty*

Previous research by Yap et al., (2012) found that trust positively affected customer loyalty, while Caceras and Paparoidamis (2007) stated that compared to satisfaction, trust played a more significant role in affecting customer loyalty. Further research conducted by Doney and Cannon (1997) and Hsu (2007) strengthened these findings, in which customer loyalty was revealed to be positively affected by trust. Several studies conducted by Jin et al., (2008), Chu (2009), Guenzi et al., (2009), Nguyen et al., (2013), Garepasha et al., (2021) and Bhat et al., (2021) also found that trust had a positive impact on customer loyalty. Similar to the concept of satisfaction, the relationship between trust and loyalty has also become one of the most discussed and popular topics within the realm of marketing research, as it will always be interesting to thoroughly understand how consumers' levels of trust toward a company could eventually affect their loyalty toward the company itself. In this case, since trust deals with the company's ability to fulfill any kinds of promises made to the consumers, then it will make any sense that trust will eventually affect the consumers' loyalties toward the company, since the company's ability to always fulfill or deliver on its promises to the consumers will enhance the consumers' trust; in the end, the consumers' maximized levels of trust toward the company will eventually elevate or boost their loyalty toward the company itself. Based on these results, the authors would like to posit the sixth hypothesis (H6) as follows:

**H6: Trust has a positive impact on customer loyalty**

### *Indirect Impact of Perceived Usefulness and Perceived Ease-of-use on Loyalty through Trust*

Previous studies executed by Keni (2020) found that both perceived ease-of-use and perceived usefulness had a significant role in affecting consumers repurchase intentions through trust within the Indonesian e-commerce sector. Moreover, a similar study conducted by Wilson (2019) also found out that both perceived usefulness and perceived ease-of-use positively and significantly affect customer loyalty through trust. Furthermore, another study conducted by Chinomona (2013) also discovered that both perceived ease-of-use and usefulness significantly affected the consumers' levels of trust toward a system or technology, which ultimately affected and determined the formation of loyalty in the consumers' minds. In this case, it was important for companies to note that in the world of technology, consumers' trust toward any kinds of systems, technologies or features offered by a company would not only be affected by how sophisticated or how far such technologies would increase or affect the consumers' performances or accomplishments in regard with the work that the consumers are involved in, but also it would be affected by the consumers' personal judgments with regard to how easy it would be to learn or study such new technologies installed within the products sold or offered by the companies. Therefore, companies should be able to fulfill both criteria when these companies are about to create or install any kinds of new features in the products that they are about to offer. The companies' abilities to create a one-of-a-kind yet "easy to learn" technology or feature could eventually boost the consumers' trust toward the products and the companies; such a scenario could further

increase the consumers' intentions or willingness to repurchase or re-buy the products from the same company. Based on these results, the authors would like to posit the seventh (H7) and the eighth hypotheses (H8) as follows:

**H7: Perceived usefulness has a positive impact on customer loyalty through trust**

**H8: Perceived ease-of-use has a positive impact on customer loyalty through trust**

### *Indirect Impact of Perceived Usefulness and Perceived Ease-of-use on Loyalty through Customer Satisfaction*

Previous studies by Bapat (2017) found that perceived ease-of-use played a significant and positive role in enhancing consumers' satisfaction, which in turn could lead to greater loyalty toward a bank within the banking industry. Moreover, a similar study conducted by Mohamed et al., (2014) also found the importance that both perceived usefulness and perceived ease-of-use had in positively and significantly affecting satisfaction and customers' continuance intentions in the Malaysian e-commerce sector. Similarly, another study conducted by Keni (2020) also found that both perceived ease-of-use and perceived usefulness played a significant and important role in affecting consumers' repurchase intentions through customer satisfaction in the Indonesian e-commerce sector. Similar to the concept of trust, the consumers' levels of satisfaction toward certain products which were pre-installed with certain technologies was not only determined by how easy and how fast it was for them to learn the new technologies, but it also would be determined by how far such technologies or features could eventually enhance

the quality and the efficiency of any kinds of work that the consumers were doing. In this case, a company's ability to fulfill both of these aspects (the sense of usefulness and the ease-of-use aspect of a technology) could eventually affect and enhance the consumers' satisfaction toward the products and the company, in the end, the consumers' escalating levels of satisfaction will increase their sense of loyalty toward the company. Based on these results, the authors would like to posit the ninth hypothesis (H9) and the tenth hypothesis (H10) as follows:

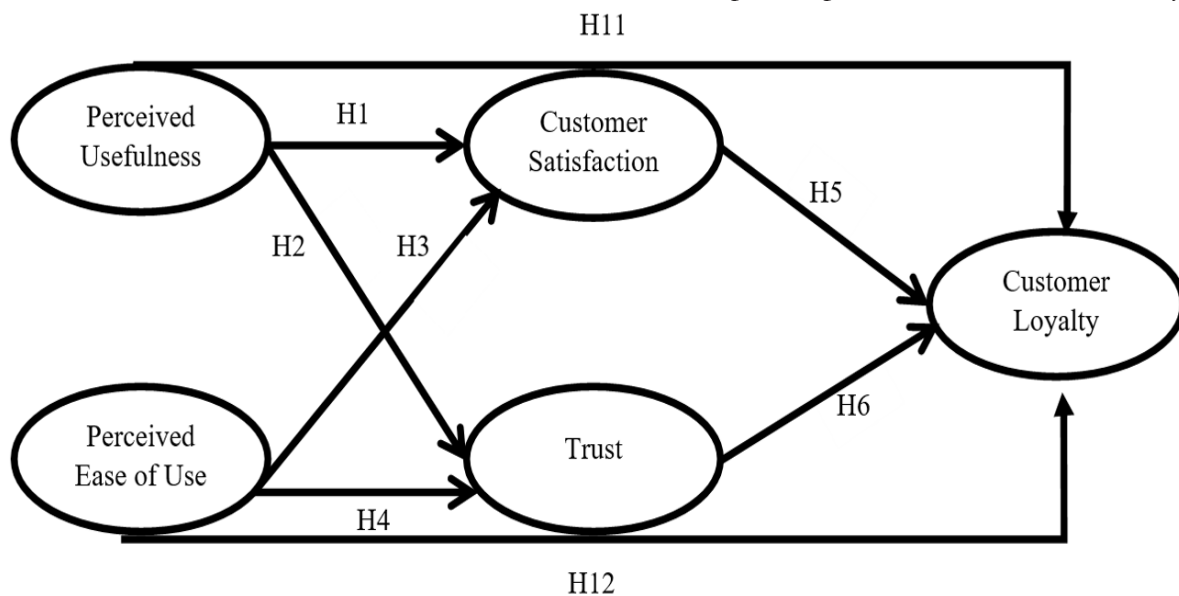
**H9: Perceived usefulness has a positive impact on customer loyalty through satisfaction**

**H10: Perceived ease-of-use has a positive impact on customer loyalty through satisfaction**

### *Direct Impact of Perceived Usefulness and Perceived Ease-of-use on Loyalty*

Previous research conducted by Sun and Ngai (2010) into the internet banking

sector in the U.K found out that both perceived usefulness and perceived ease-of-use had a positive and significant effect toward consumers' behavioral intentions to re-use the same technology or services offered by a bank. Moreover, another study undertaken by El-Haddadeh et al., (2012) also found significant relationships between both perceived ease-of-use and perceived usefulness toward customers' levels of loyalty toward specific social networking sites in China. Furthermore, studies conducted by Kim et al., (2016), Fang (2017), Wilson (2019) also underlined the importance and significance of both perceived ease-of-use and perceived usefulness in affecting and determining consumers' intentions to use and re-use the same technology and system in the future. In terms of the relationships between both perceived usefulness and perceived ease-of-use toward customer loyalty, normally, within the realm of technology, companies not only deal with what kind of new, state-of-the-art and advanced technologies they should craft and make, but also that they should deal with the concept of whether or not it would be easy and simple for potential consumers to study,



**Figure 2.** Research Model/Conceptual Framework



understand and deal with the new technologies developed by the companies. In this case, when consumers react in positive ways toward the companies' abilities to build such products, which include the kinds of new technologies which could fulfill both the usefulness and the ease-of-use criteria expected by the consumers, then such a scenario will eventually enhance and intensify the consumers' loyalties toward the company. Based on the results of these previous studies, the authors would like to posit the eleventh hypothesis (H11) and the twelfth hypothesis (H12) as follows:

**H11: Perceived usefulness has a positive and direct impact on customer loyalty**

**H12: Perceived ease-of-use has a positive and direct impact on customer loyalty**

## Methods

This is a survey study, in which questionnaires were chosen as the instrument to collect the data, and these were distributed to the respondents in order to gather the data. The sample of this study were Chinese computer users who were living in five cities in China: Beijing, Shanghai, Shenzhen, Guangzhou, and Hangzhou. Questionnaires were virtually and electronically distributed to the respondents using email, social media, an instant messenger application, and an online survey website. The respondents who participated in this study were those who had bought and personally used either a Lenovo, Apple, Dell or Asus-Brand laptop or desktop PC in the past three years, which were from 2017 to 2020. The authors' decision to choose those four brands as the object of this study was based on the result of a preliminary study which was conducted on 2,000 individuals in China concerning "Which PC/laptop brand

they thought was the most popular in China?" After collecting and analyzing the responses given by these individuals, those four brands topped the list as the four most popular laptop or PC brands in China, in which Apple topped the list as the most popular laptop or PC brand in China according to the individuals who were involved in the preliminary study (39.1%), followed by Lenovo (24.65%), Dell (15.85%), and Asus (14.4%).

Furthermore, to ensure the fairness and the equality regarding the distribution of the questionnaire, the number of respondents collected from each city was limited to 80. The authors also implement the non-probability sampling technique in the form of convenience sampling in this study. In total, 400 respondents originating from five cities in China participated in this research. The authors' decision to set the sample size at 400 was based on some recommendations given by several authors regarding the minimum and the appropriate amount for the sample size for studies using the structural equation modeling (SEM) method. Kline (2016) stated that the minimum sample size required for a SEM study is around 200 respondents, while similarly, other studies by Hoogland & Boomsma (1998), Boomsma & Hoogland (2001) and Martínez-López et al., (2013) also argued that 200 is the minimum sample size that should be set in quantitative studies using SEM. Meanwhile, Hair et al., (2010) stated that the appropriate sample size for a study should be around 5 to 10 times the number of indicators used in the study.

Regarding the items or indicators used in this research, a total of 19 indicators or items measuring all five variables were included in this questionnaire, in which three items measuring the variable perceived usefulness were adapted from Amin et al., (2014); three items measuring the variable perceived ease-of-use



were adapted from Amin et al., (2014); four items measuring the variable trust were adapted from Amin et al., (2014); four items measuring the variable customer satisfaction were adapted from Zhou et al., (2009) and Amin et al., (2014); and five items measuring the variable customer loyalty were adapted from Veloutsou (2015). Furthermore, a 7-point Likert scale was utilized to measure the respondents' levels of agreement toward the statements in the questionnaire, in which the answers or responses given by the respondents would range from "1", which reflects the respondents "strong disagreement" toward each statement, to "7", which reflects their "strong

agreement" toward the statements given in the questionnaire. Moreover, regarding the wording of each of the indicators or items, each of them had been carefully modified in order to conform with the topic of this research.

Before the questionnaires were distributed and used in this research, a pretest involving 50 respondents was conducted beforehand, in order to ensure that the instrument used and implemented in this study was valid, reliable, and that each statement in the questionnaire did not confuse the respondents. Based on the result of the pretest, it was revealed that all the items were valid and reliable. Furthermore,

**Table 9.** Indicators/Measurement Items

Variable	Indicator	Description
Perceived Usefulness	PU1	The Technology Implemented in this Laptop/Desktop Improves My Performance at Work
	PU2	The Technology Implemented in this Laptop/Desktop Improves My Productivity at Work
	PU3	This Laptop/Desktop Improves and Makes My Life Easier
Perceived Ease-of-Use	PEOU1	It's Easy to Learn How to Use this Laptop/Desktop
	PEOU2	It's Easy to Become Proficient in Using this Laptop/Desktop
	PEOU3	Overall, this Laptop/Desktop is Easy to Use
Trust	TRU1	The Company which Market this Laptop/Desktop Cares about it's Customer
	TRU2	I Believe All of the Information Given by This Brand
	TRU3	The Company which Market this Laptop/Desktop Keeps it's Promise(s) to it's Customer
	TRU4	The Brand of this Laptop/Desktop is Trustworthy
Customer Satisfaction	SAT1	I'm Very Pleased with the Overall Quality of this Laptop/Desktop
	SAT2	I'm Very Contented with the Overall Quality of this Laptop/Desktop
	SAT3	I'm Very Satisfied with the Overall Quality of this Laptop/Desktop
	SAT4	This Laptop/Desktop Had Successfully Exceeded my Expectations
	SAT5	My Decision to Buy This Laptop/Desktop Was a Wise One
Customer Loyalty	LOY1	I'll Definitely Re-Buy this Brand of Laptop/Desktop in the Future
	LOY2	I'll Recommend my Colleagues to Buy this Brand of Laptop/Desktop in the Future
	LOY3	I'll Recommend that my Family Buy this Brand of Laptop/Desktop in the Future
	LOY4	I'll Say Positive Things about This Brand of Laptop/Desktop to Other People
	LOY5	I'll Encourage Anyone who Seeks My Advice to Buy this Brand of Laptop/Desktop

each of the respondents who participated in the pretest were contacted individually in order to ask their opinion regarding the wording of each statement included in the questionnaire. After asking for their opinions, several revisions were made regarding the wording of some of the statements in order to prevent the respondents being confused while filling in the questionnaire. After completing some revisions to the questionnaire, all of the questionnaires were then distributed to all the respondents participating in this study.

## Results

### *Respondents' Profile*

Out of a total of 400 questionnaires, a total of 346 questionnaires were deemed usable and therefore were further processed

and analyzed in this study. Out of these 346 respondents, a total of 80 respondents originated from Beijing, a total of 72 respondents originated from Shanghai, a total of 80 respondents originated from Shenzhen, a total of 60 respondents originated from Guangzhou, and a total of 54 respondents originated from Hangzhou. Furthermore, the majority of the respondents were male (65.9%), aged between 17 to 25 years old (91.6%) and most of them choose a bachelor's degree as their highest educational status (77.2%). Furthermore, the majority of the respondents spend an average of RMB2,500 to RMB5,000 a month (67.1%). Moreover, regarding how frequently they changed their computers, it was revealed that the majority of them (94.8%) had change their computers between 4 to 6 times in the past five years. The complete analyses of the respondents' profiles are shown in Table 1.

**Table 1.** Respondents' Profiles

Profile	Criteria	Percentage
Gender	Male	65.9%
	Female	34.1%
Age	≤17 Years Old	0.9%
	18-25 Years Old	91.6%
	26-34 Years Old	5.2%
	≥35 Years Old	2.3%
Educational Background	Bachelor's Degree	77.2%
	Master's Degree	22.3%
	Doctoral Degree	0.6%
Monthly Expenditure	< RMB2,500	25.7%
	RMB2,500 – RMB5,000	67.1%
	> RMB5,000	7.2%
Frequency of Changing Computers every 5 Years	≤ 3 Times	3.2%
	4-6 Times	94.8%
	≥ 7 Times	2.0%
Cities which respondents originated from	Beijing	23.1%
	Shanghai	20.8%
	Shenzhen	23.1%
	Guangzhou	17.3%
	Hangzhou	15.6%

### *Measurement Model (Outer Model) Assessment*

After analyzing the profiles of the respondents, the data were further processed in order to determine the relationship between each of the variables, and also to obtain the result of this research. However, before determining the relationship between the variables, all of the data had to fulfill the validity and reliability criteria in the measurement model analysis beforehand. Regarding the measurement model (outer model) assessment, Peterson (1994), Henseler et al., (2009), and Hair et al., (2011) had stated several criteria that needed to be fulfilled in order for the data to be deemed valid and reliable. Those criteria were: The value of both Cronbach's alpha and the composite reliability for each variable should exceeded 0.7. The factor loadings val-

ue for each of the indicators should exceeded 0.7. The AVE value of each variable should be greater than 0.5. The square root of AVE for each variable should be greater than the correlation between the latent variables. After conducting a measurement model assessment on the data, it was revealed that all the indicators and variables had fulfilled all of the criteria set by Peterson (1994), Henseler et al., (2009), and Hair et al., (2011). Therefore, it could be concluded that all of the data had fulfilled the measurement model criteria. After the data had been deemed valid and reliable, structural model (inner model) assessments were further conducted on the data in order to uncover the relationship that existed between the variables. The results of the measurement model assessment are shown in tables 2 and 3.

**Table 2.** Measurement Model Analysis

<b>Variables</b>	<b>Items/Indicators</b>	<b>Factor Loadings</b>	<b>Cronbach's Alpha</b>	<b>Composite Reliability</b>	<b>AVE</b>
Perceived Usefulness	PU1	0.810	0.786	0.808	0.602
	PU2	0.760			
	PU3	0.775			
Perceived Ease-of-use	PEOU1	0.702	0.726	0.756	0.560
	PEOU2	0.903			
	PEOU3	0.761			
Trust	TRU1	0.747	0.741	0.790	0.571
	TRU2	0.818			
	TRU3	0.794			
	TRU4	0.733			
Customer Satisfaction	SAT1	0.893	0.803	0.767	0.589
	SAT2	0.768			
	SAT3	0.779			
	SAT4	0.765			
Customer Loyalty	LOY1	0.727	0.791	0.817	0.536
	LOY2	0.710			
	LOY3	0.897			
	LOY4	0.801			
	LOY5	0.754			

Table 3. Discriminant Validity (Fornell-Larcker) Analysis

	Perceived Usefulness	Perceived Ease-of-use	Trust	Customer Satisfaction	Customer Loyalty
Perceived Usefulness	<b>0.798</b>				
Perceived Ease-of-use	0.601	<b>0.824</b>			
Trust	0.714	0.650	<b>0.866</b>		
Customer Satisfaction	0.721	0.719	0.748	<b>0.759</b>	
Customer Loyalty	0.689	0.668	0.708	0.732	<b>0.772</b>

*Structural Model (Inner Model) Assessment*

After assessing the data in the measurement model (outer model) assessment, the structural model (inner model) assessment was conducted in order to examine the relationship between the variables. In the structural model assessment, the relationship between the variables was measured by analyzing the path coefficient value of each variables by using the bootstrapping method, in which a cut-off value of 1.96 with 5% significance level ( $\alpha=5\%$ ) was used in this research. With regards to this value, the relationship between the variables was revealed to be positive and significant if the t-value was greater than 1.96, while an at-value lower than 1.96 indicated that the relationship between the variables was not significant. Furthermore, other than analyzing the relationship between the variables, the mediating assessment was also conducted by this research; such an assessment was conducted in order to determine whether both customer satisfaction and trust could positively mediate the impact of perceived usefulness and perceived ease-of-use toward customer loyalty.

Furthermore, to ensure and prove that the model proposed in this study was fit, both the standardized root mean square residual (SRMR) and the normed fit index

(NFI) were also assessed using SmartPLS 3.3.2 software, from which, based on the results of the analysis, the value of both the SRMR and NFI obtained from the result of the data analysis were 0.88 and 0.934 respectively. Based on these findings, the authors could conclude that the model assessed in this study was fit. Such a conclusion was based on the suggestions given by Bentler and Bonett (1980), Hu and Bentler (1999), and Lohmöller (1989) who stated that the SRMR value of the model should be between 0.8 and 1 in order for the model to be categorized as fit, while on the other hand, regarding the minimum requirement value for the NFI, the closer the value is to one, the better the model will be. Therefore, since both the SRMR and the NFI values of this model had fulfilled these minimum criteria, the authors could conclude that the model proposed in this study was fit.

Moreover, the result of the path coefficient obtained from conducting the structural model assessment was also used to test the hypotheses proposed in this research, to find whether they were supported or rejected. A hypothesis would be supported if the t-value of the hypothesis (the relationship between variables) is greater than the cut-off value of 1.96, while the hypothesis would be rejected if the t-value of the hypothesis (the relationship between variables) is lower than the cut-off value of 1.96.

**Table 4.** Model Fit Analysis

Criteria	Value	Recommended Value	Conclusion
Standardized Root Mean Square Residual (SRMR)	0.88	Between 0.8 – 1	Model is a Fit
Normed Fit Index (NFI)	0.934	The closer to 1, the better the model will be	Model is a Fit

**Table 5.** Path Coefficient Results

Relationship	Sample Mean (Coefficient of Influence)	t-value	p-value	Results
Perceived Usefulness → Customer Satisfaction	0.443	4.667	0.000	Significant
Perceived Usefulness → Trust	0.353	4.039	0.000	Significant
Perceived Ease-of-use → Customer Satisfaction	0.487	4.455	0.000	Significant
Perceived Ease-of-use → Trust	0.508	5.070	0.000	Significant
Customer Satisfaction → Customer Loyalty	0.431	3.605	0.000	Significant
Trust → Customer Loyalty	0.359	2.660	0.000	Significant
Perceived Usefulness → Customer Satisfaction → Customer Loyalty	0.182	2.465	0.014	Significant
Perceived Ease-of-Use → Customer Satisfaction → Customer Loyalty	0.194	2.320	0.021	Significant
Perceived Usefulness → Trust → Customer Loyalty	0.190	2.668	0.008	Significant
Perceived Ease-of-Use → Trust → Customer Loyalty	0.213	2.420	0.016	Significant
Perceived Usefulness → Customer Loyalty	0.243	3.028	0.003	Significant
Perceived Ease-of-use → Customer Loyalty	0.326	3.159	0.002	Significant

**Table 6.** R-squared (R<sup>2</sup>)

Variables	R <sup>2</sup> Value
Trust	0.671
Customer Satisfaction	0.459
Customer Loyalty	0.792

Based on the results of the structural model assessment shown in Table 5, it could be concluded that the perceived ease-of-use had a positive and significant impact on both customer satisfaction and trust. Moreover, both customer satisfaction and trust also positively and significantly affected customer loyalty among computer users in China. These arguments were based on the results which showed that the path coefficient value between the variables was higher than the cut-off value of 1.96. Therefore, it could be concluded that the relationship of all the variables analyzed in this research was significant.

Furthermore, based on the result shown in Table 6 regarding the value of r squared (R<sup>2</sup>) for three of the variables, which were trust, satisfaction, and customer loyalty, it could be concluded that, with the R<sup>2</sup> value of 0.671, the variables perceived usefulness and perceived ease-of-use could explain the variable trust by 67.1%, while the rest (32.9%) was explained by the other variables which were not discussed in this research. Meanwhile, with the r squared (R<sup>2</sup>) value of 0.459, it could be concluded that the variables perceived usefulness and perceived ease-of-use could explain the variable satisfaction by 45.9%, while



the rest (54.1%) was explained by the other variables which were not discussed in this research. On the other hand, with the r squared (R2) value of 0.792, it could be concluded that the variables customer satisfaction and trust could explain the variable customer loyalty by 79.2%, while the rest (20.8%) was explained by the other variables which were not discussed in this research.

### Hypotheses Testing

Hypotheses testing were conducted in this research not only to determine the impact of the independent variables on the dependent variables, but also to determine whether the hypotheses proposed or posited by this research were supported or rejected. To know

and determine whether the hypotheses were supported or rejected, a cut-off value of 1.96 ( $t \geq 1.96$ ) was used as the criteria to support or reject the hypotheses. If the t value of a hypothesis was lower than 1.96, the hypothesis was rejected. However, if the t value of the hypothesis was greater than 1.96, then it could be assumed and concluded that the hypothesis was supported. The results of the hypotheses testing are shown in Table 7.

Based on the results shown in Table 7, it could be concluded that all the hypotheses proposed in this research were supported. The first hypothesis (H1) posits that perceived usefulness has a positive impact on customer satisfaction. The t value of the first hypothesis was 4.186, which was greater than the cut-off

**Table 7.** Hypotheses Testing Results

	Hypotheses	Sample Mean (Coefficient of Influence)	t value	p-value	Results
H1	Perceived Usefulness has a positive impact on Customer Satisfaction	0.443	4.667	0.000	H1 Supported
H2	Perceived usefulness has a positive impact on Trust	0.353	4.039	0.000	H2 Supported
H3	Perceived Ease-of-use has a positive impact on Customer Satisfaction	0.487	4.455	0.000	H3 Supported
H4	Perceived Ease-of-use has a positive impact on Trust	0.508	5.070	0.000	H4 Supported
H5	Customer Satisfaction has a positive impact on Customer Loyalty	0.431	3.605	0.000	H5 Supported
H6	Trust has a positive impact on Customer Loyalty	0.359	2.660	0.000	H6 Supported
H7	Perceived Usefulness has a positive impact on Customer Loyalty through Trust	0.190	2.668	0.008	H7 Supported
H8	Perceived Ease-of-use has a positive impact on Customer Loyalty through Trust	0.213	2.420	0.016	H8 Supported
H9	Perceived Usefulness has a positive impact on Customer Loyalty through Satisfaction	0.182	2.465	0.014	H9 Supported
H10	Perceived Ease-of-use has a positive impact on Customer Loyalty through Satisfaction	0.194	2.320	0.021	H10 Supported
H11	Perceived Usefulness has a direct positive impact on Customer Loyalty	0.243	3.028	0.003	H11 Supported
H12	Perceived Ease-of-use has a direct positive impact on Customer Loyalty	0.326	3.159	0.002	H12 Supported

or minimum acceptance value of 1.96 ( $4.816 > 1.96$ ). Therefore, the first hypothesis (H1) was supported. The second hypothesis (H2) posits that perceived usefulness has a positive impact on trust. The t value of the second hypothesis was 2.982, which was greater than the cut-off or minimum acceptance value of 1.96 ( $2.982 > 1.96$ ). Therefore, the second hypothesis (H2) was also supported. The third hypothesis (H3) posits that perceived ease-of-use has a positive impact on customer satisfaction. The t value of the third hypothesis was 5.016, which was greater than the cut-off or minimum acceptance value of 1.96 ( $5.016 > 1.96$ ). Therefore, the third hypothesis (H3) was also supported. The fourth hypothesis (H4) posits that perceived ease-of-use has a positive impact on trust. The t value of the fourth hypothesis was 3.541, which was greater than the cut-off or minimum acceptance value of 1.96 ( $3.541 > 1.96$ ). Therefore, the fourth hypothesis (H4) was also supported.

The fifth hypothesis (H5) posits that customer satisfaction has a positive impact on customer loyalty. The t value of the fifth hypothesis was 2.435, which was greater than the cut-off or minimum acceptance value of 1.96 ( $2.435 > 1.96$ ). Therefore, the fifth hypothesis (H5) was also supported. The sixth hypothesis (H6) posits that trust has a positive impact on customer loyalty. The t value of the sixth hypothesis was 3.698, which was greater than the cut-off or minimum acceptance value of 1.96 ( $3.698 > 1.96$ ). Therefore, the sixth hypothesis (H6) was also supported. Furthermore, the seventh (H7), eighth (H8), ninth (H9), tenth (H10), eleventh (H11) and the twelfth hypothesis (H12) were also supported accordingly, since the t-value of these relationships exceeded 1.96 as the minimum acceptance value, in order for the relationship to be determined as significant, and in order for the hypotheses to be supported.

### *Mediation Assessment*

Other than determining the relationship between variables, a mediation analysis was also conducted in this research, in order to determine whether or not both customer satisfaction and trust could mediate the impact of perceived usefulness and perceived ease-of-use toward customer loyalty. In conducting the mediation assessment in this model, the authors compared both the direct effect and the indirect effect between the variables assessed in this study. In this case, both satisfaction and trust were said to be mediating the effect between the independent variables and the dependent variables if the t-value of the relationship between the independent, mediating, and dependent variables was significant (greater than 1.96). On the other hand, the mediating effect did not occur (no mediation) if the t-value of the relationship between the independent, mediating, and dependent variables was not significant (lower than 1.96). Furthermore, in the event that the mediation effect occurred in this study, it should be noted that one of these two types of mediation might occur, which are partial mediation or full mediation. In this study, partial mediation would occur if the direct effects between both the perceived ease of use and perceived usefulness toward customer loyalty were significant, while at the same time, the indirect effects between both perceived ease of use and perceived usefulness toward customer loyalty through both satisfaction and trust were also significant. On the other hand, full mediation would occur if the direct effects between both the perceived ease of use and perceived usefulness toward customer loyalty were not significant, while at the same time, the indirect effects between both perceived ease of use and perceived usefulness toward customer loyalty through both satisfaction and trust were also signif-

icant. The results regarding the mediation assessment on the mediating variables discussed in this research are shown in Table 8.

supported. This result was in line with previous research by Amin et al., (2014) who stated that as customers felt that there was

**Table 8.** Mediation Effect Analysis

Direct and Indirect Effect	Sample Mean (Coefficient of Influence)	t value	p-value	Results	Explanations
Perceived Usefulness → Customer Loyalty	0.243	3.028	0.003	-	<b><i>Partial Mediation</i></b> occurs when both the direct effect and the indirect effect between variables show significant results. In this case, since both the direct and indirect effect given by both perceived usefulness and perceived ease-of-use (through both satisfaction and trust) yield significant results, then it could be concluded that <b><i>Partial Mediation</i></b> occurs due to these results
Perceived Usefulness → Customer Satisfaction → Customer Loyalty	0.182	2.465	0.014	<i>Partial Mediation</i>	
Perceived Usefulness → Trust → Customer Loyalty	0.190	2.668	0.008	<i>Partial Mediation</i>	
Perceived Ease Of Use → Customer Loyalty	0.326	3.159	0.002	-	
Perceived Ease Of Use → Customer Satisfaction → Customer Loyalty	0.194	2.320	0.021	<i>Partial Mediation</i>	
Perceived Ease-of-use → Trust → Customer Loyalty	0.213	2.420	0.016	<i>Partial Mediation</i>	

Based on the data shown in Table 8, it could be concluded that both of the mediating variables, which were customer satisfaction and trust, positively mediated the impact of perceived usefulness and perceived ease-of-use toward customer loyalty. Furthermore, both of the variables were revealed to partially mediate the impact of perceived usefulness and perceived ease-of-use toward customer loyalty, since both perceived usefulness and perceived ease-of-use positively affected customer loyalty in the computer sector within China, both directly and indirectly.

## Discussions

Based on the results obtained by this research, it was revealed that all the hypotheses posited or proposed by this research were supported. The first hypothesis (H1) which proposed that perceived usefulness has a positive impact on customer satisfaction was

some “added value” that they could get, or when they felt that their performance would be improved by using the new technology (or product which was equipped with the latest technology), then it could increase their satisfaction with the product, technology, or even toward the company which manufactured it. Similarly, the second hypothesis (H2) which proposed that perceived usefulness has a positive impact on trust was also supported. This result was also in line with the result of the previous research by Amin et al., (2014), who stated that customers’ perceptions of whether using the technology will increase their value and performance could determine their trust in the product or company, by having a feeling or belief that the company would not disappoint them, and that the technology or product would indeed improve their performance; this could establish or instill the customers’ trust toward the product or company. Furthermore, the third (H3) and

fourth hypotheses (H4) which proposed or posited that perceived ease-of-use positively affected customer satisfaction and trust were also supported. These results indicated that the customers' levels of satisfaction will increase if they believe that the technology or product they are using is easy to learn, easy to use, and effortless. Similarly, the customers' levels of trust toward a product, technology, or company will also increase as they believe or perceived that they do not need to expend much effort to learn how to operate or use it.

Moreover, the fifth (H5) and sixth hypotheses (H6) which proposed that customer satisfaction and trust positively affected customer loyalty were also supported. Regarding these results, satisfied customers have a tendency to become loyal to a company, which means that they would not seek to purchase a product or service from the company's competitors (Velotsou, 2015). Such a scenario will be beneficial for companies, as they could retain more and more customers and could outperformed their competitors in the same industry. On the other hand, trust also has a positive impact on customer loyalty. As previous authors have argued (Hsu, 2007; Jin et al., 2008; Zhou et al., 2009), as the customers' levels of trust increase, their tendency to accept risk and vulnerability while doing a transactional activity with a company will also increase, which could cause them to keep buying products or services from the same company. Therefore, in this case, companies would successfully retain their respective customers, and make them loyal to the company.

Furthermore, the rest of the hypotheses were also supported. This study underlines how people's or consumers' perceptions regarding the benefits that they could get and extract from using the new technologies im-

plemented in the newly-released computers or laptops that they are buying, together with their personal judgement and views regarding whether or not they will encounter much difficulty and confusion in terms of learning and understanding how the systems work, plays such a massive and significant role in affecting their behavioral intentions toward the technology, laptop or the PC; such factors could not only affect people's intentions to buy and eventually use the technology or the device, but also in terms of affecting their intentions to re-buy and re-use a newer version of the laptop, computer, PC or device which are manufactured and sold by the same brand or company which have the newest and more advanced technologies installed, compared to the current versions. In this case, it could be quite problematic for consumers, particularly for the older ones, in terms of understanding the differences between the new technologies and the current ones installed on the older versions of the laptop or PC when the new technologies being installed are radically or totally different from what the consumers have used or learned before. As more and more consumers are looking for efficiency and practicality, over-complex systems or technologies could lower their motivation and intention to buy and use the new laptops or PCs, which eventually could hamper the companies' sales of the products.

Moreover, consumers' perceptions regarding the usability and the advantages that consumers have toward the new technologies installed in the newly-developed computers, laptops or PCs also may cause a significant and positive impact toward the consumers' levels of satisfaction and trust that the new technologies or systems could actually perform better and bring additional values which improve the consumers' lives (or toward what consumers have been doing),

compared to the current one. In this case, it should be noted that consumers tend to not buy or use new technologies if they feel and think that no additional differences or values exist between the new technologies and the older ones. This is mainly because people (or consumers) will spend more money and effort to buy a new laptop, computer or PC installed with the newest technologies. If consumers felt that the newer one actually possesses similar features, systems, specifications or technologies to the previous ones, without much difference, then the consumers might opt against buying the new computers or products, and could eventually stick to the current ones that they have been using. Therefore, it should be noted by companies or brands engaging in the Chinese computer sector that not only do they need to create user-friendly, highly-efficient and easy-to-learn systems installed in the new computers, laptops or PCs which the companies are going to manufacture and sell, but also that they should pay more attention to the additional values or benefits that the consumers could get; such new features or benefits could serve as the difference between the current and the new technologies, which could eventually boost the consumers' and people's interests and intentions to buy, and eventually re-buy and become loyal consumers of the brand.

Furthermore, concerning the results of the analysis regarding the profile of the respondents, the authors were trying to link or combine both the results of the respondents' profiles analysis and the hypotheses testing results, as several additional and interesting findings could be further explained and discussed based on the combined results. First of all, according to the results of the respondents' profiles analysis, it was revealed that the majority of the respondents who were participating in this study were male (65.9%)

as compare to female (34.1%). Therefore, it could be implied from this finding that the number of male consumers who are buying or using laptops or computers in China tends to be higher, compared to their female counterparts. With regard to this finding, one main reason or factor which could explain such a phenomenon (why the number of male consumers who are using or buying computers/laptops in China tends to be higher compared to the number of female consumers) is mainly because of the sex or gender ratio in China, which, as of 2020, according to the statistical data published by Statistics Times (StatisticsTimes.com, 2020), the male population in China makes up 51.29% of the total population, which is greater than the female population (48.71%). Moreover, based on the same source, it was also reported that there are around 113 boys for every 100 girls born in China; such statistical findings may explain why more males participated in this study (and who tend to use or buy laptops or computers in China) as compared to females.

Moreover, regarding the majority of the respondents based on their age, it was revealed that the vast majority of the respondents were aged between 18 to 25 years old (91.6%), which means that the majority of them are categorized as either millennials or centennials. In this case, linking this finding with the hypotheses testing results for H1 to H4 (in which both the perceived usefulness and perceived ease-of-use were found to have a positive effect on trust and satisfaction), the authors could concluded that since both millennials and centennials have a better understanding concerning both the introduction and the adaptation of a certain technology, then it would be quite easy for individuals who came from these two generations to learn, understand, adopt, use and integrate such a technology into their daily activities,



as compared to older people. Therefore, such findings could explain why the respondents, who are categorized as both millennials and centennials, tend to believe that the implementation and adoption of a certain technology will increase, boost or enhance the quality of their work, since individuals from these two generations have lived or spent most of their lives in an era in which technology and the internet had become an important part of human life. Therefore, such an explanation could explain why perceived usefulness was revealed to have a positive and significant effect on both trust and satisfaction, since individuals from these two generations have done most of their things or work with the help of technology, as compared to the previous generations. Moreover, since these individuals have grown up in the midst of rapid technological development and advancement, then it could be understood that it would be much easier and faster for these individuals (both the millennials and the centennials) to learn and try to adopt a certain technology which they have never seen before, thus explaining why the perceived ease-of-use was also found to have a positive and significant impact on both trust and satisfaction, since people from these two generations tend to think and argue that learning or trying to adopt a new technology in their life is actually effortless.

Furthermore, based on the results of the respondents' profile assessments, it was also found that most of the respondents have a steady income, earning between RMB2,500 and RMB5,000 each month (67.1%). This implies that most of the respondents are categorized as middle-to-high income individuals, since based on the data published by the National Bureau of Statistics of China (2021), the per capita annual disposable income of the residents of China was around

RMB32,189 in 2020, compared to the average monthly income of most of the respondents who participated in this study (between RMB2,500 and RMB5,000), therefore it could be concluded that the income level of most of the respondents was actually higher than the average income per capita of China in 2020. In this case, combined with the fact that over a five year period, most of these respondents tended to change their laptop or PC around 4 to 6 times, then it could be implied that since most of the respondents could be classified as middle-to-high income citizens or individuals, then it could be understood that this group of respondents tended to be less sensitive with regard to the price of a product as compared to those who were classified as middle-to-low income individuals; their low price sensitivity attitude in regard to the prices charged for each and every laptop or computer could explain why most of these consumers tended to change their laptop or computer quite often during this timeframe (4 to 6 times over the past five years). Moreover, in order to improve our understanding with regard to this phenomenon, the authors conducted an additional in-depth interview with these groups of consumers or respondents, from which, after digging and collecting more information regarding their buying behavior, the authors found that most of them tended to change their laptop or computer to different types or series which were manufactured or marketed by the same companies or brands (77.29%), since most of them argue that they are interested in checking and trying the features, technology and the quality of other types of laptop or computer (other than the ones that they have been using) which were basically still manufactured or marketed under the same brand name. Therefore, it could be understood that since most of them are categorized as either

millennials or centennials, then their high level of curiosity about learning, trying or discovering new kinds of technology, together with their high level of interest in comparing the features and technology installed on one type of laptop or computer with another could explain their shifting behavior from one type of laptop/computer to another (which still came under the same brand). Such explanations could ultimately explain why these groups of consumers tended to change or buy new kinds of laptops/computers quite often within the given timeframe (4 to 6 times during the past five years).

Moreover, based on other results obtained from the respondents' profiles analysis, the authors also found out that most for the respondents originated from three cities in China, namely Beijing, Shanghai and Shenzhen. In this case, such results do not imply that the respondents or consumers who come from these three cities are more loyal as compared to the other consumers who originated from the other cities in China, as these results only suggest that most of the respondents originated or lived in these three cities (Beijing, Shanghai and Shenzhen), which further implies that most of the respondents or consumers who live or originate from these cities have been using laptops or computers of various brands for quite a long time.

## Conclusions

### *Conclusions and Managerial Implications*

This research was conducted in order to determine the impact that perceived usefulness and perceived ease-of-use had on customer loyalty in the Chinese computer in-

dustry. Based on the results which have been discussed above, it could be concluded that perceived usefulness and perceived ease-of-use have a positive impact on customer loyalty, either directly, or indirectly through customer satisfaction and trust. Furthermore, all our hypotheses were supported, and it was further revealed that both customer satisfaction and trust partially mediated the impact of perceived usefulness and perceived ease-of-use toward customer loyalty. Based on these results, each and every single company which operates a business in the computer industry in China should pay attention to the products or technologies that they are putting or going to put in their computers (PC or laptop). In this case, companies should be able to ensure that the new products or technologies that are due to be installed in the new computers that they are aiming to sell will not be difficult to learn and could really improve an individual's performance when doing their activities or tasks. When companies have successfully created such technology, the customers will be satisfied, and will put their trust in the company at the same time, which, in the end, will cause the customers to become loyal to the company.

Furthermore, since the results obtained in this study also underline that most of the respondents were millennials and centennials, who are aged between 18 to 25 years old, and tend to have a higher acceptance or adoption rate for new technology as compared to older people, the authors would also like to suggest to companies conducting their business in China's computer sector to create and implement a unique and interesting type of advertizing which could highlight the main technological advancements or developments which are installed by these companies in their newly-developed laptops or computers, which they are about to market or

introduce to the consumers. In this case, such advertizing could enhance the consumers' interests and intentions to learn more about the new technology (and the new products) which could persuade or motivate them to eventually try and buy the newly-developed laptops or computers. Moreover, integrating new and state-of-the-art technologies (such as 4D or 5D technology, facial recognition technology, or the other AI-related features) into the laptops or computers developed by the company could enhance the consumers' willingness and intention to buy (and eventually re-buy) such laptops or computers from the company in the future.

### *Research Limitations and Suggestion for Future Research*

Despite the rigorous nature of this research, several imitations exist in this research. First, the aim of this research was to analyze the impact of perceived usefulness and perceived ease-of-use toward customer loyalty in the computer industry in China, either directly or indirectly through customer satisfaction and trust. In this case, since the computer industry was the only industry chosen as the industry to be analyzed and assessed, the results of this research might not be generalizable to other industries. Therefore, further research might conduct an analysis about this topic with other industries. Second, this research was solely conducted in China, which means that the result of this research might

not be generalizable to other countries, since the behavior and perceptions of consumers may differ across countries. Therefore, it is strongly suggested that further research be conducted in other countries, to see if other countries will generate the same results. Third, this research only assessed perceived usefulness, perceived ease-of-use, customer satisfaction, and trust as variables which could positively affected customer loyalty. Since there might be other variables which could affect customer loyalty, further research into other variables which might also affect loyalty in the same industry is strongly suggested, in order to know whether customer loyalty in the computer industry could be affected by these other variables. Fourth, only four laptops or computers brands were discussed and assessed in this study, which were Apple, Lenovo, Asus and Dell; all of these brands were assessed simultaneously. Therefore, considering that consumers' perceptions or behavior might be different toward each of these brands, the authors recommend that future studies could assess each of these brands individually, in order to gain a better understanding regarding the consumers' personal behavior toward each of these brands. Lastly, since there are so many different laptop or computer brands marketed and sold in China (other than the four brands which were discussed in this study), the authors recommend that future studies could also include the other brands, in order to enhance the quality and the variability of this topic.

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