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A Study on the Adoption of Autonomous Online Shopping from the Perspective of Customer Trust and Perceived Risk

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Abstract: The advancement of technology including Artificial Intelligence (AI), machine learning, robots and many more has made more consumers move towards modernization where most of technology focuses on the automation. This in line with rapid growth of technology, where most of countries invest huge amount of money to come up with an innovation. Currently, autonomous systems are getting more attention and are being implemented in every sector, especially the retail industry. Because it is a new technology, there are still few studies that explore the adoption of autonomous shopping systems in the context of online shopping. However, studies on an autonomous online shopping system still very lacking of follower's perspectives especially in context of Gen Y and Gen Z. Hence, this research aims to find a relationship between trust and perceived risk in autonomous shopping systems and online shopping intention in context among Gen Y and Gen Z. This study has collected data from 155 respondents among Gen Y and Gen Z in Johor. Data will be collected using quantitative data using a questionnaire survey. All the collected data were analyzed using the Statistical Package for Social Science (SPSS) to expand the quantitative reports presented in frequency, percentage of mean, and standard deviation. This study assists businesses understand and implement business strategy. The result shows all variables have a significant relationship with online shopping intention and trust has the highest correlation coefficient of 0.677.

Keywords: Autonomous shopping system, Online shopping intention, Trust, Perceived risk

1. Introduction

With the rapid development of the internet and social media, connection and networking activities including shopping have become more popular, especially for young generation (Anderson, 2018). New technologies, especially the internet, are strongly growing and affecting customers in their daily lives (Bauerova and Klepek, 2018). That fits with the meaning of technology, which is the application of

scientific knowledge that aims to change the human environment, and it keeps changing from time to time in order to match with current needs (Britannica, 2022). Artificial Intelligence (AI) is one of the latest innovations that is not a fiction anymore. Speech recognition, search engines learning frameworks, and object identification are just a few of the AI applications that aim to improve human life (Nadimpalli, 2017).

Many sectors are experiencing the application of AI including retail industry where they are likely to shift from offline businesses to online. This happen as everything has been digitized, also customers' behavior when purchasing products keeps changing (DomainEnroll, 2021). In order to remain competitive in the market, businesses must understand customers' needs and rapidly innovate. AI technology is one of the technologies that was created to improve every process in a business to improve their market visibility. This situation brings marketers and academics to focus on online purchase intentions to get a better understanding (Lim, 2015). With the increase in the number of online shoppers, it is proven that online shopping provides a convenient process for consumers. However, issues such as information leakage, fraud, misrepresentation of product quality and grade, and failed delivery raise consumer perceptions of risk and trust (Paluch and Wunderlich, 2016). This present study attempts to fill that gap by contributing a study that investigates the relationship between trust and perceived risk in the adoption of autonomous online shopping and their influence on shopping intention.

Malaysian retail sales reached a new record level, increasing 62.5% in the second quarter of 2022 compared with the same period in 2021, according to Retail Group Malaysia (RGM) (Kang, 2022). Furthermore, innovation in technology has brought most activities into automation, and nowadays we move from the stage of automation to the stage of autonomy, which is the technologies becoming highly autonomous (Schmitt, 2019). As autonomous online shopping is still new in the market, this could induce trust and perceived risk among the customers who want to try the technology. The factors of trust and perceived risk will determine the performance of the business. There are a few studies that have been conducted to explore trust and perceived risk in online purchase intention. Previous studies found that online trust is the main element in business because it is related to perceived risk and results show that trust affects purchase intention in online shopping (Bauman and Bachmann, 2017). Customers tend to not put their trust in something if they find something risky. As an example, customers are required to fill in some personal data when purchasing online. This puts customers in a risk state as some of the data is private. In this case, the study eventually came up with a result that showed that risk is negatively affecting customers' purchase intentions in e-commerce (Liebana-Cabanillas *et al*., 2017). This study was undertaken in order to fully understand the adoption of autonomous online shopping, the relationship between trust and perceived risk toward autonomous online shopping, and the level of trust and perceived risk towards an autonomous shopping system.

2. Literature Review

2.1 Online Shopping Intention

Online purchase intention can be classified as a factor to predict customer behavior toward an action to finalize the decision using the internet and can be refer as a component that predicts customer behavior toward completing a transaction via the internet (Mainardes *et al*., 2019). Online purchase intention is commonly influenced by multiple factors that are experienced by customers (Diallo and Siqueira, 2017). Among several factors that can influence customers' behavior in the context of online shopping This study analyses the factors of trust and perceived risk together with several theory models. By using a variety of models and theories such as the Technology Acceptance Model, the Theory of Reasoned Action (TRA), and the Theory of Planned Behavior, the consumer's intention to engage in online transactions is a significant predictor of the consumer's actual perception of e-commerce transactions.

2.2 Autonomous Shopping System

An autonomous shopping system is one of the elements of an artificial intelligence-based system. Autonomous technology has changed many aspects of our lives. The retail industry is one of the industries that stands to benefit from this technology. According to a McKinsey report, they found that the retail industry has the biggest potential to create value with autonomous technologies and AI out of nineteen major industries (Chui *et al.*, 2018). Furthermore, in the shopping process, autonomous devices provide convenience and context in the context of their time and effort perception (Berry *et al.*, 2020). Other than that, autonomous shopping systems have been adopted in households, such as smart refrigerators that can scan the barcode labels of food, inform customers about the contents of their fridge, and help them order groceries online (Midrack, 2021). Samsung's Family Hub Refrigerator is the autonomous technology that is able to make a grocery order autonomously by scanning the number of items in the fridge. However, new technology usually struggles to enter the market as it is difficult to convince customers to invest in technology that is unknown to them (Bellis and Johar, 2020). Research has shown that customers may have difficulty adopting autonomous technology for various reasons. For example, research found that perceived risk may make it hard to adopt autonomous products (Rijsdijk and Hultink, 2003). Additionally, when the autonomy of autonomous products is high, it is perceived as riskier. Besides, lack of trust will also limit the adoption of AI-based autonomous shopping systems.

(a) Trust

Trust can be defined as the foundation of all human relationships and communication and can be specifically defined as having confidence and feeling secure about certain situations (Thagard, 2021). Many disciplines have looked into trust, including social psychology, e-commerce, and e-banking, which also categorize trust in terms of expectations and willingness to trust others. Trust can be defined as a behavioral trait based on one's opinions about another's attributes that involve two parties, a trustor and a trustee. In order to increase customers' acceptance of new technology in online shopping, their trust is one of the important elements (Muslikhin *et al.*, 2021). Customers do not have any control in every process, which brings them more uncertainty (Hult *et al.*, 2019). Customers lack trust in online transactions because they do not have complete control over every process. Therefore, customer trust towards the process is related to determining their intention and even being a domain factor in their decision-making process (Hajli *et al.*, 2017). Trust is interrelated with security in the context of system security and customer safety (Hogail, 2018). Some people believe that every system should have the necessary elements to perform well in every condition (Harrison, 2017). The latest research regarding technology adoption has focused on trust as an important element of technology usage behaviors (Tam *et al.*, 2017).

(b) Perceived Risk

Trust can be interrelated with perceived risk, as a high level of trust can reduce perceived risk (Siegrist *et al.*, 2015). Perceived risk is referred to as a main challenge in the development of e-commerce (Malaquias and Huang, 2016). Perceived risk is when customers believe they will experience negative and uncertain results when buying online (Park and Tussydiah, 2017). Many studies have found that most psychological factors have a negative influence on shopping intention (Dabrynin and Zhang, 2019; Ariffin *et al.*, 2018). Some studies were conducted and show that the elements of perceived risk are much higher when shopping online than the traditional method (Bajaj and Kumar, 2019; Mortimer *et al.*, 2016). This situation might appear because of the lack of an ability for customers to physically examine products before purchase. When compared to traditional shopping, it is usual for a customer to be reluctant to make an online purchase because the perceived risk can be overwhelming. In the traditional way, customers can make decisions before purchasing a product by touching, feeling, and even trying the product. This can reduce the amount of perceived risk. In comparison to online purchases, customers must enter a lot of personal information such as their address, phone number, and

even their secret credit card information. After the process, the customer needs to wait for the transaction to be completed before being successfully delivered. That is why customers tend to perceive risk in online shopping. In the context of the adoption of autonomous systems in retail, perceived risk is still a factor, but focusing on security and privacy concerns (Wahlstrom *et al.*, 2020).

2.3 Theory Acceptance Model

Theory Acceptance Model (TAM) is used to make a prediction of consumer behavior in the decision-making of purchasing goods and services online (Koththagoda and Herata, 2018). The Technology Acceptance Model was first developed by Davis in 1989. To predict behavior and develop a theoretical basis for the effective use of technology, TAM aimed to shed light on the mechanism underlying technology acceptance. TAM was once frequently used to forecast how users would utilize and adopt technology and information systems. According to Davis, perceived usefulness is the subjective likelihood that utilizing a particular application system will improve a potential user's job or personal performance. Besides, trust and perceived risk are the other elements that can influence TAM (Hense *et al.*, 2017).

2.4 Theory of Planned Behavior

Similar to TAM, Ajzen (1991) added a new element called "Perceived Behavioral Control" to the Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975) to create Theory of Planned Behavior (TPB). Perceived behavioral control represents how simple or difficult it is to carry out a behavior depending on the resources and opportunities that are available (Ajzen, 1991). According to TPB, A consumer's behavioral intention is influenced by their attitude, subjective norms, and perceived behavioral control. TPB is well known and has been used in research to predict people's usage intentions and particular behaviors. Additionally, empirical studies have shown that this model is appropriate for examining consumer behavior in the context of online buying (Hansen *et al.*, 2004).

2.5 Relationship between Trust, Perceived Risk and Online Shopping Intention

A lot of studies focusing on the adoption of technology to the online shopping intention especially in aspects of risk and trust. Online shopping require trust. According to previous studies, trust has a significant association with online purchase intention and can even affect that intention (Verhagen, Meents, and Tan, 2006). A study from (Sharma *et al.*, 2022) shows that trust in autonomous shopping is influences customers' shopping intention. Once customers start to put their trust, it will be a magnet that brings together strengths and competencies. Moreover, a study shows perceived risk is influence the consumers' online shopping purchase (Fagih, 2013). According to Ariffin *et al.* (2018), the consumer is learning to value the good over the internet in order to view or examine the information that requires competency in the delivery of service. Therefore, if the customer knew that there were security tools in place, they would not want to buy the goods. Security risk is related to A number of account users have disclosed their credit card information and safety pins to the security system, and they concur that security risk is one of the barriers to online buying (Azizi and Javidani, 2010).

2.6 Conceptual Framework

The major elements of the conceptual framework, which consist of the independent and dependent variables. In this study, a two-dimensional independent variable and dependent variable were both present. The trust and perceived risk dimensions will be used to further discuss the independent variables.
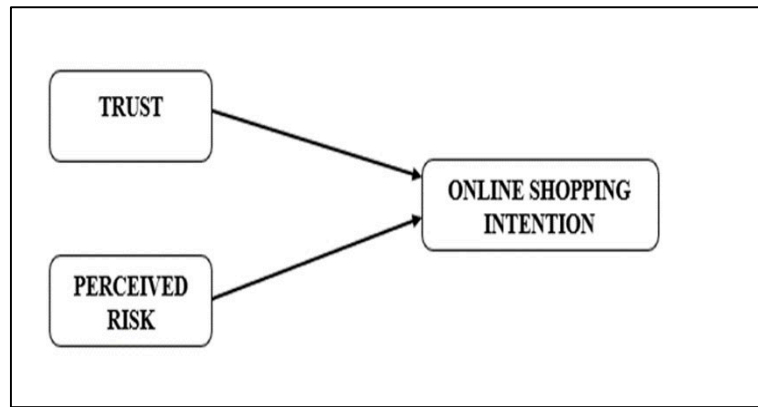
Figure 1: Conceptual Framework

(a) Trust

Trust in this context refers to the one of variables or elements that can influence online purchase intention. As the online purchase is occur in virtual, hence the trust is more important compared to traditional method. Retailers should take into account that they can boost their success by assuring customers that their personal information will be safe and by building their trust by offering services that enable more secure transactions for them when they make purchases online (Halimi,2012).

(b) Perceived Risk

Perceived risk refers to the belief of an individual regarding to chances of gain or losses resulting from making purchases on the internet (Van *et al*., 2006). Perceived risk also one of the factors that can online purchase intention. The retailers should concern that customers feel hesitate to purchase online is because of fear of uncertainty. Some of customers have negative perception towards purchasing activities through online (Haron, 2016). Due to the fact that online commerce takes place in a virtual setting, online businesses should implement privacy and security measure to protect their assets and customers from unauthorized attack (Vos, 2014).

2.7 Hypothesis

H1: Trust is positively influencing online shopping intention.

H2: Risk is positively/negatively influencing online shopping intention.

H3: There is a significant relationship between customers trust and perceived risk towards online shopping intention.

3. Research Methodology

3.1 Research Design

A quantitative method will be used as the research design in this research. For the quantitative method, a set of survey questionnaires will be provided as a tool to collect data regarding the issue of the relationship between trust and perceived risk towards autonomous shopping systems. After the process of selection, an online questionnaire will be distributed to people in Johor. By using a questionnaire, survey data can be collected and analyzed quickly from a target population.

Besides that, descriptive research has also been used in order to get information used in hypothesis development. This research aims to get as many respondents as possible among people in Johor.

3.2 Sampling Method

This study has been carried for people in Johor who are categorized as Gen Y and Gen Z that is estimated to be between 15 and 44 years old. The estimated population in this research is 1746896 people. This study has established a total of 384 respondents to respond to the questionnaire that will be delivered using Google Form, based on the sample plan of Krejcie & Morgan (1970).

3.3 Data Collection

A questionnaire survey will be used as a quantitative method in this study. It will highlight the data in a context of measurement, analysis, and mathematical numeric that are collected from a questionnaire, survey, or poll. It can gather the data through primary and secondary data.

(a) Primary Data

Primary data refers to data that is collected by researchers from first-hand sources by using qualitative and quantitative methods such as surveys and interviews. It is collected to achieve an objective as it provides relevant, accurate, unbiased information. Thus, primary data for this research was obtained using the online questionnaire research method as an instrument to gather the information needed. The questionnaire was distributed to Gen Z and Gen Y in Johor using Google Form.

(b) Secondary Data

Secondary data is the data that has been collected by a primary data source and is available for research to use. This data is important to support primary data that has been collected and help researchers identify the objective of this study. There is secondary data available from various sources such as textbooks, articles, journals, newspapers, and e-books. Secondary data for this study were obtained from previous research journals and articles on the websites Tunku Tun Aminah Library and Google Scholar.

3.4 Research Instrument

Measurement tools meant to collect data on a topic of interest from study subjects are known as research instruments. Research instruments may consist of questionnaires, surveys, interviews, checklists or simple tests. This study used quantitative approaches, which is a questionnaire survey. A questionnaire consists of 3 sections, which are section A, section B, and section C. Section A provides demographic questions followed by Section B, which provides questions related to autonomous shopping systems, and Section C, which consists of questions related to online shopping intention.

3.5 Data Analysis

All the collected data that was obtained was arranged in a systematic and easy-to-understand manner. Statistical software will be used to analyze qualitative data. All questionnaires will be sent for screening and data cleaning using SPSS. SPSS version 20 is used to collect data for this study, and it will be applied for descriptive and correlation analysis.

4. Results and Discussion

4.1 Response Rate

This study has collected data from a total sample size of 384 people among gen Y and gen Z in Johor. The questionnaire was distributed to 439 respondents. However, only 155 respondents answered all the questions. Based on that, the response rate of this study is 37%. The questionnaire response rate is recorded in Table 1 below.

Table 1: Questionnaire Response Rate

Population	Sample Size	Questionnaires Distributed	Return Questionnaire	Percentage (%)
1746896	384	419	155	37%

4.2 Reliability and Validity Analysis

Reliability and validity analysis in research are the method to measure the accuracy and consistency of results.

(a) Reliability and validity of pilot study

Based on the Table 2, Cronbach alpha for trust, perceived risk and online shopping intention are 0.911, 0.935 and 0.965 respectively. Hence, the researcher can proceed with the collection.

Table 2: Cronbach's Alpha value for 30 respondents

Factors	Cronbach's Alpha	No. Item
Trust	0.911	5
Perceived Risk	0.935	4
Online Shopping Intention	0.965	5

(b) Reliability and validity for actual study

Based on Table 4.3, the results show Cronbach's Alpha value of questionnaire is more than 0.7, which means the research instruments used are reliable.

Table 3: Reliability Test (Actual Study)

Factors	Cronbach's Alpha	No. Item
Trust	0.862	5
Perceived Risk	0.833	4
Online Shopping Intention	0.918	5

4.3 Part A: Demographic Analysis

Table 4 shows questions stated in Section A that related to demographic information of the respondents. In this study, questions related to gender, age level of education, monthly salary, shopping experience and time period involve in online shopping. The result shows all the questions and items in this study were (excellent) and proved the data collected in the actual study had (high) reliability and validity. Hence, all the questions used in this research were suitable.

Table 4: Frequency Percent Value for Respondent Demographic Information

Item	Frequency	Percent (%)
Gender		
Male	75	48.4
Female	80	51.6
Total	155	100.0
Age		
18-24 years old	68	43.9
25-34 years old	69	44.5
35-44 years old	18	11.6
Total	155	100.0
Level of Education		
Primary Education	4	2.6
Secondary Education	3	1.9
A Level/ Certificate	50	32.3
Diploma	94	60.6
Degree	3	1.9
Other	1	0.6
Total	155	100.0
Monthly Salary		
Less than RM1500	46	29.7
RM1501-RM3000	86	55.5
RM3001-RM5000	20	12.9
More than RM5000	3	1.9
Total	155	100.0
Online Shopping Experience		
Yes	154	99.4
No	1	0.6
Total	155	100.0

Table 4 shows that the number of respondents that have been categorized by gender. In this study, 75 respondents which equal to 48% are male and 80 respondents are female which equal to 51.6%. In this study, a total of 155 respondents are classified into three range of age category which consists of age 18-24 years old, 25-34 years old and 35-44 years old. The majority 44.5% of respondent fall at the age between 25-34 years old with 69 number of respondents, followed by the categorized in 18-24 years old and between 35-44 years old group with 68 and 18 number of respondents respectively. Those with a degree have the most respondents which is 94, followed by those with a diploma and those with

secondary education, who have 50 and 4 respondents, respectively. Around three respondents had an A-level or certificate as well as a master's degree. Lastly, only 1 respondent graduated from STPM. Majority of respondents have monthly salary between RM1501-RM3000 which is 55.5%, followed by respondents who had salary less than RM1500 which bring 46%. Besides that, 20 of respondents earn monthly salary between RM3001-RM5000. Lastly, 1.9% of respondents a monthly salary more than RM5000. Almost all respondents have the experience of using online shopping platform for shopping. Only 1 respondent never had the experience of online shopping.

4.4 Part B: Analysis on the variables

Descriptive analysis is used to investigate the characteristics by examined the data to describe the mean and standard deviation related to all variables which are trust, perceived risk and online shopping intention. Other than that, this analysis is helpful to differentiate each part in the mean distribution based on Likert-scale to measure the level of all independent and dependent variables by using SPSS software.

(a) Trust

Table 5: Mean and Standard Deviation for Trust

No	Item	Mean	Standard Deviation (SD)	Level
1.	I rely on online shopping system that uses autonomous technology.	4.06	0.888	High
2.	I am confidence in an online shopping system that uses autonomous technology.	4.20	0.833	High
3.	I am confidence that the technology behind autonomous online shopping will be reliable.	4.23	0.754	High
4.	I depend on autonomous shopping system that offer time and cost savings.	4.22	0.775	High
5.	I assure that the technology behind autonomous online shopping us trustworthy.	4.17	0.763	High
	Total Average	4.18	0.803	High

Table 5 shows the level of mean and standard deviation for trust. The total average of mean for trust is 4.18 and a total average of standard deviation is 0.803. Besides that, the highest value of mean is 4.23 with the statement of "*I am confidence that the technology behind autonomous online shopping will be reliable*". Followed by the item "*I depend on autonomous shopping system that offer time and cost savings*" and "*I am confidence in an online shopping system that uses autonomous technology*" with the level of mean are 4.22 and 4.20 respectively. Next, the value of mean is 4.17 with the statement of "*I assure that the technology behind autonomous online shopping us trustworthy*". While the lowest value of mean for trust is 4.06 with statement of "*I rely on online shopping system that uses autonomous technology*". In overall, the trust had a high level of mean.

(b) Perceived Risk

Table 6: Mean and Standard Deviation for Perceived Risk

No	Item	Mean	Standard Deviation (SD)	Level
1.	Shopping through an autonomous online system may be risky for my personal data.	4.24	0.712	High
2.	Shopping through an autonomous online system carries a higher risk of security and privacy.	4.25	0.744	High
3.	Shopping through an autonomous online system can be insecure.	4.23	0.844	High
4.	Shopping through an autonomous online system may disclose my personal data.	4.26	0.846	High
	Total Average	4.25	0.787	High

Table 6 shows that the level of mean and standard deviation for perceived risk. Based on the table above, it is clearly seen that the highest level of mean is 4.26 which indicates that the respondents agreed with the statement of "*Shopping through an autonomous online system may disclose my personal data*.". While the lowest value of mean for perceived risk is 4.23 where "*Shopping through an autonomous online system can be insecure*". In this study, the total average of perceived risk is high level with mean of 4.25 and standard deviation of 0.787 which reflects a high level.

(c) Online Shopping Intention

Table 7: Mean and Standard Deviation for Online Shopping Intention

No	Item	Mean	Standard Deviation (SD)	Level
1.	I intend to de online shopping through an autonomous shopping system.	4.07	0.884	High
2.	I prefer to use an autonomous shopping system whenever I shop online.	4.07	0.920	High
3.	I intend to purchase goods through an autonomous online shopping system.	4.05	0.870	High
4.	I prefer to buy goods via an autonomous online shopping system.	4.13	0.858	High
5.	I intend to use autonomous shopping systems in the future.	4.20	0.863	High
	Total Average	4.10	0.879	High

Table 7 shows the value of mean, standard deviation and the level for each question for online shopping intention. Result shows "*I intend to use autonomous shopping systems in the future*" with the mean and standard deviation are 4.20 and 0.863 has the highest mean value. While question "*I intend*

to purchase goods through an autonomous online shopping system" with the mean and standard deviation are 4.05 and 0.870 provides the lowest mean value. In this study, the level of online shopping intention variables is high.

5. Discussion and Conclusion

5.1 Research Question 1

Table 8: Level of customer trust towards an autonomous shopping system

Item	Average Mean Score	Level
Trust	4.18	High

In this study, descriptive analysis has been used to describe the average mean score of the trust. Table 8 shows the level of the average mean score for the variable that has been measured. The total average score for trust is 4.18 which indicates a high level. The result proved that the respondents agreed that trust is the important element in the intention of an autonomous online shopping. Thus, people in gen Y and gen Z in Johor believed that people would have intention to purchase online using autonomous system when they trust the system. Previous study stated that customer trust towards the process is related to determining their intention and even being a domain factor in their decision-making process (Hajli *et al*., 2017).

5.2 Research Question 2

Table 9: Level of customer perceived risk towards on autonomous shopping system

No	Item	Mean	Standard Deviation (SD)	Level
1.	I intend to de online shopping through an autonomous shopping system.	4.07	0.884	High
2.	I prefer to use an autonomous shopping system whenever I shop online.	4.07	0.920	High
3.	I intend to purchase goods through an autonomous online shopping system.	4.05	0.870	High
4.	I prefer to buy goods via an autonomous online shopping system.	4.13	0.858	High
5.	I intend to use autonomous shopping systems in the future.	4.20	0.863	High
	Total Average	4.10	0.879	High

Table 9 illustrates the result of mean and standard deviation for the level of perceived risk of customer towards autonomous online shopping. The result shows item 5 which is *"I intend to use autonomous shopping system in the future."* has the highest value of mean. The total average score for perceived risk is 4.10 which indicates a high level. The result show that perceived risk is the factor that influence online shopping intention. In general, the respondents in this research are very serious and

assume that shopping online is quite risky. This is in line with the study from Haron (2016) that some of customers have negative perception towards purchasing activities through online.

5.3 Research Question 3

**Table 10: Hypothesis of the relationship between independent variables
and dependent variable**

Item	Correlation Coefficient	Level
H1: Trust is positively influencing online shopping intention	0.677	Moderate
H2: Perceived risk is positively/negatively influencing online shopping intention	0.412	Weak

Table 10 shows the result of correlation coefficient for the relationship between trust and perceived risk towards an autonomous shopping system. The result shows that both variables have a significant positive relationship with online shopping intention. Overall, both hypotheses have been accepted, which is trust with a moderate level of correlation coefficient and perceived risk is positively influence online shopping intention. This is in line with a previous study that trust is a very positive and significant influence on consumer purchasing decisions (Hsu *et al*., 2013). In accordance with the results of the same research in terms of trust will affect the attitudes and decisions of customers towards online shopping. Moreover, the inverse relationship between perceived risk and online shopping intention was proofed from a previous study by Singh and Srivastava (2018).

5.4 Limitation of Study

There are several limitations we faced during conducting this research. Firstly, is about the selection of respondents in this research, which only focuses on gen Y and gen Z in Johor and does not represent the whole of gen Y and gen Z in Malaysia. Secondly, the limited time available for collecting the data for research. Although the questionnaire had been conducted in an easy and low-cost way, some respondents refused to answer which affected the response rate. Besides that, the limitation of this study is the accuracy of the results. The survey was asked the respondents based on their perceptions and experiences on the statement derived in the questionnaire. Hence, the respondents might intentionally rate differently from the reality. It might cause a certain amount of bias in the data collected.

5.5 Recommendation for the Future Research

In this research, there are several recommendations that can be made to further improve the findings. Firstly, future researchers may improve the selection of respondents for this research, which will open it to more Gen Y and Gen Z in Malaysia. Secondly, the time for data collection in this study can be expanded to improve the response rate. This is because the researcher can encourage more respondents to get involved. Last but not least, the future studies are recommended to use mix of the method which are qualitative and quantitative method. This is because, in this study, the quantitative method only involves numerical data from the questionnaire. But in qualitative method, it can deal with words which more subjective. In short, the mix of methods may add more details and valuable information to the research. As a conclusion, this study determined the relationship between two variables. Besides that, this study has been carried out to achieve the objectives of the study, which were for researchers to determine the relationship between trust, perceived risk towards an autonomous shopping system.

Overall, all of 3 hypotheses have been supported. Technically, both trust and perceived risk have significant relationship towards an autonomous online shopping.

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References

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*(2), 179–211. https://doi.org/10.1016/0749-5978(91)90020-t

AlHogail, A. (2018). Improving IoT Technology Adoption through Improving Consumer Trust. *Technologies*, *6*(3), 64. https://doi.org/10.3390/technologies6030064

The Benefits of Communication. (2018, March 5). *The Benefits of Communication –*. Medium. https://medium.com/the-benefits-of-communication

Kamalul Ariffin, S., Mohan, T., & Goh, Y. N. (2018). Influence of consumers' perceived risk on consumers' online purchase intention. *Journal of Research in Interactive Marketing*, *12*(3), 309–327. https://doi.org/10.1108/jrim-11-2017-0100

Bajaj, R., Kumar, P (2019) Exploring the Influence of Consumers of Demographic

Factors On Perceived Performance Risk Among Youth Towards Online Shopping in Punjab. *Int. J. Bus. Glob,* 23(1), 47 https://doi.org/10.1504/IJBG.2019.100786

Bauerová, R., & Klepek, M. (2018). Technology Acceptance as a Determinant of Online Grocery Shopping Adoption. *Acta Universitatis Agriculturae Et Silviculturae Mendelianae Brunensis*, *66*(3), 737–746. https://doi.org/10.11118/actaun201866030737

Bauman, A., & Bachmann, R. (2017). Online Consumer Trust: Trends in Research. *Journal of Technology Management &Amp; Innovation*, *12*(2), 68–79. https://doi.org/10.4067/s0718-27242017000200008

Berry, L. L., Seiders, K., & Grewal, D. (2002). Understanding Service Convenience. *Journal of Marketing*, *66*(3), 1–17. https://doi.org/10.1509/jmkg.66.3.1.18505

Brahambhatt, R. (2021, June 16). *Origin of the Internet: Who Invented the World Wide Web?* https://interestingengineering.com/culture/origin-of-the-internet-who-invented-the-world-wide-web

Britannica The Editors of Encyclopedia. (1998, July 20). *Technology | Definition, Examples, Types, & Facts*. Encyclopedia Britannica. https://www.britannica.com/technology/technology

Chui, M., James, M., Mehdi, M., Nicolaus, H., Rita, C. and Sankalp, M (2018) *Notes from the AI frontier: Applications and value of deep learning*. (n.d.). McKinsey & Company. https://www.mckinsey.com/featured-insights/artificial-intelligence/notes-from-the-ai-frontier-applications-and-value-of-deep-learning

Dabrynin, H and Zhang, J. (2019). The Investigation of the Online Customer Experience and Perceived Risk on Purchase Intention in China. (2019). *Journal of Marketing Development and Competitiveness*, *13*(2). https://doi.org/10.33423/jmdc.v13i2.2005

Daroch, B., Nagrath, G., & Gupta, A. (2021). A study on factors limiting online shopping behavior of consumers. *Rajagiri Management Journal*, *15*(1), 39–52. https://doi.org/10.1108/ramj-07-2020-0038

Diallo, M. F., & Siqueira Jr, J. R. (2017). How previous positive experiences with store brands affect purchase intention in emerging countries. *International Marketing Review*, *34*(4), 536–558. https://doi.org/10.1108/imr-07-2014-0224

de Bellis, E., & Venkataramani Johar, G. (2020). Autonomous Shopping Systems: Identifying and Overcoming Barriers to Consumer Adoption. *Journal of Retailing*, *96*(1), 74–87. https://doi.org/10.1016/j.jretai.2019.12.004

DomainEnroll (2021, November 3). *Business Offline to Online : Digital Transformation*. DomainEnroll. https://domainenroll.com/dlin-e-commerce-app/business-offline-to-online-digital-transformation/

Fagih, K (2013) Exploring the Influence of Perceived Risk and Internet Self-efficacy

On Consumer Online Shopping Intentions: Perspective of Technology Acceptance Model, *International Management Review,* 9(1), https://www.researchgate.net/publication/277664434_Exploring_the_Influence_of_Perceived_Risk_and_Internet_Selfefficacy_on_Consumer_Online_Shopping_Intentions_Perspective_of_Technology_Acceptance_Model

Falcão, J., Ruiz, C., Pan, S., Noh, H. Y., & Zhang, P. (2020). FAIM: Vision and Weight Sensing Fusion Framework for Autonomous Inventory Monitoring in Convenience Stores. *Frontiers in Built Environment*, *6*. https://doi.org/10.3389/fbuil.2020.568372

Grewal, D., & Roggeveen, A. L. (2020). Understanding Retail Experiences and Customer Journey Management. *Journal of Retailing*, *96*(1), 3–8. https://doi.org/10.1016/j.jretai.2020.02.002

Hajli, N., Sims, J., Zadeh, A. H., & Richard, M. O. (2017). A social commerce investigation of the role of trust in a social networking site on purchase intentions. *Journal of Business Research*, *71*, 133–141. https://doi.org/10.1016/j.jbusres.2016.10.004

Halimi, A. B. (2012, February 22). *Factors Affecting Consumersâ Attitude Towards Online Purchasing Among Degree Holders in Singapore*. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2009242

Hansen, T., Møller Jensen, J., & Stubbe Solgaard, H. (2004). Predicting online grocery buying intention: a comparison of the theory of reasoned action and the theory of planned behavior. *International Journal of Information Management*, *24*(6), 539–550. https://doi.org/10.1016/j.ijinfomgt.2004.08.004

Hansen, J. M., Saridakis, G., & Benson, V. (2018). Risk, trust, and the interaction of perceived ease of use and behavioral control in predicting consumers' use of social media for transactions. *Computers in Human Behavior*, *80*, 197–206. https://doi.org/10.1016/j.chb.2017.11.010

Harrison, H., Birks, M., Franklin, R., and Mills, J (2017). Case Study Research:

Foundations And Methodological Orientations. *Forum Qualitative Sozialforchung/ Forum: Qualitative Social Research ,*18(1). https://doi.org/10.17169/fqs-18.1.2655

Hansen, J. M., Saridakis, G., & Benson, V. (2018b). Risk, trust, and the interaction of perceived ease of use and behavioral control in predicting consumers' use of social media for transactions. *Computers in Human Behavior*, *80*, 197–206. https://doi.org/10.1016/j.chb.2017.11.010

Hsu, C., Chuan-Chuan Lin, J., & Chiang, H. (2013). The effects of blogger recommendations on customers' online shopping intentions. *Internet Research*, *23*(1), 69–88. https://doi.org/10.1108/10662241311295782

Hult, G. T. M., Sharma, P. N., Morgeson, F. V., & Zhang, Y. (2019). Antecedents and Consequences of Customer Satisfaction: Do They Differ Across Online and Offline Purchases? *Journal of Retailing*, *95*(1), 10–23. https://doi.org/10.1016/j.jretai.2018.10.003

J Haron, A. (2016). E-Commerce Innovations Customer Perceptions in Qatar. *International Journal of Economics &Amp; Management Sciences*, *05*(01). https://doi.org/10.4172/2162-6359.1000310

Kang, S.L. *Malaysia's retail sales at record level, up 63% in 2Q*. (2022, September 19). The Edge Markets. https://www.theedgemarkets.com/article/malaysias-retail-sales-record-level-63-2q

Koththagoda, K. C. (2018). *Factors Influencing Online Purchasing Intention: The Mediation Role of Consumer Attitude | Koththagoda | Journal of Marketing and Consumer Research*. https://www.iiste.org/Journals/index.php/JMCR/article/view/40727/41883

Lai, A (2022). Retail Sector Eyes Strong Recovery | *The Star*. (2022, April 9). https://www.thestar.com.my/news/nation/2022/04/09/retail-sector-eyes-strongrecovery

Lim, W. M. (2015). Antecedents and consequences of e-shopping: an integrated model. *Internet Research*, *25*(2), 184–217. https://doi.org/10.1108/intr-11-2013-0247

Liébana-Cabanillas, F., Marinković, V., & Kalinić, Z. (2017). A SEM-neural network approach for predicting antecedents of m-commerce acceptance. *International Journal of Information Management*, *37*(2), 14–24. https://doi.org/10.1016/j.ijinfomgt.2016.10.008

Mainardes, E. W., Araujo, D. V. B. D., Lasso, S., & Andrade, D. M. (2017). Influences on the intention to buy organic food in an emerging market. *Marketing Intelligence &Amp; Planning*, *35*(7), 858–876. https://doi.org/10.1108/mip-04-2017-0067

Malaquias, R. F., & Hwang, Y. (2016). An empirical study on trust in mobile banking: A developing country perspective. *Computers in Human Behavior*, *54*, 453–461. https://doi.org/10.1016/j.chb.2015.08.039

McCole, P., & Palmer, A. (2001, June). A critical evaluation of the role of trust in

Direct marketing over the internet. In *World Marketing Congress,* University of Cardiff, Wales.

Midrack, R. L. *What Is so Smart About a Smart Fridge?* (2021, July 25). Lifewire. https://www.lifewire.com/smart-refrigerator-4158327

Mortimer, G., Fazal e Hasan, S., Andrews, L., & Martin, J. (2016). Online grocery shopping: the impact of shopping frequency on perceived risk. *The International Review of Retail, Distribution and Consumer Research*, *26*(2), 202–223. https://doi.org/10.1080/09593969.2015.1130737

Muslikhin, M., Horng, J. R., Yang, S. Y., Wang, M. S., & Awaluddin, B. A. (2021). An Artificial Intelligence of Things-Based Picking Algorithm for Online Shop in the Society 5.0's Context. *Sensors*, *21*(8), 2813. https://doi.org/10.3390/s21082813

Nadimpalli, M. (2017). Artificial Intelligence – Consumers and Industry Impact. *International Journal of Economics &Amp; Management Sciences*, *06*(03). https://doi.org/10.4172/2162-6359.1000429

Paluch, S., & Wünderlich, N. V. (2016). Contrasting risk perceptions of technology-based service innovations in inter-organizational settings. *Journal of Business Research*, *69*(7), 2424–2431. https://doi.org/10.1016/j.jbusres.2016.01.012

Park, S., & Tussyadiah, I. P. (2016). Multidimensional Facets of Perceived Risk in Mobile Travel Booking. *Journal of Travel Research*, *56*(7), 854–867. https://doi.org/10.1177/0047287516675062

Righini, E. (2023, January 26). *Retail industry definition: distinctions between brick and digital*. Doxee. https://www.doxee.com/blog/customer-experience/retail-industry-definition-distinctions-between-brick-and-digital/

Rijsdijk, S. A., & Hultink, E. J. (2003). "Honey, Have You Seen Our Hamster?" Consumer Evaluations of Autonomous Domestic Products. *Journal of Product Innovation Management*, *20*(3), 204–216. https://doi.org/10.1111/1540-5885.2003003

Schmitt, B. (2019). From Atoms to Bits and Back: A Research Curation on Digital Technology and Agenda for Future Research. *Journal of Consumer Research*, *46*(4), 825–832. https://doi.org/10.1093/jcr/ucz038

Sharma, S., Islam, N., Singh, G., & Dhir, A. (2022). Why Do Retail Customers Adopt Artificial Intelligence (AI) Based Autonomous Decision-Making Systems? *IEEE Transactions on Engineering Management*, 1–17. https://doi.org/10.1109/tem.2022.3157976

Siegrist, M., Gutscher, H., & Earle, T. C. (2005). Perception of risk: the influence of general trust, and general confidence. *Journal of Risk Research*, *8*(2), 145–156. https://doi.org/10.1080/1366987032000105315

Singh, S., & Srivastava, S. (2018). Moderating effect of product type on online shopping behavior and purchase intention: An Indian perspective. *Cogent Arts &Amp; Humanities*, *5*(1), 1495043. https://doi.org/10.1080/23311983.2018.1495043

Thagard, P (2021). What is Trust? Retrieve from https://www.psychologytoday.com/us/blog/hot-thought/201810/what-is-trust

Tamilmani, K., Rana, N. P., & Dwivedi, Y. K. (2017). *A Systematic Review of Citations of UTAUT2 Article and Its Usage Trends*. SpringerLink. https://link.springer.com/chapter/10.1007/978-3-319-68557-1_5?error=cookies_not_supported&code=28fa4089-1381-4f99-95e2-d16f6fe40c9b

Van Slyke, C*.,* Shim, J., Johnson, R. and Jiang, J. (2006) Concern for Information

Privacy and Online Consumer Purchasing, Journal of the Association for Information Systems, 7(6), 297-316. https://www.researchgate.net/publication/316924093_The_effects_of_privacy_concerns_perceived_risk_and_trust_on_online_purchasing_behaviour

Vos, A., Marinagi, C., Trivellas, P., Eberhagen, N., Skourlas, C., & Giannakopoulos, G. (2014). Risk Reduction Strategies in Online Shopping: E-trust Perspective. *Procedia - Social and Behavioral Sciences*, *147*, 418–423. https://doi.org/10.1016/j.sbspro.2014.07.122

Wahlstrom, K., Ul-haq, A., & Burmeister, O. (2020). Privacy by design. *Australasian Journal of Information Systems*, *24*. https://doi.org/10.3127/ajis.v24i0.2801