Market-e: An E-Commerce Platform for Local Markets

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Abstract

E-commerce is a technological application that has proven very useful, especially during the Covid-19 pandemic. The presence of e-commerce websites, online shopping, and presence of other virtual services has increased during lockdown and quarantine periods when people tend to spend most of their time in their houses. The recommender system made an e-commerce website sustainable to the needs of its customers. The direct transaction of local producers makes a convenient price lookout for those who are living in the city. This study developed an e-commerce website that caters to the need of urban consumers to cut costs through direct shopping of goods to local producers. This study aims to see what features of the developed system can be identified as a factor to be called useable. In this context, usability is defined as a measurement to perceive how easy, or effective can one do a task. To determine the usability of the system, multiple standard questionnaires such as Nielsen Heuristics Evaluation and Questionnaire for User Interface Satisfaction were deployed. Random sampling was done in three (3) groups of end-users, specifically, the consumers, the store vendors, and the store owners. The results showed that some factors need improvement, but the system's overall design reflected how satisfactory it is to the target users. Finally, it may be concluded that the system has successfully reflected the user interface design from the prototype to the final system, which satisfied one of the six styles of usability requirements, the design style.

Keywords
e-commerce, local market, mobile application, online shopping

1. Introduction
The evolution of technology, specifically the internet, has given the world a new perspective. It gave life to e-commerce. From diverse platforms where people can shop, or establish their businesses, it is taking everyone by storm (Alyoubi et al. 2020). Online shopping and its convenience have been an integral part of almost everyone (Trang et al. 2020). With devices such as laptops, cellphones and tablets are getting cheaper and cheaper (Kumar and Mittal 2020), and the Filipinos love for being active users of social media (Reyes et al. 2018), it is no surprise that they are easily exposed to online shopping (Nartea et al. 2019).

The Philippines is a developing country and its technological infrastructure in the country is changing (Rudnick and Velasquez 2019), giving lots of opportunities for the Filipinos to work in the wonderful world of technology (Tudy 2021). That emerging trend of online services has become a demand, especially during COVID-19 pandemic (Pastor 2020). The pandemic changed the way we live in and we learned to survive during the lockdown period. E-commerce websites were started to be noticed and used by those who never utilized it before. Since then, there is an increasing demand for anyone who wants to find a way on how to maximize the use of Internet, e-commerce facilities most especially.

The convenience of doing a seamless transaction online has been proven long time ago (Diana and Leon 2020). Some customers do not pick online shopping as a viable option because of the expensive items and service fees included, meaning, budget is an issue (Nguyen et al. 2019). Multi-path retailing is now the standard way of expanding products across countries. Online retailing is considered one of the fastest ways for distribution channel growth (Park and

Armstrong 2019). The reason being is that more people are having access to mobile phones and the Internet. Developing countries may try to implement e-commerce effectively and efficiently to improve the output and make their way to a competitive advantage (Xuhua et al. 2019).

A recommender feature within an e-commerce website has been a strategic approach to engage consumers in buying online (Xiao et al. 2019). This is a trend commonly used by many big players in the e-commerce world (chen et al. 2020).

This study is about developing a system that will cater local food producers in a business to business (B2B) and business to consumer (B2C) platform. Developing a web-based application where consumers and vendors alike can connect to each other and minimize the use of middlemen for direct availability of local products in a marketplace of direct communication between food producers to consumers or buyers. The developed system caters the transaction between city buyers or consumers to local farmers with the present components e-commerce with a recommender system.

1.1 Objective of the Study

The main goal of the study is to develop an e-commerce application for meat and seafood products, and fresh produce that includes a recommender feature. Specifically, to developed a recommender system in an e-commerce website for local producers and farmers and directly caters the need of the consumers in the urban city. The design of the database includes various categories of meat, processed food (e.g., hotdog, atchara, etc.), seafood, and fresh produce from participating vendors or store owners. This study identifies which feature of an e-commerce platform for direct local producers and consumer transaction is mostly usable. The developed system provides administrator interface with market management and vendor management on the e-commerce application.

1.2 Scope and Delimitation

The study developed a web-based application through HTML, CSS, and JavaScript. The system includes those wet markets located on each small units of a community comprises of local producers. The design of the database caters any local products from participating vendors of wet markets who are willing to deliver their products to customers living in the city. An inventory is an integral part of an e-commerce database design (Luan and Zhang 2020). The wet market products include meat, seafood, and fresh produce also include processed products that are know to every household in the Philippines. A transaction history plays an important role in local consumers as a market loyalty of the Filipinos (Balinado et al. 2021).

The developed system's conceptual framework, as shown in Figure 1, includes inventory system on the vendor's side and administrative management. There will be a transaction history to record the transactions that have been completed. Then, the vendors and their shops can be managed by an administrator. Wherein, the administrator can view the existing list of all the markets and the vendors and can add and delete as well from the current list.

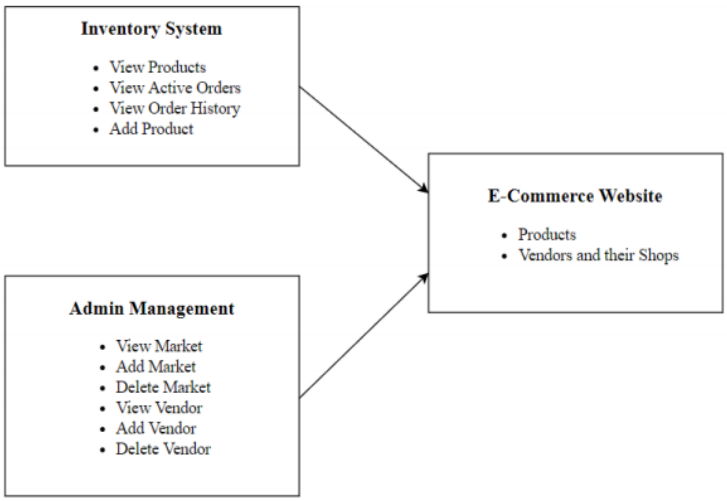

Figure 1. Conceptual Framework of the Developed E-commerce Application

1.3 Significance of the Study

The outcome of the study will contribute to the Filipino community, especially those people who are working relentlessly and those who feel weak and ill. The project will be helpful in times of calamity like the SAR-CoV-2 (COVID-19) by reducing contact among the people. The long-term impacts of the pandemic remain unclear and the way on how we percept public spaces will never be the same. This study hopes to strengthen the design of e-commerce website and caters to promote the business of local market players and the need of city buyers without comprising both services and price.

2. Literature Review

Online shopping is an emerging trend today (Pantano and Gandini 2018). The convenience it offers can be advantageous to many, especially to those whose time limits them from going to physical stores— such as their local markets. It is believed that online stores could be of great assistance to them if everything they need can already be found on online platforms.

Since 2015, the Indian e-commerce sector experiences expeditious advancement. The increase in people having access to the Internet and online implementation of transactions are two main reasons for the rise of online shopping. The permissibility of online transactions and beneficial target audiences has reconstructed the method of how companies interact and communicate with the customers. The study concludes that the online grocery industry is still growing because of the increase of people having internet access and will buy groceries online due to the convenience of saving time and effort knowing that they can do grocery shopping with no time restrictions. The study states that when buying groceries, E-grocery, and the physical market are unalike. Most respondents from the survey retrieve the information about the brands because of the internet (Kavitha 2017).

E-commerce/electronic commerce means performing transactions of goods and services with the use of digital media and the Internet (Hendrawan et al. 2018). E-commerce allows people to retail business with the assistance of the Internet. It relates to a vendor using a website online to commercial products or services directly with the customer from a portal. A web portal is a website that carries information from various sources (Tran et al. 2020). The portal that is involved with e- 21 commerce uses a digital shopping cart or a digital basket system and allows payment through debit card, credit card, or Electronic Fund Transfer (ETF). Because of the implementation of technologies in transactions of goods or services, multiple companies in various industries, like education, banking, and commerce, etc. enhanced their services (Lee-Geiller and Lee 2019).

According to a study Internet users declare that they use the Internet before making a purchase decision examining online shopping behavior. The online shopping experience is made of physical, ideological, and pragmatic dimensions. This study concerning the role of trust in online shopping found out that security and privacy are more important than overall design and ease of navigation of the website. They also found out that Internet users give false personal details in fulfilling forms for these reasons: because they want to avoid advertising, because they do not want to give their personal information, and just because they want to maintain anonymity (Kozyreva et al. 2020).

Cashless transactions have been increasing exponentially in the Philippines because of the growing popularity of online shopping among young urban Filipinos. It is one of the steps took by the Philippine government to level with the evolving technology of the country. They (the Philippine government) have been also working hand in hand with the private sector to address the structural deficiencies of the country's economy, such as its poor financial inclusions and its heavy reliance on remittances (Gupta and Xia 2018).

Recommender systems allow fast and automated customization of e-commerce sites (Wakil et al. 2019). The sites to generate more sales by modifying to the demands of the consumers. Selling extra products by also bundling related products together tends to increase customer loyalty because of showing customers those sites take effort to understand their needs (Fernandez-Lanvin et al. 2018). Recommendations can be personalized, or community-driven that would allow for a wide range of possibilities. Recommendations can also be refreshed by changing search history, the arrival of new products, or even ratings (Zhou et al. 2018). Developing and implementing a marketing strategy is highly important to the practice of marketing (Morgan et al. 2019).

3. Methodology

This study was made possible with the help of local producers and partnership with different vendors in the wet markets. The functional and non-functional requirements formulated to come up with the design of the system. A responsive layout of the website has been considered to adopt to the user system navigation needs. Moreover, the design's choice of colors is related to the niche of the platform but also designed in a way that the font and the background have good contrasts to make the texts visible. Also, to avoid dizziness, especially for those people who have problems with eyesight (Benyon 2019). The sample screenshots of the developed system is shown in Figure 2 and Figure 3. The home page is in Figure 2 while Figure 3 shows the nearby wet markets page where users can choose where to buy products from.

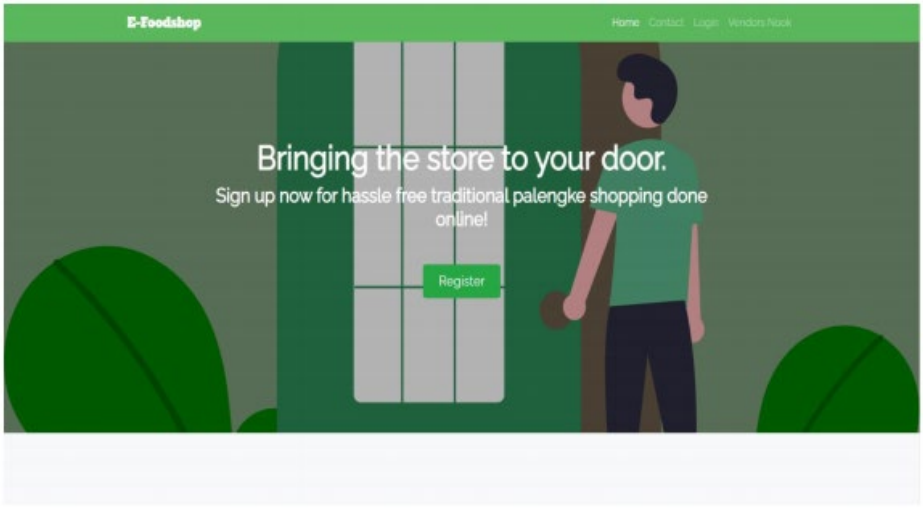

Figure 2. Home Page of Market-e

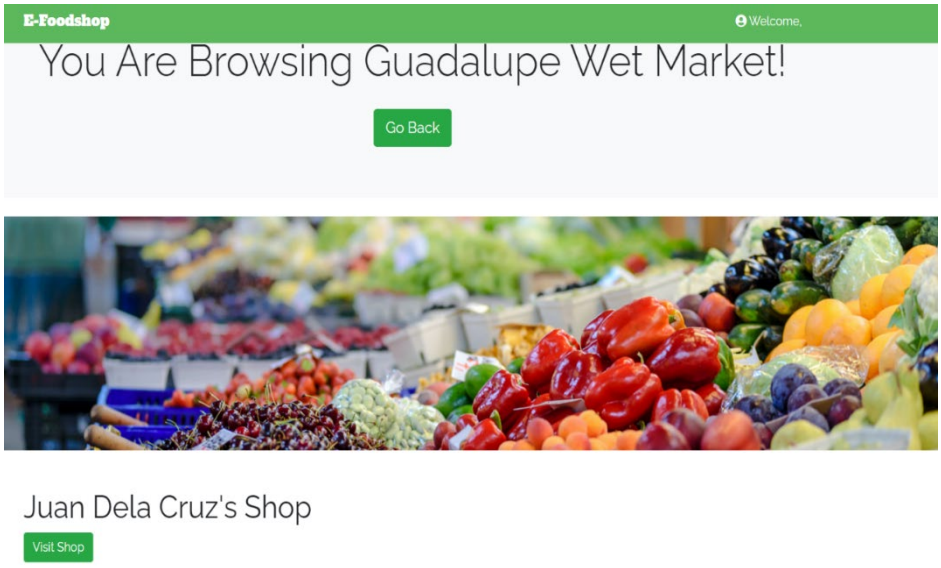

Figure3. Screenshot of Wet Markets

The system has some minor sections, the suggested products, and discounted products. Suggested products are under the highlight of the HOT ITEM! An area for discounted products is available to help the users recognize the discounted products. It is the decision of vendors whether to place discounts on their products. Another feature is the inventory system. This feature is essential for the vendors to monitor their products which include the remaining stocks and prices. Products sold can be tracked by viewing the order history. Adding products can be done by filling in the

necessary details like the product name, category, quantity, and price per measure. An image is needed as well to help the customers visualize the product. Administrator account is composed of two management, which is market management and vendor management. Both have the same functions, like viewing, adding, and deleting, but both have separated buttons easily distinguished by the administrator. Viewing the market will result in seeing the name of the market and the description of it. To see the list of vendors along with their other details, click the view vendor. To add market and vendor, filling in information is needed to include them on the list. To delete markets and vendors, click the delete button on the right side of the screen. The application has two delivery options, the cash-on-delivery and order pick-up, as the delivery depends on the storeowners or the vendors. Meaning, those who desire to expand their selling area can voluntarily participate as long as they are willing to deliver.

Testing of the developed system was done to make sure that all program errors has been addressed and corrected in initial testing of the expected output. The functionality testing and usability testing has been done, along with cross-browser compatibility of the developed application.

Using the Questionnaire for User Interface System (QUIS) and Nielsen Heuristic Evaluation, 30 respondents such as customers, vendors, and store owners will answer the survey. A demonstrated of the system and training has been conducted for the respondents to answer the survey. The users of the system tested all the functional and the non-functional requirements listed in the analysis.

4. Results and Discussion

The results of the Questionnaire for User Interface System (QUIS) for the screen design of the developed system have been shown in Table 1. According to the respondents, this part was quite subjective as they saw the sequence as common. The font size is readable as it garnered an average of 8.5 over 10. The highlights are helpful as the respondents were able to notice all the important text. For the comparison of two major features of the system, the inventory interface got a score of 9.93 outlasting the administrator interface by a small percentage. Few of the respondents pointed out that the admin cannot view the products that are being sold by the vendor. They believed that it is needed for security purposes, for example, one of the vendors intentionally post an illegal substance as their product to be sold. So, it is needed to be taken out fast, as well as the vendor to create a safe environment for the users. Table 1 shows that users were satisfied with the screen layouts of the web application.

Table 1. QUIS Survey Result – Screen

Description		**Average**
Reading Characters on Screen		**8.5**
Hard	Easy	
Highlighting Simplifies Task		**8**
Not at all	Very Much	
Organization of Information		**7.7**
Confusing	Very Clear	
Sequence of Screens		**7.93**
Confusing	Very Clear	
Inventory Interface		**9.93**
Unhelpful	Helpful	
Administrator Interface		**9.83**
Unhelpful	Helpful	
	Total Average:	**8.65**

The result for the Terminology and System Information the system is shown in Table 2. Results shows that the first three questions as it averages above 75%. Other respondents mentioned that there are a few indications about progress,

like adding products to the cart and the delivery progress. For the error messages, there are error prompts that help the users to know their fault. The system highlights the textbox in some of the pages to help the users notice where the mistake is. So, for this case, the respondents noticed those, and all of them are grammatically correct, and there are no harsh words. Table 2 shows that users were satisfied with most of the terminology and system information features, although the application was a bit behind on the computer informing users about its progress.

Table 2. QUIS Survey Result - Terminology and System Information

Description		**Average**
Use of Terms Throughout the System		**8.40**
Inconsistent	Consistent	
Terminology Related to the Task		**8.20**
Never	Always	
Position of Messages on Screen		**7.60**
Inconsistent	Consistent	
Prompts for Input		**7.50**
Inconsistent	Consistent	
The Computer Informs about its Progress		**6.53**
Never	Always	
Error Messages		**7.06**
Inconsistent	Consistent	
	Total Average:	**7.548**

The result for the Learnability of the system is shown in Table 3. The questionnaires are subjective as there are few respondents whose age is 40 and above. Many millennials notice that there are no help messages or the usual '?' symbol that can be found on the system. There were no tutorials for beginners for those who are not tech-savvy. Table 3 shows that users suggesting that help messages where unhelpful which hinders the learning process of the application.

Table 3. QUIS Survey Result – Learnability

Description		**Average**
Learning to Operate the System		**6.16**
Difficult	Easy	
Exploring New Features by Trial and Error		**7.46**
Difficult	Easy	
Remembering Names and User of Commands		**7.77**
Difficult	Easy	
Performing tasks is Straightforward		**8.43**
Never	Always	
Help Messages on the Screen		**5.63**
Unhelpful	Helpful	
Supplemental Reference Materials		**6.63**
Confusing	Clear	
	Total Average:	**7.013**

The result for the System Capabilities of the system is shown in Table 4. According to the respondents, the system capabilities are good as they explore it. Ages below 30 were able to notice that they were not able to edit their delivery information as it was processed immediately and were not able to cancel it or even edit. They also mentioned that they were not able to change their account information after registering. So, the fourth question was lowered down to 7.63

from 8.21. Table 4 shows that users find the reliability of the application is decent. Some users mentioned that they were not able to change their account information after registering. But overall, they are still satisfied with the speed and reliability.

Table 4. QUIS Survey Result – System Capabilities

Description		**Average**
System Speed		**8.33**
Too Slow	Fast Enough	
System Reliability		**7.57**
Unreliable	Reliable	
The Systems Tends to be		**8.97**
Noisy	Quiet	
Correcting Your Mistakes		**7.63**
Difficult	Easy	
Designed for All Levels of Users		**7.17**
Never	Always	
	Total Average:	**7.934**

The Overall Reaction to the Software of the respondents is shown in Table 5. The overall reaction of the respondents is slightly good when they realized the purpose of the project as helpful for those people who want to expand their businesses in their barangays. The system was said to be easy to use by most of them as they already have initial knowledge of how to deal with online shopping. The design was amusing as it caught their attention because of its simplicity. Although, there were things that bother them, like the website template, which was not edited initially. Respondents were able to point out the importance of cashless transactions in our current situation. They saw that the system can still be improved, nevertheless, they are satisfied as they realized that the extension of help to expand the area coverage of low earning businesses is great. Table 5 shows that the overall reaction of the respondents is slightly good when they realized the purpose of the project as helpful for those people who want to expand their businesses in their local communities.

Table 5. QUIS Survey Result – Overall Reaction to Software

Description		**Average**
Terrible	Wonderful	**8.03**
Difficult	Easy	**7.97**
Frustrating	Satisfying	**7.3**
Inadequate Power	Adequate Power	**7.6**
Dull	Stimulation	**8.17**
Rigid	Flexible	**8.1**
	Total Average:	**9.13**

5. Conclusion

As the study aimed to know the features in the developed system that can adapt to the usability requirement, the researchers build an e-commerce application for products, such as meat, seafood, and fresh produce. The features of the developed system are the inventory for products and admin management. Moreover, along with the functional requirements, the system has successfully reflected the user interface design from the prototype to the final application, which satisfied one of the six styles of usability requirements, the design style.

In comparison among the system features, inventory was the most impactful because the vendors will obtain a digital inventory system that will surely help their business. Therefore, it increases their task efficiency, making them adapt to design style. The admin management was helpful, but some of the respondents highlighted that the admin needs to check the vendors' products. Overall result of the QUIS conducted showed that the developed system satisfied the needs of its intended users.

References

Alyoubi, B.A., Alharbi, I.M., Alyoubi, A.A., Qaffas, A.A. and Almazmomi, N.K., Management of E-Commerce: Impact on Start-Up Ecosystem, 2020.

Trang, S., Trenz, M., Weiger, W.H., Tarafdar, M. and Cheung, C.M., One app to trace them all? Examining app specifications for mass acceptance of contact-tracing apps. *European Journal of Information Systems,* 29(4), pp.415-428, 2020.

Kumar, V. and Mittal, S., Mobile marketing campaigns: practices, challenges and opportunities. *International Journal of Business Innovation and Research*, 21(4), pp.523-539, 2020.

Reyes, M.E.S., Marasigan, J.P., Gonzales, H.J.Q., Hernandez, K.L.M., Medios, M.A.O. and Cayubit, R.F.O., Fear of Missing Out and its Link with Social Media and Problematic Internet Use Among Filipinos. *North American Journal of Psychology*, 20(3), 2018.

Nartea, M., Jamice, J. and Goyenechea, A., Exploring the characteristics of millennials in online buying behavior. *Asia Pacific Journal of Multidisciplinary Research*, 7(4), 2019.

Rudnick, H. and Velasquez, C., Learning from Developing Country Power Market Experiences: The Case of the Philippines. *World Bank Policy Research Working Paper*, (8721), 2019.

Tudy, R.A., From the corporate world to freelancing: The phenomenon of working from home in the Philippines. *Community, Work & Family*, 24(1), pp.77-92, 2021.

Pastor, C.K.L., Sentiment analysis on synchronous online delivery of instruction due to extreme community quarantine in the Philippines caused by COVID-19 pandemic. *Asian Journal of Multidisciplinary Studies*, 3(1), pp.1-6, 2020.

Diana, N. and Leon, F.M., Factors affecting continuance intention of FinTech payment among Millennials in Jakarta. *European Journal of Business and Management Research,* 5(4), 2020.

Nguyen, D.H., De Leeuw, S., Dullaert, W. and Foubert, B.P., What is the right delivery option for you? Consumer preferences for delivery attributes in online retailing. *Journal of Business Logistics,* 40(4), pp.299-321, 2019.

Park, H. and Armstrong, C.M.J., Is money the biggest driver? Uncovering motives for engaging in online collaborative consumption retail models for apparel. *Journal of Retailing and Consumer Services*, 51, pp.42-50, 2019.

Xuhua, H., Elikem, O.C., Akaba, S. and Worwui-Brown, D., Effects of business-to-business e-commerce adoption on competitive advantage of small and medium-sized manufacturing enterprises. *Economics & sociology*, 12(1), pp.80-366, 2019.

Xiao, L., Guo, F., Yu, F. and Liu, S., The effects of online shopping context cues on consumers' purchase intention for cross-border E-Commerce sustainability. *Sustainability*, 11(10), p.2777, 2019.

Chen, Z., Cao, H., Xu, F., Cheng, M., Wang, T. and Li, Y., Understanding the Role of Intermediaries in Online Social E-commerce: An Exploratory Study of Beidian. *Proceedings of the ACM on Human-Computer Interaction*, 4(CSCW2), pp.1-24, 2020.

Luan, Y. and Zhang, Z., Research on e-commerce integrated management information system of cross-border enterprises based on collaborative information middleware. *Information Systems and e-Business Management,* 18(4), pp.527-543, 2020.

Balinado, J.R., Prasetyo, Y.T., Young, M.N., Persada, S.F., Miraja, B.A. and Perwira Redi, A.A.N., The effect of service quality on customer satisfaction in an automotive after-sales service. *Journal of Open Innovation: Technology, Market, and Complexity*, 7(2), p.116, 2021.

Pantano, E. and Gandini, A., Shopping as a "networked experience": an emerging framework in the retail industry. International Journal of Retail & Distribution Management, 2018.

Kavitha, R., A Study on Consumers acuity towards online grocery shopping. *International Journal of Creative Research Thoughts*, 5(4), pp.2882-2891, 2017.

Hendrawan, A., Sucahyowati, H. and Cahyandi, K., E-commerce in small and medium enterprises (smes) in order to improve performance. *Jurnal Terapan Manajemen Dan Bisnis,* 4(2), pp.208-215, 2018.

Tran, B.X., Dang, A.K., Thai, P.K., Le, H.T., Le, X.T.T., Do, T.T.T., Nguyen, T.H., Pham, H.Q., Phan, H.T., Vu, G.T. and Phung, D.T., Coverage of health information by different sources in communities: implication for

COVID-19 epidemic response. *International journal of environmental research and public health*, 17(10), p.3577, 2020.

Lee-Geiller, S. and Lee, T.D., Using government websites to enhance democratic E-governance: A conceptual model for evaluation. *Government Information Quarterly*, 36(2), pp.208-225, 2019.

Kozyreva, A., Lewandowsky, S. and Hertwig, R., Citizens versus the internet: Confronting digital challenges with cognitive tools. *Psychological Science in the Public Interest*, 21(3), pp.103-156, 2020.

Gupta, A. and Xia, C., A paradigm shift in banking: Unfolding asia's fintech adventures. In Banking and finance issues in emerging markets (Vol. 25, pp. 215-254). Emerald Publishing Limited, 2018.

Wakil, K., Alyari, F., Ghasvari, M., Lesani, Z. and Rajabion, L., A new model for assessing the role of customer behavior history, product classification, and prices on the success of the recommender systems in e-commerce. Kybernetes, 2019.

Fernandez-Lanvin, D., de Andres-Suarez, J., Gonzalez-Rodriguez, M. and Pariente-Martinez, B., The dimension of age and gender as user model demographic factors for automatic personalization in e-commerce sites. *Computer Standards & Interfaces*, 59, pp.1-9, 2018.

Zhou, M., Ding, Z., Tang, J. and Yin, D., Micro behaviors: A new perspective in e-commerce recommender systems. In Proceedings of the eleventh *ACM international conference on web search and data mining* (pp. 727-735), 2018.

Morgan, N.A., Whitler, K.A., Feng, H. and Chari, S., Research in marketing strategy. *Journal of the Academy of Marketing Science*, 47(1), pp.4-29, 2019.

Benyon, D., Designing user experience. Pearson UK, 2019.