Studies in Systems, Decision and Control 216

Allam Hamdan
Haneen Mohammad Shoaib
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# The Implementation of Smart Technologies for Business Success and Sustainability

## During COVID-19 Crises in Developing Countries

Springer

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# Preface

Smart technologies are defined as information, material, and social–political technologies with advanced and intelligent features; such technologies with intelligent features included big data, Internet of things, cloud computing and artificial intelligence, and other modern technologies that contributed to digital economy trends. Thus, it can examine the implications of SMEs sustainability strategy within innovative business models. However, SMEs challenging their survival during uncertainty manners among the crises, although customers and suppliers may increase their expectations through effective technology. Literature finds that organizations have to adopt sustainability strategy in their management practices, to help obtain successful business performance in profitability, while ensuring environmental stability and social sustainability. Industry 4.0 technologies are identified as the main contributor to the digitalization era. New technology delivers optimal outputs by utilization of effective resource. Therefore, smart technologies that have inventive and creative objects became critical to enterprise; recent studies show that it has led enterprises business such as SMEs to considerable investments, which many organizations over the world attempt to use innovative technologies such as IoT and AI, and these technologies have potential on sustainable business models.

This book includes 82 chapters by authors from 29 countries. Parts of the chapters of this book were based on direct personal invitations, while the other part was carefully selected from the CBF'2022. All of the chapters have been evaluated by the editorial board and reviewed based on a double-blind peer-review system by at least two reviewers.

The chapters of the book are divided into seven main parts:

I. E-Marketing, Advertisement, E-Commerce, and Business Success.
II. Artificial Intelligence, TechManagement, Women Entrepreneurship, and Social Implications.
III. Driving Innovative, Sustainability, and Creative Practices.
IV. Modern Social Media, Public Relations, and Its Effects on Society and Business.

V. Education Management, Technology, Smart Universities, and COVID-19 Impact.
VI. Sustainable Finance, Innovation, and Business Uncertain Situations.
VII. The Fourth Industrial Revolution, Tourism and Hospitality, and Healthcare Services.

The chapters of this book present a selection of high-quality research on the theoretical and practical levels, which ground the uses of smart technologies in business, health care, media, marketing, education, entrepreneurship, and other vital areas. We hope that the contribution of this book will be at the academic level and decision-makers in the various economic and executive levels.

Manama, Bahrain — Allam Hamdan
Jeddah, Saudi Arabia — Haneen Mohammad Shoaib
Güzelyurt, Turkey — Bahaaeddin Alareeni
Manama, Bahrain — Reem Hamdan
March, 2022

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# Consumer Perceived Severity and Application Based Platform Purchase Behavior Amid COVID 19 in Society 5.0

**Dhea Radika Putri, Sari Lestari Zainal Ridho, Habsah Binti Haji Mohamad Sabli, Kartini Binti Che Ibrahim, Mohammad Fardillah Bin Wahi, Suhaimi Bin Sibir, Hadi Jauhari, Alditia Detmuliati, Alfitriani, Fernando Africano, Agung Anggoro Seto, Keti Purnamasari, Beni Wijaya, and Jovan Febriantoko**

**Abstract** Society 5.0 is a design where humans live side by side with technology. This design has accelerated implementation in the midst of the COVID-19 pandemic, including in the behavior of buying one of tourism industry, i.e., food and or beverage business. Food and beverages business offered their services in vary platform. One of which is in the form of application-based platform food and beverage service providers. Many factors influence purchasing behavior during the pandemic, and it is believed to have an effect on perceived severity. However, there is still a research gap regarding the effect of perceived severity on purchasing behavior. Therefore, this study aims to evaluate the effect of perceived severity along with several other variables, hygiene awareness, quality, and interface on attitudes and shopping behavior in the community 5.0. The method used is quantitative analysis with Partial Least Square-Structural Equation Modeling. Using 112 samples collected through a questionnaire of the second semester of 2021 in Indonesia, this study found that perceived severity along with several other variables, hygiene awareness, quality, and interface effect the shopping attitudes and behavior in the community 5.0.

**Keywords** Food and beverage business · Society · Purchase behavior

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## 1 Introduction

Society 5.0 is equated with a smart society which is a design where humans and technology coexist as an effort to build social equality and sustainable development with the aim of solving economic and social problems [3, 9, 13]. The coexistence and harmony between humans and technology has accelerated in the midst of the Covid-19 pandemic. More intense interaction between technology and humans occurs because technology really helps solve many problems that arise in the midst of the Covid-19 pandemic. The Indonesian Internet Service Providers Association (APJII), based on a survey they conducted, stated that there was an increase of 25.5 million new users in the second quarter of 2020 [1]. Furthermore, data shows that based on research results in 2019, 58% of the population ordered food through food delivery applications [15, 18, 19]. Based on survey data from the Central Statistics Agency in April 2020, public consumption patterns during the pandemic showed that the level of spending on ready-to-eat food was higher [10]

Provision of food and beverage business or food and beverage service industry (providers of food and beverage services) is one of the businesses included in the tourism and creative economy sectors [11]. Service providers in the tourism industry must be aware of the different motivations for using services in different segments, this is based on the fact that each segment has special needs that may differ from those of other tourists [2]. Society 5.0 is a society with a certain lifestyle, where the lifestyle of society 5.0 is one segment which is a community group with the characteristics of spending time interacting more intensely with technology. One of the triggers for the increase in purchases using applications, apart from being familiar with technology which is the lifestyle of the community, based on previous research, perceived severity during the Covid-19 pandemic affected shopping routines using applications [12], because the pandemic caused several government policies, including restrictions on community activities. Hence, one way to enjoy the food provided by the restaurant is through a food delivery application. Not only the severity of the epidemic, the choice of food delivery service and the food used is believed to be influenced by awareness regarding hygiene [17], and the interface of the application provider [16] as well as the quality of the restaurant providing food and/or beverage services [4].

On the contrary, other previous studies on the one hand found that the perceived severity factor had no significant impact on intention to use online food delivery services during the Covid-19 pandemic [12], although on the other hand there were other studies which stated a significant effect on perceived severity perceived against the use of food and beverage services with an application-based platform [7]. Because there is still a gap regarding the effect of perceived severity on shopping attitudes and behavior, this study aims to evaluate the effect of perceived severity along with several other variables, hygiene awareness, quality, and interface on shopping attitudes and behavior in the community. This paper has been divided into four sections. The first section deals with the introduction, the second section deals with the methodology, the third section deal with the result, and the last section deals with the conclusion.

## 2 Method

This study uses a quantitative approach method in testing the relationship between variables. This research was using the Partial Least Square-Structural Equation Modeling (PLS-SEM) technique. The SEM was using in data processing, since SEM is an analytical technique to confirm further in order to determine whether a particular model is valid or not. The PLS-SEM model evaluation is consist of 2 evaluations, namely by evaluating the model (evaluating the *outer model*) and evaluating the structural model (evaluating the *inner model*). First, the evaluation of *outer model* includes the value of *outer loading*, *average variance extracted* (AVE), and *composite reliability* (CR), and second, the evaluation of *inner model* includes the value of *path coefficients*, and *R-squre* ($R^2$) [5, 6, 8].

The population of this study were users of the consumer of food and beverage application based platform in Palembang, Indonesia and the sampling for this research, refer to statistical requirement, the appropriate sample size in the study can be between 30 and 500 [14]. Based on that requirement, in this study, the sample size used was 112 respondents, which was collected successfully through efforts to distribute as many questionnaires as possible during the Covid-19 pandemic, along the second semester of 2021.

## 3 Result

### *3.1 Descriptive Statistics*

The following tables show the output in the form of a Frequency Distribution Table. Table 1 refers to descriptive statistic of gender and frequency of using food delivery application for the research framework (model) 1:

Regarding the gender of the respondents, the results of observations described that there were 84 female respondents (75%), and the remaining 28 respondents were male (25%). It can be concluded that almost three quarters of the respondents are women. The majority of respondents used food delivery application more than

**Table 1** Gender and use frequency

| Gender | Frequency | Percentage | Use | Frequency | Percentage |
|---|---|---|---|---|---|
| Male | 28 | 25.0 | Once | 0 | 0.0 |
| Female | 84 | 75.0 | Twice | 14 | 12.5 |
| | | | Three times | 16 | 14.3 |
| | | | More than three times | 82 | 73.2 |
| Total | 112 | 100.0 | Total | 112 | 100.0 |

*Source* Data processing results, 2022

**Table 2** Age

| Age | Frequency | Percentage |
|---|---|---|
| 18 | 23 | 20.5 |
| 19 | 38 | 33.9 |
| 20 | 21 | 18.8 |
| 21 | 7 | 6.3 |
| 22 | 12 | 10.7 |
| 23 | 6 | 5.4 |
| 24 | 3 | 2.7 |
| 25 | 1 | 0.9 |
| 29 | 1 | 0.9 |
| Total | 112 | 100.0 |

*Source* Data processing results, 2022

3 times as many as 82 people (73.2%). It can be concluded that three quarters of respondents use food delivery application more than 3 times.

Table 2 refers to the respondent's age category. In the respondent's age category, it was concluded that the respondents' ages spread following a right-sloping normal distribution with ages ranging from 18 to 29. The most respondents aged 19 years were 38 people (33.9%).

## *3.2 Validity and Reliability Test*

Table 3 refers to validity and reliability test. Validity testing was conducted to determine the correlation between each question item (indicator) and the total score of all questions (factor). The indicator is said to be valid when the correlation (r) > 0.50. Besides, to test the reliability, the reliability coefficient used is Cronbach's Alpha. Cronbach's Alpha is a reliability coefficient calculated by the Alpha formula made by Cronbach. This test was conducted to determine the reliability (level of confidence) between the question items (all indicators) to the total score of all questions (factors). All indicators are said to be reliable when Cronbach's Alpha Value > 0.60. From the output results, it is found that the correlation between the research variables and their respective indicators is given in the Table 3.

From these results, the correlation coefficient of all indicators is greater than 0.50, hence the validity test can be concluded that all indicators are said to be valid (accurate). In addition, all indicators have a correlation greater than 0.70, so all indicators in this case can be said to be ideal. In addition, Cronbach's alpha values for Interface Issues (IF), Hygiene Consciousness (HC), Perceived Severity (PS), Quality Issues (QL), Attitude (AT), and Purchase Routine (PR) were 0.919, 0.742, respectively: 0.920, 0.814, 0.855, and 0.811 hence this reliability test can be concluded that

**Table 3** Validity and reliability test

| Variable | Indicator | Correlation | Cronbach's Alpha |
|---|---|---|---|
| Interface issues (IF) | IF1 | 0.974 | $\alpha = 0.919$ |
| | IF2 | 0.960 | |
| Hygiene consciousness (HC) | HC1 | 0.889 | $\alpha = 0.742$ |
| | HC2 | 0.894 | |
| Purchase routine (PR) | SR1 | 0.924 | $\alpha = 0.811$ |
| | SR2 | 0.911 | |
| Perceived severity (PS) | PS1 | 0.863 | $\alpha = 0.920$ |
| | PS2 | 0.847 | |
| | PS3 | 0.890 | |
| | PS4 | 0.882 | |
| | PS5 | 0.853 | |
| | PS6 | 0.776 | |
| Quality issues (QL) | QL1 | 0.821 | $\alpha = 0.814$ |
| | QL2 | 0.898 | |
| | QL3 | 0.850 | |
| Attitude (AT) | AT1 | 0.914 | $\alpha = 0.855$ |
| | AT2 | 0.934 | |
| | AT3 | 0.792 | |

*Source* Data processing results, 2022

all indicators are said to be reliable (can be trusted). Thus, testing the validity and reliability of the constructs of all indicators is concluded to be valid and reliable.

## *3.3 Goodness of Fit*

Table 4 refers to the goodness of fit. The goodness-of-fit index results are acceptable. The results are shown in Table 4.

From the overall suitability test of the model, all test results that show the model are of good value, so it can be concluded that the SEM model is good. Furthermore, Table 5 refers to the factor loading, VE, CR, and Cronbach's Alpha values are very satisfactory for the modified SEM model. All factors loading is still above the cut-off value (0.50). The reliability obtained shows good results because all variance extracted (VE) values are greater than 0.50, construct reliability (CR) is above 0.70, and Cronbach's Alpha is above 0.60 (cut-off values). Table 5 provides summary results of score information from factor loading, VE, CR, and Cronbach's Alpha for the SEM model. This test was held to test discriminant validity, with good results

**Table 4** Goodness of fit

| Goodness of fit | Result | Model requirement | Decision |
|---|---|---|---|
| RMSEA | 0.071 | RMSEA < 0.08 is a *good fit*<br>RMSEA < 0.05 is a *close fit* | Good fit |
| GFI | 0.858 | GFI ≥ 0.90 is a *good fit*<br>0.80 ≤ GFI ≤ 0.90 is a *marginal fit* | Marginal fit |
| AGFI | 0.790 | 0 ≤ AGFI ≤ 1<br>PGFI bigger, better | Good fit |
| CFI | 0.954 | CFI > 0.90 is a *good fit*<br>0.80 ≤ CFI ≤ 0.90 is a *marginal fit* | Good fit |
| TLI | 0.938 | TLI > 0.90 is a *good fit*<br>0.80 ≤ TLI ≤ 0.90 is a *marginal fit* | Good fit |
| CMIN/DF | 1.556 | CMIN/DF < 2.00 is a *good fit* | Good fit |

*Source* Data processing results, 2022

on CR. Table 5 refer to the value of factor loading, CR, and Cronbach's alpha for construct investigations.

**Table 5** The validity and reliability measurements for all constructs

| Item description | Factor loading | VE | CR | Cronbach's Alpha |
|---|---|---|---|---|
| IF1 | 0.921 | 0.875 | 0.950 | 0.919 |
| IF2 | 0.950 | | | |
| HC1 | 0.707 | 0.575 | 0.729 | 0.742 |
| HC2 | 0.806 | | | |
| PR1 | 0.851 | 0.660 | 0.795 | 0.811 |
| PR2 | 0.772 | | | |
| PS1 | 0.809 | 0.679 | 0.927 | 0.920 |
| PS2 | 0.772 | | | |
| PS3 | 0.878 | | | |
| PS4 | 0.894 | | | |
| PS5 | 0.808 | | | |
| PS6 | 0.775 | | | |
| QL1 | 0.867 | 0.736 | 0.892 | 0.814 |
| QL2 | 0.727 | | | |
| QL3 | 0.963 | | | |
| AT1 | 0.867 | 0.676 | 0.860 | 0.855 |
| AT2 | 0.911 | | | |
| AT3 | 0.668 | | | |

*Source* Data processing results, 2022

**Table 6** The relationship path among the constructs

| Hypothesized paths | Estimate | C.R | *P* | Result | Information |
|---|---|---|---|---|---|
| H1: IF → AT | 0.009 | 0.182 | 0.855 | Not significant | Direct effect |
| H2: HC → AT | 0.437 | 4.068 | <0.001*** | Significant | Direct effect |
| H3: PS → AT | 0.535 | 3.986 | <0.001*** | Significant | Direct effect |
| H4: QL → AT | 0.031 | 0.692 | 0.489 | Not significant | Direct effect |
| H5: IF → PR | 0.145 | 1.939 | 0.052* | Significant | Direct effect |
| H6: AT → PR | 0.369 | 2.863 | 0.004*** | Significant | Direct effect |
| H7: QL → PR | 0.140 | 1.822 | 0.068* | Significant | Direct effect |

*Note* ***, **, and * denote the two-tail statistical significance at 1%, 5%, and 10% respectively
*Source* Data processing results, 2022

## *3.4 Interpretation of Path Coefficients in SEM Model*

The results of the hypothesis shown in Table 6 refer to the results of hypothesis testing. The table shows the results of hypothesis testing in a direct relationship of several constructs. Of the 3 hypotheses that were formulated, all hypotheses were significant with *p*-value <0.05. In addition, the largest estimate (0.535) is given between Perceived Severity (PS) and Attitude (AT).

$$AT = 0.009IF + 0.437HC + 0.535PS + 0.031QL + e_1 \quad (1)$$

$$PR = 0.14IF + 0.39AT + 0.140QL + e_2 \quad (2)$$

The results of the hypothesis shown in Table 6 refer to the results of hypothesis testing. The table shows the results of hypothesis testing in a direct relationship of several constructs. Of the 3 hypotheses that were formulated, all hypotheses were significant with *p*-value <0.05. In addition, the largest estimate (0.535) is given between Perceived Severity (PS) and Attitude (AT) (Fig. 1; Table 7).

On the structural equations and decomposition effects, the test obtained the following results and conclusions:

1. There is no significant direct effect of Interface Issues (IF) on Attitude (AT). The higher/lower the Interface Issues value, it does not affect the Attitude value.
2. Hygiene Consciousness (HC) has a significant direct effect on Attitude (AT) of 0.437. The higher the Hygiene Consciousness value, the higher the Attitude value. Conversely, the lower the Hygiene Consciousness value, the lower the Attitude value.
3. The direct effect of Perceived Severity (PS) is obtained which is significant on Attitude (AT) of 0.535. The higher the Perceived Severity value, the higher the Attitude value. Conversely, the lower the Perceived Severity value, the lower the Attitude value.

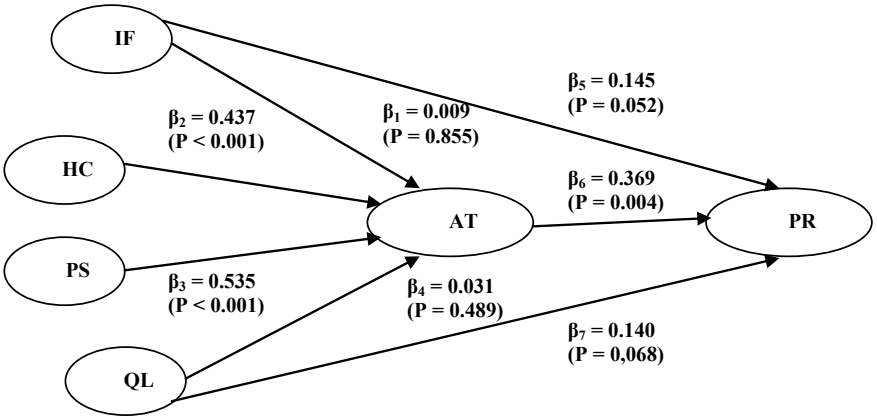


**Fig. 1** Path coefficient. *Source* Data processing results, 2022

**Table 7** The decomposition effect among the constructs

| Hypothesized paths | Passed paths | Estimate | Calculate | Information | Calculate | Information |
|---|---|---|---|---|---|---|
| H8: IF → PR | IF → SR | 0.145 | – | Direct effect | 0.145 + 0.003 = 0.148* | Total effect |
| | IF → AT AT → PR | 0.009 0.369 | 0.009 × 0.369 = 0.003 | Indirect effect | | |
| H9: HC → PR | HC → AT AT → PR | 0.437 0.369 | – | Indirect effect | 0.437 × 0.369 = 0.161* | Indirect effect |
| H10: PS → PR | PS → AT AT → PR | 0.535 0.369 | – | Indirect effect | 0.535 × 0.369 = 0.197* | Indirect effect |
| H11: QL → PR | QL → PR | 0.140 | – | Direct effect | 0.140 + 0.011 = 0.151* | Total effect |
| | QL → AT AT → PR | 0.031 0.369 | 0.031 × 0.369 = 0.011 | Indirect effect | | |

*Note* *denote significance because the value is not close to zero
*Source* Data processing results, 2022

4. There is no significant direct effect of Quality Issues (QL) on Attitude (AT). The higher/lower the Quality Issues value, it does not affect the Attitude value.
5. The direct effect of Interface Issues (IF) is obtained which is significant on the Purchase Routine (PR) of 0.145. The higher the Interface Issues value, the higher the Purchase Routine value; conversely, the lower the Interface Issues value, the lower the Purchase Routine value.
6. Attitude (AT) has a significant direct effect on Purchase Routine (PR) of 0.369. The higher the Attitude value, the higher the Purchase Routine value; conversely, the lower the Interface Issues value, the lower the Purchase Routine value.
7. The direct influence of Quality Issues (QL) is obtained which is significant on the Purchase Routine (PR) of 0.140. The higher the Quality Issues value, the higher the Purchase Routine value; conversely, the lower the Quality Issues value, the lower the Purchase Routine value.
8. The direct effect of total Interface Issues (IF) which is significant on Purchase Routine (PR) is 0.148. This occurs because the value of the direct influence of Interface Issues (IF) on the Purchase Routine (PR) is significant, although the direct effect of Interface Issues (IF) on Attitude (AT) is not significant.
9. There is a significant indirect effect of Hygiene Consciousness (HC) on Purchase Routine (PR) of 0.161. This happens because the value of the direct influence of Hygiene Consciousness (HC) on Attitude (AT) is significant, and there is a direct effect of Attitude (AT) on Purchase Routine (PR) is also significant.
10. There is a significant indirect effect of Perceived Severity (PS) on Purchase Routine (PR) of 0.197. This happens because the value of the direct influence of Perceived Severity (PS) on Attitude (AT) is significant, and there is a direct effect of Attitude (AT) on Purchase Routine (PR) is also significant.
11. The direct effect of total Quality Issues (QL) which is significant on Purchase Routine (PR) is 0.151. This happens because the value of the direct influence of Quality Issues (QL) on the Purchase Routine (PR) is significant, although the direct influence of Quality Issues (QL) on Attitude (AT) is not significant.

These findings support some of the previous theories or researches, i.e., regarding the effect of perceived severity, that asserted the perceived severity affect the application based platform purchase behavior [12]. Furthermore, this research in line with the previous researches in term of hygiene consciousness on attitude [17]; a direct influence of quality issues, on purchase behavior [4]; a significant indirect effect of hygiene consciousness on purchase routines and a direct influence of attitude on purchase routines which is also significant; a significant indirect effect of perceived severity on the purchase routine as well as a significant direct effect of attitude on the purchase routine; the effect of total interface issues on the purchase routine; a direct effect of total quality issues that are significant to the purchase routine [12].

## 4 Conclusion

The purpose of this study was to evaluate the effect of perceived severity along with several other variables, hygiene awareness, quality, and interface on attitudes and shopping behavior in the community 5.0. Based on the results of data processing that has been shown previously, it was found that there was a direct effect of perceived severity, hygiene consciousness on attitude; a direct influence of quality issues, on purchase behavior; a significant indirect effect of hygiene consciousness on purchase routines and a direct influence of attitude on purchase routines which is also significant; a significant indirect effect of perceived severity on the purchase routine as well as a significant direct effect of attitude on the purchase routine; the effect of total interface issues on the purchase routine; a direct effect of total quality issues that are significant to the purchase routine. However, there was no direct influence of significant interface issues on attitude and no direct influence of significant quality issues on attitude was obtained. Hence, it can be said that the finding of this research in line with the previous research that asserted the perceived severity affect the application based platform purchase behavior.

The implication of these findings, that it is important for the food and beverages business to improve even more to enhance the quality and the interface issues. In order to gain the trust of the consumer since the consumer, the society 5.0, considering the hygiene, the quality and more over the severity they perceived amid COVID 19. Furthermore, this research has some limitations; one of it is the scope of the research, in term of the location only in Indonesia. Hence for the future agenda it is recommended to expand the scope of the research, for instance to add some survey location or to add some more variables that hypothetically affect the behavior of the customer.

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# CERTIFICATE OF APPRECIATION

Ahlia University Certify That

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