COMBINATION PATTERNS OF OPEN KNOWLEDGE MAPS AND DATA MINING FOR DETERMINING SMES BUSINESS SUSTAINABILITY MODELS

ISTIANINGSIH, NANIK

Student, Universitas Putra Indonesia YPTK Padang, Indonesia. Email: nanikistianingsih1324@gmail.com

DEFIT, SARJON

Universitas Putra Indonesia YPTK Padang, Indonesia. Email: sarjond@yahoo.co.uk

ZEFRIYENNI

Universitas Putra Indonesia YPTK Padang, Indonesia. Email: zefriyenni@upiyptk.ac.id

Abstract

The recovery of MSMEs after the Covid 19 pandemic requires a strategy in research modeling. There have been many studies examining the performance of MSMEs during the pandemic, but this research is different from what has been done before. This study attempts to conduct a research mapping using a combination of the Open Knowledge Map and the Data Mining Method to find a focus on issues that are often discussed in research during a pandemic. With the pattern of the a priori algorithm the researcher finds the focus of the research that has been done so that it finds gaps that have not been studied. Based on this, the research variables were found and a concept was formed that described the business sustainabilitty model.

Keywords: Open Knowledge Map, Data Mining, Business Model

INTRODUCTION

The presence of information technology from various sources makes researchers and academics compete to present new ideas for research (Donthu, Kumar, et al., 2021). Starting from a finding or issue of a global problem that has an impact on the environment, this provides an opportunity for researchers from various parts of the world to present a new finding. These findings are expected to provide benefits or novelty and scientific contributions as information that can be utilized by the world community (Donthu, Reinartz, et al., 2021).

There have been major changes globally, especially in terms of scientific developments and social change. As a direct consequence of this expectation, there has been a parallel paradigm shift in the field of education (Bozkurt et al., 2015). To find trends in research topics globally, researchers and academics must be able to find information from several reliable sources (Gumus et al., 2018). To ensure that the research topics developed have research quality as needed and have a contribution to the world community. The role of researchers and academics must know four aspects in looking at the quality of research that will be developed such as state of the art, research gap, novelty and knowledge contribution (Bhagat et al., 2020).

This research is different from previous research because it uses a combination of the Open Knowledge Map with the Data Mining Method in learning information systems. By

using this combination, researchers want to find a model for Business continuity Strategy during the Covid 19 Pandemic and after. The results of this study are expected to be able to add information to future researchers as a material consideration in finding a variable combination formulation to be studied in accordance with the trend being discussed.

LITERATURE RIVIEW

Open Knowledge Maps

Open Knowledge Maps is a non-profit organization that develops a search platform specifically designed to help researchers quickly and easily find relevant scientific literature. This platform uses a visual concept map to present literature information in a more intuitive and easy-to-understand form than a typical search result list. The main advantage of Open Knowledge Maps is its ability to help researchers find literature related to the topic of the scientific article being researched, not just literature that only has the same keywords. By using concept maps, users can visually see the relationships between different literatures and easily find the most relevant sources.

Searching for scientific literature is the process of finding sources of scientific literature or references that are relevant to a particular research topic or field of knowledge. Scientific literature searches are usually performed using literature search databases such as Google Scholar, JSTOR, or PubMed and BASE. This platform uses a visual concept map to present literature information in a more intuitive and easy-to-understand form than a typical search result list. Researchers can visually see the relationship between various literature and easily find the sources most relevant to the topic under study.

Data Mining

The simple definition of data mining is the extraction of important or interesting information or patterns from data in large databases (In et al., 2020).

In scientific journals, data mining is also known as Knowledge Discovery in Database (KDD). The stages of data mining can be seen in Figure 1. An explanation of each stage is as follows:

1. *Data cleaning* (to eliminate inconsistent data noise).

2. *Data integration* (split data sources can be merged).

3. *Data selection* (data relevant to the analysis task is returned to the database).

4. *Data transformation* (data is transformed or aggregated into a proper form for mining by performance summary or aggression operation).
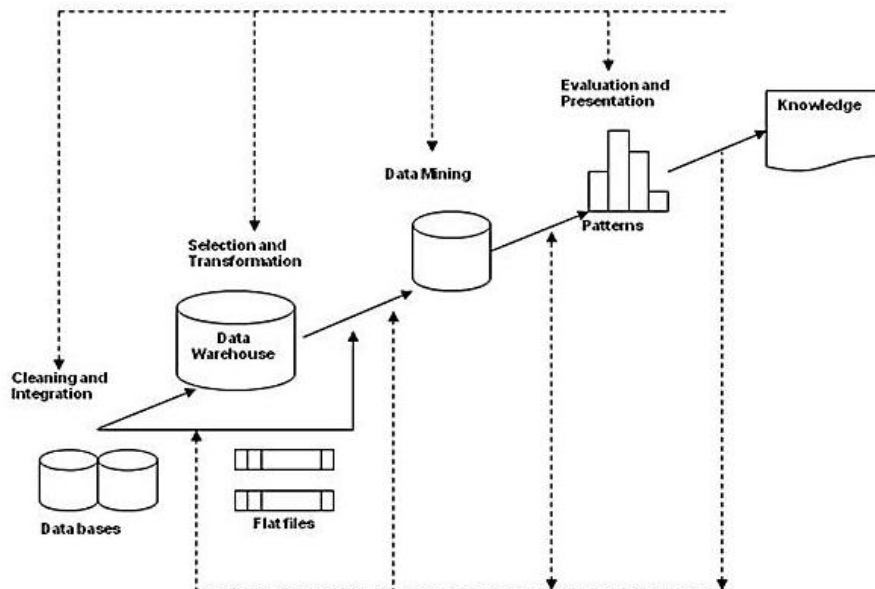
Figure 1: Stages in Data Mining

5. *Pattern evolution* (to identify really interesting patterns representing knowledge based on some interesting actions).

6. *Knowledge presentations* (where image visualization techniques and knowledge are used to convey the mined knowledge to the user).

Datamining divided into several groups based on the task/work that can be done, namely:

1. *Description:* sometimes researchers and analysts simply want to try to find ways to describe the patterns and trends contained in the data. Descriptions of trend patterns often provide possible explanations for a pattern or trend.

2. *Estimation:* almost the same as classification, except that the target variable is estimated more in the numerical direction than in the categorical direction. The model is built using complete data lines (records) that provide the value of the target variable as a predictive value. Furthermore, in the next review, the estimated value of the target variable is made based on the value of the predicted variable.

3. *Prediction:* much the same as classification and estimation, except that in predicting the value of an outcome in the future. Some of the methods and techniques used in classification and estimation can also be used (in appropriate circumstances) for prediction.

4. *Classification:* there is a target categorical variable. For example, the classification of income can be separated into three categories, namely high income, medium income and low income.

5. *Clustering:* is a grouping of records, observations, or attention and form classes of objects that have similarities. A cluster is a collection of records that are similar to one another and have dissimilar records in other clusters. In contrast to classification,

there is no target variable in clustering. Clustering does not classify, estimate, or predict the value of the target variable, however, the clustering algorithm tries to divide the entire data into groups that are similar (homogeneous), where the similarity of records in one group will be of maximum value, while the similarity with records in other groups will be minimal.

6. *Association:* the task of association in data mining is to find attributes that appear at one time. One of the implementations of the association is market basket analysis as will be discussed in this study.

METHODOLOGY

This study uses a combination of the Open Knowledge Maps application and the Apriori Algorithm Data Mining. Open Knowledge Maps is an application dedicated to revolutionizing scientific knowledge discovery for science and society. This public service gives us a new way to find research or other writing related to the topic we want to study or study. Advantages of Using Open Knowledge Map among others are:

1. It's easier to get an overview of the research topic

2. Knowledge maps provide a quick overview of a topic to be researched by showing the main areas at a glance, and documents related to those areas. This will make it easier for researchers to identify a variety of useful and relevant information.

3. Identify relevant concepts

4. One of the most difficult jobs when starting a research field is learning the "language" of that research field. Open Knowledge Maps makes it easy to label research areas with relevant concepts.

5. Do grouping

6. The grouping feature of similar documents makes it easy to identify relevant content when researchers are looking for ambiguous terms, or when they want to identify content from a single discipline in a multidisciplinary field.

7. Find open content

8. Open Knowledge Maps presents a knowledge map that includes both closed and open access documents. Most open access documents can be read from within the interface. If you can't read it, the full text is accessible with just one click.

The research method also uses an a priori algorithm which is a type of association rule in data mining. In this study, researchers used three data collection methods to support research, namely observation, interviews and documentation. There are two techniques in data collection, as follows:

1. Secondary data, collected from library research, literature: journals, e-books, reports and others.

2. Primary Data, taken directly from the field.

In determining an association rule, there is an interestingness measure (a measure of trust) obtained from the results of data processing with certain calculations. Generally there are three measures, namely: 1) Support: which is a measure that shows how much the level of dominance of an item/itemset of the entire transaction is. This measure will determine whether an item/itemset is feasible to search for its confidence (for example, from all existing transactions, how big is the level of dominance indicating that items A and B were purchased together) can also be used to find the dominance level of a single item (Saura, 2021)(Maroufkhani et al., 2020).

1) In general it can be written as equation (1) below.

Support (A→B) = Probability (A→B)

2) Confidence: namely a measure that shows the relationship between two items conditionally (for example, how often item B is purchased if people buy item A). In general it can be written as equation (2) below.

Confidence A→B = ∑ A∩B x 100 %

$$\frac{}{\sum A}$$

3) Improvements: which is a measure that shows the probability that two items can be purchased simultaneously. More details can be seen in equation (3).

Improvements (A→B) = Support (A→B)

Support A*Support B

These three measurements will later be useful in determining interesting association rules, namely to be compared with the specified threshold. These limits generally consist of from min support, min cofidence, and min improvement.

The problem of association rule mining consists of two sub-questions:

1. Finding all combinations of items, called frequent itemsets, which have support greater than the minimum support.

2. Use frequent itemsets to generate the desired rules. For example, ABCD and AB are frequent, then the rule AB → CD is obtained if the ratio of support (ABCD) to support (AB) is at least equal to the minimum confidence. This rule has minimum support because ABCD is frequent.

The Apriori algorithm which aims to find frequent itemsets is run on a set of data. In the k-iteration, all itemsets that have k items will be found, called k-itemsets. Each iteration contains two stages (In et al., 2020)(Saura, 2021). For example Oracle Data Mining Fk represents the set of frequent k-itemsets, and Ck is the set of candidate k-itemsets (which have the potential to become frequent itemsets). The first stage is to generate candidates, where the set of all frequent (k-1) itemsets, Fk-1, found in the (k-1) iteration, is used to generate candidate itemsets Ck. The generate candidate procedure ensures that Ck is a superset of the set of all frequent k-itemsets. The hash-tree data structure is used to store Ck. Then the data is scanned in the support calculation stage. For each transaction, candidate in Ck is loaded into the transaction, determined using a hash-tree data structure

and the value of the support count is increased. At the end of the second stage, Ck values are tested to determine which of the candidates are frequent. The terminal condition of this algorithm is reached when Fk or Ck+1 is empty.

DISCUSSION

By using Open knowledge maps, researchers have conducted an analysis of 100 (one hundred) articles that were included in the BASE data with the keywords Business Model During Covid 19. The mapping can be seen as shown in the following figure:
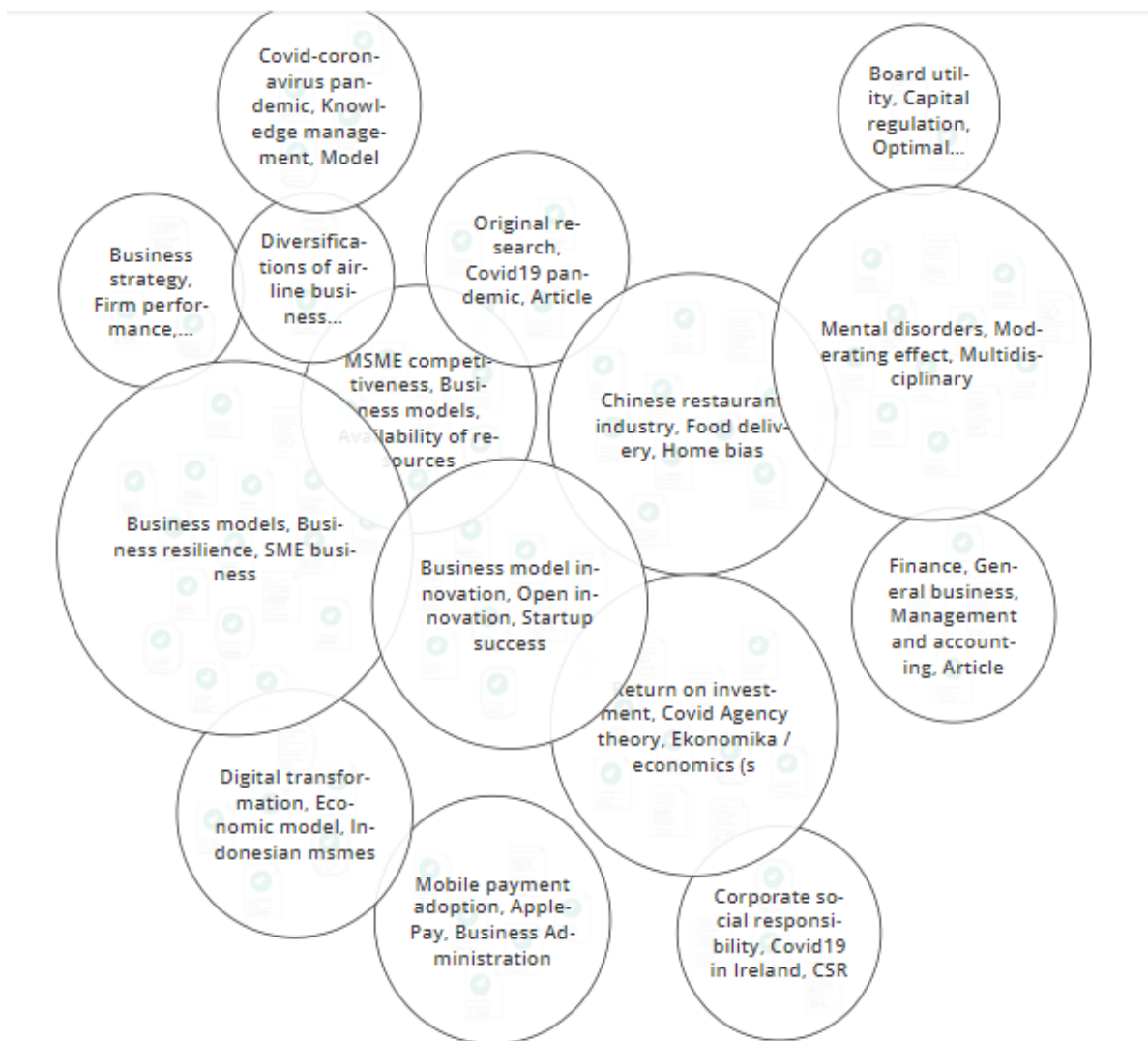

Figure 1: Mapping using the Open Knowledge Map

From the results of the mapping, 15 (fifteen) research mapping areas have been obtained as shown in Table 1.1 below:

Table 1.1 Research Mapping based on Open Knowledge Maps

No.	Research Areas	Number of Publications
1	*Covid-coronavirus pandemic, Knowledge management, Model*	4 articles
2	*Business strategy, Firm performance, Agile supply chain*	3 articles
3	*Diversifications of airline business models, Airlines, Astronautics*	2 articles
4	*Original research, Covid19 pandemic, Article*	4 articles
5	*Board utility, Capital regulation, Optimal guaranteed rate*	2 articles
6	*MSME competitiveness, Business models, Availability of resources*	6 articles
7	*Chinese restaurant industry, Food delivery, Home bias*	9 articles
8	*Mental disorders, Moderating effect, Multidisciplinary*	13 articles
9	*Business models, Business resilience, SME business*	17 articles
10	*Business model innovation, Open innovation, Startup success*	9 articles
11	*Return on investment, Covid Agency theory, Economics / economics*	10 articles
12	*Finance, General business, Management and accounting*	4 articles
13	*Digital transformation, Economic model, Indonesian msmes*	6 articles
14	*Mobile payment adoption, ApplePay, Business Administration*	6 articles
15	*Corporate social responsibility, Covid19 in Ireland, CSR*	4 articles

Source: Research Processed Results, 2022

https://openknowledgemaps.org/map/314cf2beb6320d532ce4482cdf6a7b92?area=7)

Furthermore, to find solutions that can be implemented by businesses is to use data mining methods to detect patterns from which conclusions can be drawn, and thereby create the best conditions to direct decision making. The Data Mining method is a process used to find interesting patterns from a large set of data. Researchers identify areas of current research that focus on the impact of COVID-19 on business. For this reason, the text summarization technique in text mining was first applied, in order to identify the terms most frequently mentioned in business research papers during COVID-19. Then the text clustering method is carried out using the a priori algorithm data mining method which is applied to identify the most frequent group of terms or research paths. The subjects of the analysis are articles published in business journals indexed in the Google scholar, Scopus and Web of Science (WoS) databases. In particular, 34 articles out of 100 previously obtained in the data base were analyzed.

Researchers filter the variables that are most often used with a minimum limit of 2 times. The result is a combination of variables that are the center of attention in the study as follows:

Table 2: Table of Research Variable Algorithm Rule 1 Item Set

NO.	VARIABLE	AMOUNT	SUPPORT VALUE
1	Tourism	6	6,818
2	Crisis	5	5,682
3	Digital Marketing	16	18,182
4	Sustainability	10	11,364
5	Entrepreneurship	7	7,955
6	Financial	2	2,273
7	customers	4	4,545
8	Innovations	13	14,773
9	performance	20	22,727
10	Effectiveness	5	5,682
	AMOUNT	**88**	

Source: Research Processed Results, 2021

Furthermore, the researcher determines the support value or value that meets the criteria. The minimum support value set is 10 for the reason that there are so many variables in the data based, so variables that appear only once are not included in determining the support value. Then variables that have a support value above 10 are tested for a second support value to see the combination of 2 item sets between frequent variables. The results are shown in Table 1.3 as follows:

Table 3: Combination 2 Research variable set items

COMBINATION OF VARIABLES		AMOUNT	*SUPPORT*	*CONFIDENT*
Digital Marketing	*Sustainability*	9	10,227	56.25
Digital Marketing	*Innovations*	9	10,227	56.25
Digital Marketing	*performance*	9	10,227	56.25
Sustainability	*performance*	4	4,545	40
Sustainability	*Innovations*	4	4,545	40
Innovations	*performance*	6	6,818	46.15
AMOUNT		41		

Source: Research Processed Results, 2021

From Table 1.3 above it can be seen that combinations that have a Support value above 10 and a Confident value (have a level of truth) of at least 50% or above 50 are combinations that are frequent (have a value above the support value) which are considered dominant and important which are discussed in the research map during Covid 19

The first focus variable that is often discussed is business sustainability or business continuity. According to the theory, business continuity is the ability of business managers to sustain their business operations indefinitely (Morgan et al., 2021). Business sustainability is the main goal of all business entities, including MSMEs, which is largely determined by business management in managing resources and anticipating changes in the economic, political and social environment. Proper management that can handle business resources and environmental changes in a professional and efficient manner will ensure business continuity. Conversely, bad management that is unable to properly

manage business resources and environmental changes will result in business bankruptcy(Che Omar et al., 2020). Based on(Gamage et al., 2020), business continuity can be measured by the ability of a business company to: (i) make a positive contribution to employees internally; (ii) creating a conducive business climate; (iii) to building the image and brand of the products made; (iv) developing product innovation; and (vi) having a social impact on society.

Previous studies have shown that the performance of MSMEs greatly influences business sustainability. When MSMEs have good performance as indicated by an increase in total sales and assets, the sustainability of their business will be guaranteed. Previous studies on determining the performance and sustainability of MSME businesses have been carried out in many developing countries, generally in Africa, but very little has been done in Indonesia even though this country has millions of MSME units. In addition, previous research has only examined the direct effect (Arrezqi et al., 2020) and locus of control (Suraya et al., 2020). And there are not many studies that identify how indirect influences on business performance and sustainability.

Today's business leaders are really focused on big business sustainability issues related to COVID-19, and they must first continue to ensure maximum employee safety, ensure financial stability, assess supply chain sustainability, and strengthen critical systems to support the level of technology while fighting a surge in cyber attacks (Leal Filho et al., 2021).

Several studies conducted before Covid 19 and during the Covid 19 period stated that business performance had a positive and significant influence on business sustainability according to (Suraya et al., 2020). However, on the other hand, Huan Huu Nguyen's research (2021) actually states that there is no influence between business performance and business sustainability. This indicates that there is a research gap that needs to be reviewed regarding the effect of business performance on business sustainability.

The focus of further research talks is to look at the effect of innovation on business sustainability. Every crisis comes there will be potential to solve related problems through innovative solutions. The global crisis that emerged with the spread of COVID-19 is a crisis twice as big as the previous one (Oppong Peprah, 2020). The health crisis has not only created a need to develop new therapies and vaccines. Likewise, the infection control practices adopted by many governments around the world to manage health crises have led to economic crises (Danciu, 2020) (Kristinae et al., 2020) (Kelley et al., 2020) as indicated, for example, by the reaction of financial markets (Widarti et al., 2020). Both aspects of the COVID-19 crisis are likely to trigger innovative behaviors that deal with the consequences of these actions.

Research on the effect of innovation on business sustainability resulted in significant influence conclusions during the Covid 19 pandemic as stated by(Ben Amara & Chen, 2020), (Gregurec et al., 2021). However, different conditions were conveyed by (Mercedes & Burrell, 2021)who stated the results of his research before the covid 19 pandemic that innovation had no effect on business continuity. One of the reasons is that

innovation requires large costs in African SMEs so that the focus on innovation will spend capital and businesses will experience financial difficulties.

Furthermore, the combination of variable influences is innovation and business performance, where there are still inconsistencies in research results. Given that a crisis as large as the COVID-19 pandemic is accompanied by many pressing challenges, investigating how quickly organizations can react to challenges seems to be of the utmost importance. Because new challenges require new solutions, how quickly organizations can introduce innovations is as important as what other managerial actions need to be taken during a crisis. In general, time is an important characteristic of all human activity. High innovation speed potential accompanies fast innovation response time to result in good performance. Study (Widagda et al., 2020), (Bouwman et al., 2019) (Kuncoro et al., 2021), said that innovation affects business performance. Different from (Bertoni et al., 2021) said that innovation has no effect on business performance. Research (Saliba de Oliveira et al., 2018) actually obtained the result that innovation has a negative and significant impact on business performance. Thus, further testing is still needed on the consistency of the relationship between innovation and business performance.

As shown by the above studies related to various types of business firms, trying to explain the relationship between innovation and firm performance, as well as the influence of innovation mechanisms on firm performance. However, it has been shown that the impact of the degree of innovation on firm performance varies with different types of firms, different risk attitudes, different economic levels, different types of innovation, and different types of performance measurement. (Sajjad & Rasel, 2020) (Young et al., 2020). Therefore, the conclusions from the existing research are mixed and the relationship between innovation and firm performance is still inconclusive. This not only hinders the development of relevant theory but also makes it difficult for managers to make decisions about whether to implement innovations in a given situation.

Crisis research has emphasized survival mechanisms and innovative capabilities have been found to be key mechanisms for organizational growth and renewal(Abu Hatab et al., 2021). Especially in times of environmental turmoil such as natural crises, companies need to realize the need for innovation to fight destruction (Cucculelli & Peruzzi, 2020). In the context of sudden disasters such as the COVID-19 crisis, technological innovation always requires a long research and development cycle (Ibidunni et al., 2020), whereas marketing innovations (compared to technological innovations) can be implemented relatively quickly to adapt to new and changing customer demands. Therefore, marketing innovation is an effective strategy for companies to survive during the COVID-19 crisis (Kristinae et al., 2020).

By looking at the business phenomenon in the midst of Covid 19 as it was in the past and the orientation of the future business after Covid 19 ends, even though it is not yet known when it will end, business continuity is the most important thing. Many businesses that have performed well with current Covid conditions are unable to survive and be sustainable (Rafiq et al., 2020) (Nguyen et al., 2021). Based on this, the researcher examines and assumes that there is a mediating variable that connects business performance and business sustainability. The variable is Adaptive Culture.

The business world is faced with continuous and distinct changes. and ready to change, it is important for managers, professional leaders of companies to understand the factors that influence individual readiness to change. Appropriate organizational culture can efficiently facilitate change, also a manager can increase the readiness of employees to change to have a positive impact on the organization(Antonio & Anamaria, 2019). Cultural change is more likely to be achieved when there is an example of senior management, good planning and involvement of employees at higher levels, to learn from resistance to change in the past (Nayeemunnisa & Gomathi, 2020) (Costanza et al., 2016a).

Today, updating organizational culture is very important for business and especially a key aspect for innovation. The characteristics of a competitive and innovative culture have a direct relationship with company performance. Strong organizational culture and transformational ability are associated with better performance, and, based on that, it is possible to predict short-term performance (Méndez-Picazo et al., 2021). Organizational adaptive culture can encourage the development of institutional processes (Chaabane, 2019). Organizational culture evolves over years and stabilizes uncertainty, but once it is created, it is difficult to change in a short time without changing the people in the group. (Munthali, George & Xuelian, 2020). Unfortunately, there is no convincing conceptual model that clearly shows how change occurs at a deeper level and how behavior change can ultimately lead to cultural change.(Costanza et al., 2016b). (Guldenmund, 2018) discovered the complex relationship between organizational culture, performance measurement systems, and innovation capabilities, which is important to investigate in the context of business organizations.

In addition to business performance, another keyword associated with business continuity is innovation. However, the relationship between the two variables is still inconsistent, thus the researcher tries to provide antecedent variable as a precursor to the innovation variable. The Manager's Behavioral Variable was chosen as the antecedent variable according to the suggestions (Harel et al., 2020) (Izadi ZD et al., 2020) (Li et al., 2018).

The role of managers in driving and supporting organizations through the digital innovation business transition is critical. As previously mentioned, the literature on managers in the context of digital business transformation is still in its infancy. However, the behavior of managers in organizational change is a topic that has been researched extensively, and the existing literature provides many useful ideas about digital business transformation. (Церковна & Карелова, 2020) proposes a framework for organizational change management in the context of digitalization. This framework includes four foundations of manager behavior, such as: 1) aligned leadership; 2) mobilizing the organization; 3) build capabilities; and 4) ensuring sustainability. Company managers must be able to challenge how their organizations operate, involving their personnel in the process of redefining their work roles.

From the description above, the researcher has produced several important variables that can be analyzed for research, so that the model that can be produced from this research is as shown in the following figure:
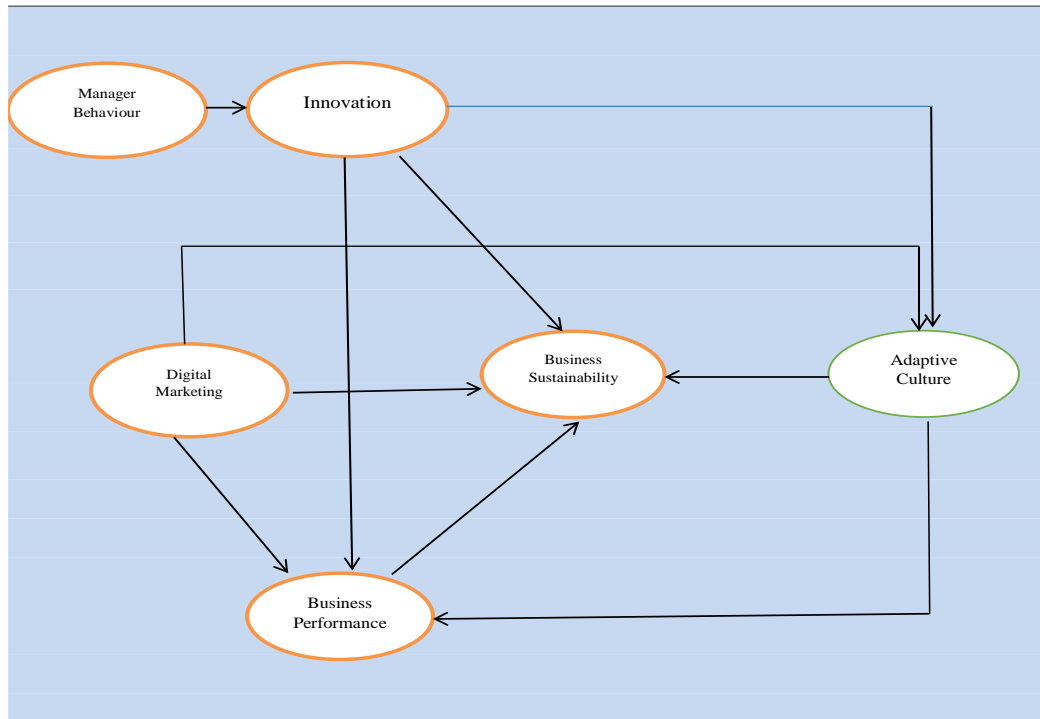
Figure 2: Business Sustainability Strategy Model

DISCUSSION

Based on the search for business phenomena using a combination of open knowledge that occurred during the Covid 19 pandemic and associated with the research gaps previously described, researchers tried to identify research opportunities that could be carried out as solutions for academics and business. This study seeks to explain the inconsistencies regarding the relationship between Business Performance and Business Continuity Variables, the relationship between Innovation and Business Continuity Variables and the relationship between Innovation and Business Performance Variables. For more details, it can be seen in Table 4 below:

Table 4: Research Gap in Previous Research and Research Opportunities

No.	Variable Relations	Research result	Researcher
1.	Business Performance and Business Sustainability	1. Significant Positive Influence 2. No effect	Elmi et al (2020); Osbal Saragih, at al (2020); Flavio Hourneaux Jr, at al (2018) and Ida Ayu et al (2020) Muhammad Rafiq at al (2020) and Huan Huu Nguyen (2021)
2.	Business Innovation and Sustainability	1. Significant Positive Influence 2. No effect	Dhekra Ben Amara & Hong Chen (2019); Iva Gregurec, at al (2021); Ijaz Hussain et al (2020); Jackson, Emerson Abraham (2020) Furawo, Tapiwa and Scheepers C A.(2018)

3.	Innovation on Business Performance	1. Significant Positive Influence	I Gusti Ngurah Agung Jaya Widagda et al (2020); Board of Md. Zahurul Islama at al (2020); Amin Kuncoro (2020); Harry Bouwman (2019)
		2. No effect	Massimo G. Colombo (2020); Mohammad Zainal (2020)
		3. Significant Negative Influence	Ivanka Visnjic, et al (2020)

Source: Previous Research, 2016-2021

CONCLUSION

From the results of the analysis of the gaps in research results and business phenomena above, it can be concluded that a business sustainability strategy model can be built as follows:

1. Business Sustainability is a very important variable for MSMEs in the midst of the current Covid 19 pandemic, facts on the ground show a decrease in the number of MSMEs that are able to survive (Obrenovic et al., 2020) (Raucci & Tarquinio, 2020).

2. Business performance, especially for MSMEs, has decreased during the Covid-19 pandemic. Many business industries that have good business performance are not able to survive, especially those engaged in services and manufacturing. Data shows that there was a 30% decline in MSME performance during the Covid-19 pandemic (Amri, 2020).

3. There are still many MSMEs who are reluctant to innovate. Though innovation is very important to do (Harel et al., 2020) (Indartono, 2018).

4. The behavior of managers is one of the reasons why SMEs are reluctant to innovate because managers are the driving force behind SMEs (Chandler & Krajcsák, 2021) (Harel et al., 2020)

5. Not many MSMEs have taken advantage of Digital Marketing

6. Some research says that many industries are unable to adapt to the environment through their culture. Adaptive culture will be able to maintain good performance, but there is no empirical model to test it. Performance-based adaptive culture will be able to maintain business and be sustainable (Verdu-Jover et al., 2018) (Schuldt & Gomes, 2020) (Ledford, E and Benjamin, 2018).

RECOMMENDATIONS

This research has produced a study model of the MSME Business Sustainability Strategy Model so that further action is needed to test this model.

References

1) Abu Hatab, A., Lagerkvist, C. J., & Esmat, A. (2021). Risk perception and determinants in small- and medium-sized agri-food enterprises amidst the COVID-19 pandemic: Evidence from Egypt. *Agribusiness*, *37*(1), 187–212. https://doi.org/10.1002/agr.21676

2) Amri, A. (2020). Dampak Covid-19 Terhadap UMKM di Indonesia. *Jurnal Brand*, *2*(1), 123–130. https://www.academia.edu/42672824/Dampak_Covid-19_Terhadap_UMKM_di_Indonesia

3) Antonio, P., & Anamaria, N. (2019). *Driving organisational cultural change for sustainability organisations*.

4) Arrezqi, M., Wibowo, B. Y., & Filatrovi, E. W. (2020). Improving The Performance Of Smes In Semarang City In The Pandemic COVID 19. *International Journal of Economics, Business and Accounting Research (IJEBAR)*, *4*(03), 179–183. https://doi.org/10.29040/ijebar.v4i03.1273

5) Ben Amara, D., & Chen, H. (2020). A mediation-moderation model of environmental and eco-innovation orientation for sustainable business growth. *Environmental Science and Pollution Research*, *27*(14), 16916–16928. https://doi.org/10.1007/s11356-020-08206-4

6) Bertoni, F., Bonini, S., Capizzi, V., Colombo, M. G., & Manigart, S. (2021). Digitization in the Market for Entrepreneurial Finance: Innovative Business Models and New Financing Channels. *Entrepreneurship: Theory and Practice*, 1–16. https://doi.org/10.1177/10422587211038480

7) Bouwman, H., Nikou, S., & de Reuver, M. (2019). Digitalization, business models, and SMEs: How do business model innovation practices improve performance of digitalizing SMEs? *Telecommunications Policy*, *43*(9), 101828. https://doi.org/10.1016/j.telpol.2019.101828

8) Chaabane, Y. (2019). The Influence of Organizational Culture on the integration of CSR activities. *United States International University*. https://theses.ubn.ru.nl/bitstream/handle/123456789/8996/Chaabane%2C_Yasmine_1.pdf?sequence=1

9) Chandler, N., & Krajcsák, Z. (2021). Intrapreneurial fit and misfit: Enterprising behavior, preferred organizational and open innovation culture. *Journal of Open Innovation: Technology, Market, and Complexity*, *7*(1), 1–16. https://doi.org/10.3390/joitmc7010061

10) Che Omar, A. R., Ishak, S., & Jusoh, M. A. (2020). The impact of Covid-19 Movement Control Order on SMEs' businesses and survival strategies. *Malaysian Journal of Society and Space*, *16*(2), 139–150. https://doi.org/10.17576/geo-2020-1602-11

11) Costanza, D. P., Blacksmith, N., Coats, M. R., Severt, J. B., & DeCostanza, A. H. (2016a). The Effect of Adaptive Organizational Culture on Long-Term Survival. *Journal of Business and Psychology*, *31*(3), 361–381. https://doi.org/10.1007/s10869-015-9420-y

12) Costanza, D. P., Blacksmith, N., Coats, M. R., Severt, J. B., & DeCostanza, A. H. (2016b). The Effect of Adaptive Organizational Culture on Long-Term Survival. *Journal of Business and Psychology*, *31*(3), 361–381. https://doi.org/10.1007/s10869-015-9420-y

13) Cucculelli, M., & Peruzzi, V. (2020). Innovation over the industry life-cycle. Does ownership matter? *Research Policy*, *49*(1), 103878. https://doi.org/10.1016/j.respol.2019.103878

14) Danciu, V. (2020). The Global Value Chain in Coronavirus Era: An Impact Approach. *The

Romanian Economic Journal, *76*, 2–22.

15) Gamage, S. K. N., Ekanayake, E. M. S., Abeyrathne, G. A. K. N. J., Prasanna, R. P. I. R., Jayasundara, J. M. S. B., & Rajapakshe, P. S. K. (2020). A review of global challenges and survival strategies of small and medium enterprises (SMEs). *Economies*, *8*(4). https://doi.org/10.3390/ECONOMIES8040079

16) Gregurec, I., Furjan, M. T., & Tomičić-pupek, K. (2021). The impact of covid-19 on sustainable business models in smes. *Sustainability (Switzerland)*, *13*(3), 1–24. https://doi.org/10.3390/su13031098

17) Guldenmund, F. W. (2018). *Understanding Safety Culture Through Models and Metaphors*. https://doi.org/10.1007/978-3-319-95129-4_3

18) Harel, R., Schwartz, D., & Kaufmann, D. (2020). The relationship between innovation promotion processes and small business success: the role of managers' dominance. *Review of Managerial Science*, *0123456789*. https://doi.org/10.1007/s11846-020-00409-w

19) Ibidunni, A. S., Kolawole, A. I., Olokundun, M. A., & Ogbari, M. E. (2020). Knowledge transfer and innovation performance of small and medium enterprises (SMEs): An informal economy analysis. *Heliyon*, *6*(8), e04740. https://doi.org/10.1016/j.heliyon.2020.e04740

20) In, T., Mining, D., Learning, D., & Processing, L. (2020). *Big Data Analytics Methods : Analytics Techniques In Data Mining , Deep Learning And Natural Language Processing Author : Peter Ghavami Number of Pages : 254 pages Publisher : De Gruyter Publication Country : Boston , United States Language : English DOWN*.

21) Indartono, S. (2018). Perilaku Dan Sikap Manajer Produksi Usaha Kecil Dan Menengah: Kajian Teori Perilaku. *Perilaku Dan Sikap Manajer Produksi Usaha Kecil Dan Menengah: Kajian Teori Perilaku*, *15*(1), 50–59. https://doi.org/10.21831/jim.v15i1.25783

22) Izadi Z.D, J., Ziyadin, S., Palazzo, M., & Sidhu, M. (2020). The evaluation of the impact of innovation management capability to organisational performance. *Qualitative Market Research*, *23*(4), 697–723. https://doi.org/10.1108/QMR-04-2020-0052

23) Kelley, L. T., Fujioka, J., Liang, K., Cooper, M., Jamieson, T., & Desveaux, L. (2020). Barriers to creating scalable business models for digital health innovation in public systems: Qualitative case study. *JMIR Public Health and Surveillance*, *6*(4). https://doi.org/10.2196/20579

24) Kristinae, V., Wardana, I. M., Giantari, I. G. A. K., & Rahyuda, A. G. (2020). The role of powerful business strategy on value innovation capabilities to improve marketing performance during the covid-19 pandemic. *Uncertain Supply Chain Management*, *8*(4), 675–684. https://doi.org/10.5267/j.uscm.2020.8.005

25) Kuncoro, A., Astuti, W., & Firdiansjah, A. (2021). The effect of mixed marketing moderation and innovation on the influence of market orientation and entrepreneurship orientation toward marketing performance. *Management Science Letters*, *11*, 895–902. https://doi.org/10.5267/j.msl.2020.10.009

26) Leal Filho, W., Azul, A. M., Wall, T., Vasconcelos, C. R. P., Salvia, A. L., do Paço, A., Shulla, K., Levesque, V., Doni, F., Alvarez-Castañón, L., Mac-lean, C., Avila, L. V., Damke, L. I., Castro, P., Azeiteiro, U. M., Fritzen, B., Ferreira, P., & Frankenberger, F. (2021). COVID-19: the impact of a global crisis on sustainable development research. *Sustainability Science*, *16*(1), 85–99. https://doi.org/10.1007/s11625-020-00866-y

27) Ledford, E and Benjamin, S. (2018). Performance Feedback Culture Drives Business Impact. *Center for Effective Organizations*, *August*, 41. https://ceo.usc.edu/files/2018/07/Performance-Feedback-Culture-Drives-Business-Performance-i4cp-CEO-002.pdf

28) Li, W., Bhutto, T. A., Nasiri, A. R., Shaikh, H. A., & Samo, F. A. (2018). Organizational innovation: the role of leadership and organizational culture. *International Journal of Public Leadership*, *14*(1), 33–47. https://doi.org/10.1108/ijpl-06-2017-0026

29) Maroufkhani, P., Wan Ismail, W. K., & Ghobakhloo, M. (2020). Big data analytics adoption model for small and medium enterprises. *Journal of Science and Technology Policy Management*, *11*(2), 171–201. https://doi.org/10.1108/JSTPM-02-2020-0018

30) Méndez-Picazo, M. T., Galindo-Martín, M. A., & Castaño-Martínez, M. S. (2021). Effects of sociocultural and economic factors on social entrepreneurship and sustainable development. *Journal of Innovation and Knowledge*, *6*(2), 69–77. https://doi.org/10.1016/j.jik.2020.06.001

31) Mercedes, D., & Burrell, D. N. (2021). Managerial adaptability and business strategic change in age of COVID-19. *PSU Research Review*, *ahead-of-p*(ahead-of-print). https://doi.org/10.1108/prr-12-2020-0046

32) Morgan, A. K., Awafo, B. A., & Quartey, T. (2021). The effects of COVID-19 on global economic output and sustainability: evidence from around the world and lessons for redress. *Sustainability: Science, Practice, and Policy*, *17*(1), 77–81. https://doi.org/10.1080/15487733.2020.1860345

33) Muda, S., Rahman, M. R. C. A., Hamzah, N., & Saleh, N. M. (2020). Intellectual Capital and SMEs' Business Performance from an Organisational Lifecycle Perspective. *The South East Asian Journal of Management*, *14*(1). https://doi.org/10.21002/seam.v14i1.11939

34) Munthali, George, N. C., & Xuelian, W. (2020). A new decade for social changes. *Technium Social Sciences Journal*, *6*.

35) Nayeemunnisa, A., & Gomathi, S. (2020). Understanding organizational capabilities: Review literature. *Journal of Critical Reviews*, *7*(9), 413–415. https://doi.org/10.31838/jcr.07.09.85

36) Nguyen, H. H., Ngo, V. M., & Tran, A. N. T. (2021). Financial performances, entrepreneurial factors and coping strategy to survive in the COVID-19 pandemic: case of Vietnam. *Research in International Business and Finance*, *56*(December 2020), 101380. https://doi.org/10.1016/j.ribaf.2021.101380

37) Obrenovic, B., Du, J., Godinic, D., Tsoy, D., Khan, M. A. S., & Jakhongirov, I. (2020). Sustaining enterprise operations and productivity during the COVID-19 pandemic: "Enterprise effectiveness and sustainability model." *Sustainability (Switzerland)*, *12*(15), 1–27. https://doi.org/10.3390/su12155981

38) Oppong Peprah, E. (2020). The Review of Past Pandemics to Predict What to Expect after Covid-19. *Social Behavior Research & Health*, *4*(2), 506–518. https://doi.org/10.18502/sbrh.v4i2.4676

39) Rafiq, M., Zhang, X. P., Yuan, J., Naz, S., & Maqbool, S. (2020). Impact of a balanced scorecard as a strategic management system tool to improve sustainable development: Measuring the mediation of organizational performance through PLS-Smart. *Sustainability (Switzerland)*, *12*(4), 1–19. https://doi.org/10.3390/su12041365

40) Raucci, D., & Tarquinio, L. (2020). Sustainability Performance Indicators and Non-Financial Information Reporting. Evidence from the Italian Case. *Administrative Sciences*, *10*(1), 13. https://doi.org/10.3390/admsci10010013

41) Sajjad, H., & Rasel, M. (2020). The global economic impact of COVID-19: Three possible scenarios. *Bizinfo Blace*, *11*(1), 31–40. https://doi.org/10.5937/bizinfo2001031h

42) Saliba de Oliveira, J. A., Cruz Basso, L. F., Kimura, H., & Sobreiro, V. A. (2018). Innovation and financial performance of companies doing business in Brazil. *International Journal of Innovation Studies*, *2*(4), 153–164. https://doi.org/10.1016/j.ijis.2019.03.001

43) Saura, J. R. (2021). Using Data Sciences in Digital Marketing: Framework, methods, and performance metrics. *Journal of Innovation and Knowledge*, *6*(2), 92–102. https://doi.org/10.1016/j.jik.2020.08.001

44) Schuldt, K. S., & Gomes, G. (2020). Influence of organizational culture on the environments of innovation and organizational performance. *Gestao e Producao*, *27*(3), 1–26. https://doi.org/10.1590/0104-530x4571-20

45) Suraya, E., Azis, N., & Majid, M. S. A. (2020). Does Performance Matter for Business Survival Based on the Enhancement of Locus of Control and Business Competence? The Case of Micro Small and Medium Enterprises. *Sumerianz Journal of Business Management and Marketing*, *3*(July), 98–106.

46) Verdu-Jover, A. J., Alos-Simo, L., & Gomez-Gras, J. M. (2018). Adaptive culture and product/service innovation outcomes. *European Management Journal*, *36*(3), 330–340. https://doi.org/10.1016/j.emj.2017.07.004

47) Widagda, I. G. N. A. J., Kerti Yasa, N. N., mia, S., & Saputra, K. L. (2020). The Model Development of Business Strategy of Sme Restaurant Industry During The Covid 19 Pandemic: A Conceptual Model. *International Journal of Economics and Management Studies*, *7*(10), 39–44. https://doi.org/10.14445/23939125/ijems-v7i10p107

48) Widarti, W., Desfitrina, D., & Zulfadhli, Z. (2020). Business Process Life Cycle Affects Company Financial Performance: Micro, Small, and Medium Business Enterprises During the Covid-19 Period. *International Journal of Economics and Financial Issues*, *10*(5), 211–219. https://doi.org/10.32479/ijefi.10516

49) Церковна, А. В., & Карелова, К. С. (2020). Impact of Digitalization on the Development of Small and Middle Business in Ukraine. *Market Economy: Modern Management Theory and Practice*, *19*(2(45)), 328–339. https://doi.org/10.18524/2413-9998.2020.2(45).201486