JURNAL AGROEKOTEKNOLOGI TERAPAN
Applied Agroecotechnology Journal

Agroteknologi Universitas Sam Ratulangi **e ISSN:2797-0647**

Developing the Business Resilience - Technopreneur and Digital Transformation Model.

Octavia Diana Monica Tuegeh[1]*, Adrian Szilárd Nagy[2], Franda Benedicta Paat[3], Johan Reineer Tumiwa [2,4]

[1] *Department of Accounting, Faculty of Economics and Business, Manado State University. Manado - Indonesia; octaviatuegeh@unima.ac.id*
[2] *Institute of Economics, Faculty of Economics and Business Administration, University of Debrecen. Debrecen - Hungary; nagy.adrian@econ.unideb.hu (A.S.N.) johan.tumiwa@econ.unideb.hu (J.R.T.)*
[3] *International Business Administration (IBA), Department of Management, Faculty of Economics and Business, Sam Ratulangi University, Manado 95115, Indonesia; frandapaat23@gmail.com*
[4] *Department of Management, Faculty of Economics and Business, Sam Ratulangi University, Manado 95115, Indonesia; johantumiwa@unsrat.ac.id.*

*Corresponding author:
octaviatuegeh@unima.ac.id

Abstract: This research aims to develop a business resilience model on MSMEs during COVID-19 theoretically and empirically. This research uses the TCM method for literature review analysis and SEM for model testing. The object population of this research is MSMEs in a rural area in Indonesia. The sample of this research is 301 MSME owners who are still surviving during COVID-19. The results reveal no significant direct influence of government support assistance on business resilience. However, government support assistance, knowledge management, and innovation through technopreneur have a significant impact on digital transformation, and then digital transformation on business resilience. The research made new theoretical and empirical contributions of MSMEs to utilize government support in business resilience models and knowledge management and innovation concerning entrepreneurship.

Keywords: Business resilience; COVID-19; digital transformation; government assistance; innovation; knowledge management; MSMEs; technopreneur.

Manuscript received: 23 Augst 2025.
Revision accepted: 30 Sept. 2025.

INTRODUCTION

The COVID-19 pandemic directly impacts the global economy [1]. Various measures, such as quarantine, are being taken to stop the spread of the virus [2,3]. Other steps are self-isolation and travel restrictions, which force reductions in labor availability and productivity in the short term in all economic sectors and cause increasing in unemployment [1,4]. Moreover, government instructions regarding quarantine are not well articulated and are implemented unevenly. In addition, the income obtained by labor is affected by income polarization [5]. Schools and universities worldwide are closed, and the demand for commodities and manufactured products decreases [6]. At the same time, the world is facing a "critical shortage" of various kinds of medical supplies [7]. The food sector and daily needs are also experiencing great demand due to panic buying and hoarding. Still impacted by the COVID-19 pandemic, GDP is estimated to have declined sharply in the second quarter, with a gradual and partial recovery only by the end of 2021.

In Indonesia, the economy has contracted since the 1997 Asian crisis for the first time. The socio-economic consequences of a recession will be severe,

especially for the lower middle class, who are at significant risk of returning to poverty [8,9]. Indonesian Government launched various measurements are known as social distancing Large-Scale Social Restrictions (LSSR), which were implemented in multiple regions, starting in the capital city of Jakarta on April 10th, 2020 [10,11]. These conditions have certainly impacted the national economy, especially when the new variant of COVID-19 from other countries hit Indonesia [12]. Implementing these regulations creates a 'new normal' life, where all community activities must follow health protocols, including business activities. A new normal is a new life order to create a productive society safe from COVID-19, including micro, small, and medium-sized enterprises (MSMEs). As one of the pillars and backbone of the national economy [13], MSMEs play a strategic role for several reasons: (1) they are the most significant number of business units, with 64.2 million units, (2) they provide employment opportunities for 116.9 million people, or 97% of the total employment opportunities, (3) they contribute 61.07% to gross domestic income, (4) they contribute 14.37% of non-oil and gas exports, and (5) they contribute 60.42% of investment in Indonesia [14–16]. Because of this strategic role, MSMEs must increase their resilience in facing the multi-dimensional crisis related to COVID-19. The resilience of MSMEs will affect communities' strength, especially in the rural areas [17,18], which will affect the national economy [19–21].

Before the pandemic, the Indonesian Government has promoted rural community empowerment programs through several programs such as Nawacita Jokowi point three, namely the development of Indonesia from the border by strengthening regions and villages, implementing the "*Tri Dharma*" of higher education, etc. Most of these empowerment programs are IT for business [22–24]. Especially when the COVID-19 pandemic hit the world, the Indonesian Government swiftly went through fiscal and monetary policies to support the resilience of businesses that experienced direct effects from this pandemic. Implementing training for the community during COVID-19 further focuses on how businesses transform to digital and how to use the internet and social media to change the business process. Several MSMEs sectors have been positively impacted (potential winners), such as the chemical-pharmaceutical sector, medical devices, textiles, and food beverages. On the other hand, industries that experience negative impacts (potential losers) include tourism, construction, and transportation. The new normal life encourages MSMEs to transform entrepreneurial behavior and business to seek the opportunities behind it [25].

Practitioners, academics, and the government are still looking for the ultimate way to reach business resilience by transforming digital business models during disruptive changes by COVID-19. What is a suitable model in business resilience during the economic crisis by the COVID-19 pandemic present research question. Thus, research about how MSMEs utilize government support is robust to knowledge in business resilience models and information technology and innovation concerning entrepreneurship.

Previous research argues that business resilience positively responds to maintaining balance by paying attention to external changes [26,27]. The following research was carried out by Klein & Todesco [28] and Vong *et al.* [29], argue about the conceptual model to illustrate the general weaknesses, strengths, challenges, and opportunities for MSMEs to face this pandemic and how knowledge management (KM) can help, based on the concepts of organizational resilience. Furthermore, Priyono *et al*. [30] discuss how small model transformation to digital due to the COVID-

19 pandemic. They argue that mediocre technologies, combined with a sophisticated business model, will provide more impactful results than advanced technology adopted by the poor business model to gain business resilience. In addition, Beckmann *et al*. [31] discuss how digital transformation impacts rural areas. Some factors that influence digital transformation are intensive competition [32] and digital capabilities [30], whereas digital capabilities include the ability of employees or owners IT knowledge, innovation, and entrepreneurship spirit [33–36], called technopreneur. Many researchers argue that technology-based business or technopreneur contributes to business success [37] and business resilience [38–43]. However, previous studies discuses technopreneur limited to Entrepreneurship, Information technology, Knowledge management, and Education, abbreviated as EIKE themes [44]. Covid pandemic is a particular current issue that has not been done before. Thus, entrepreneurial ability in technology, known as a technopreneur, is necessary for digital transformation. In addition, previous researches argue that the government's role in the digitalization process and business resilience is required during the economic crisis due to COVID-19 [12,36,45,46]. However, research on business resilience models based on technopreneurs and the digitalization process to utilize government assistance during the pandemic remains unrevealed, leaving a knowledge gap. A few articles in reputable journals discuss business resilience during COVID-19 for SMEs (see figure 1).

This study offers a combined literature review analysis and statistical analysis model to utilize government assistance based on technopreneur's concepts in digital transformation to achieve business resilience [47,48].

The next section of the literature review will use MS Excel to analyze the theoretical background and supporting theory using the systematic literature review (SLR) concept by Paul and Criado [49] to develop the conceptual model and hypothesis. Next is the methodology and research approach. The respondent's descriptive analysis will be done by IBM SPSS 22, and the conceptual model and hypothesis will be analyzed using PLS-SEM. Finally, the model testing will generate exciting results and recommendations for various interested parties, limitations, and further research.

Theoretical Background and Hypothesis Development

This theoretical analysis begins with a review of the literature on Business resilience. This research adopted an SLR approach to finding hard evidence on the academic analysis process to obtain a reliable and comprehensive method. The process started with the definition of its conceptual limitations from two databases which are Scopus and Web of Science (WoS). The whole process is illustrated in Figure 1 [49–51].

This section also summarizes descriptive analyses based on the reviewed contributions. The total number of articles after the screening process is simply 26. The initial process of the related articles begins by coding those articles and making them into several categories and themes. Finally, research frameworks are generalized based on the category and theme. Several articles from reputable journals were added to wind up the definition and connection between research variables. The research variable and their relationship based on the literature review are described further in the following subsection

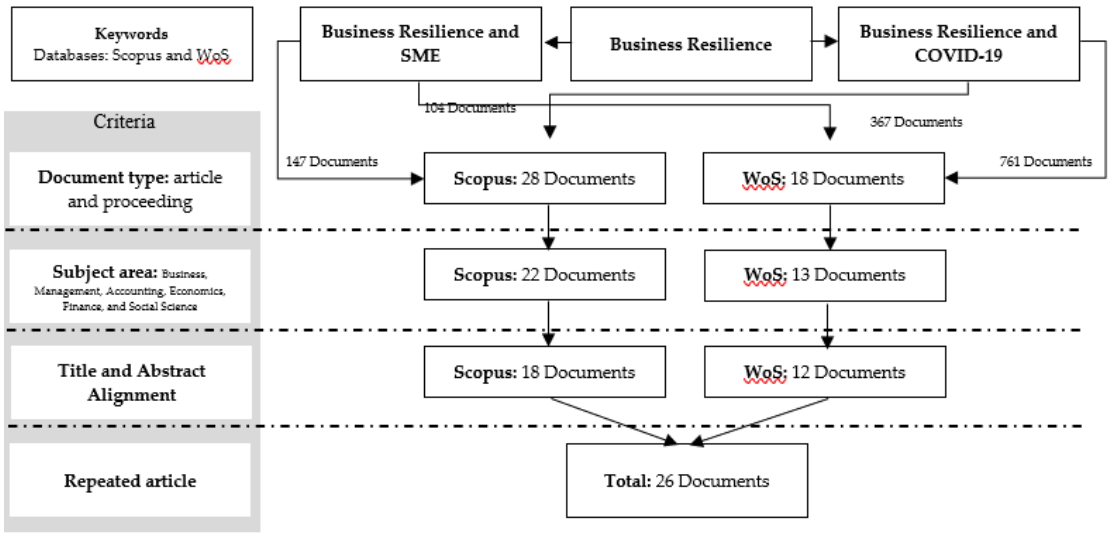

Figure 1: Literatures Collection Method

Government Support Assistance

COVID-19 has changed the world economy and caused economic crises in several countries, especially for MSMEs. Besides the classic problems [52], MSMEs face difficulty surviving the COVID-19 pandemic without taking advantage of government assistance [43,53]. This situation presents a challenge and an opportunity for the Government. Challenges are defined as short-term solutions to help MSMEs elevate the national economy. Opportunity means that short-term solutions need to be followed by long-term solutions, especially related to Industry 4.0, which requires the availability of digital technology to support economic activity [45]. This structural policy will strengthen MSMEs resilience during COVID-19 while at the same time keeping the digital transformation in the industry 4.0 era [54]. Thus, this research assumes that:

H_1: Government Support Assistance has a significant influence on Digital Transformation.

Baldock and Manson [55] argue that providing financial assistance from the government to businesses can help business performance and growth [56,57]. This financial assistant has a significant impact, especially in rural areas, rarely reached by any credit from banks or other financial institutions. Culkin [58] added that the government assists small businesses by cutting bureaucracy and collaborating with universities to provide a more comprehensive range of formal and informal support, knowledge, and resources. This assistance helps MSMEs have a better chance of surviving in the business competition world.

Before COVID-19, the Indonesian Government has issued several policies to support MSMEs, such as training, subsidies for energy use, and infrastructure [14,35,59]. Several Government policy issues to encounter the problem caused by COVID-19 include tax-incentives policy; labor protection or worker salary payment by the Government to SME employees; rescheduling of loan repayment or credit installment deferral assistance reallocation of fiscal policy at local government levels during COVID-19 [10,14,60–63]. Furthermore, Chiang & Fatt [64] and Venkataraman [38] emphasize the relationship between government assistance and technopreneur. Subsequently, Nan & Park [65] suggest that policy implication for using digital technologies should be an essential element to respond to Covid-19. Hence, this research hypothetically summarizes that:

H_2: Government Support Assistance has a significant influence on Technopreneur.

Based on a study of empirical evidence of the Government assistance impact on MSMEs [22,59,66] before and during the pandemic on MSMEs, this study postulates that:

H_3: Government Support Assistance has a significant direct influence on Business Resilience.

Technopreneur

Sommarberg & Makinen [67] revealed that technopreneur is born from creative destruction, such as the COVID-19 pandemic. This term of the entrepreneur is more suitable for the digital transformation process. Entrepreneurs must be determined to take advantage of this moment to transform behavior and business by utilizing government support [68,69]. Several previous studies concluded that technopreneurs understand and use technology for entrepreneurship purposes [40,70,71]. Ayala & Manzano [72] argue that business resilience is closely related to the resilience of entrepreneurs as measured by three dimensions, namely hardiness, resourcefulness, and optimism. Furthermore, Kindangen et al. [35] conclude that an entrepreneur is initiative, creative, committed, persevering, and adaptive in responding to challenges and seeking unconventional solutions. Several dimensions include the characteristics of the business and the entrepreneur, such as the relationships with institutions, human and social capital, and strategic management should be considered in training programs for resilient entrepreneurs to transform with the change of technology [73]. Abdulgani & Mantikayan [74] argue that the environment influences technopreneurs. Shamsuddin & Mohd [75] added that the factors influencing technopreneur intention are attitudes with the highest agreeableness values, followed by self-efficacy and perceptions, and independencies [132,133]. Digital transformation is a way to take advantage of the disruptive environment caused by COVID-19 and rapid IT development. Several researchers argue that technopreneur influences digital transformation [29,34,45,67,76–78]. Thus, this research assumes that:

H_4: Technopreneur has a significant influence on Digital Transformation.

Government and other related parties should induce the deployment of digital transformation to MSME [79,80]. Innovation [40,64,74,78,81–85] and knowledge management [28,29,44,86,87] are believed to be some of the factors/variable that influence technopreneur and digital transformation that lead to MSMEs performance [51] and further to resilience. Thus, this research predicted that:

H_5: Knowledge Management has a significant influence on Technopreneur.

H_6: Innovation has a significant influence on Technopreneur.

Digital Transformation

Li *et al.* [76] argue that many MSME entrepreneurs are not knowledgeable about IT. This issue is because digital transformation is more of a managerial problem than a technical one [88,89]. Several researchers argue about the importance of digital transformation models and their drivers. Pratama *et al.* [93] and Ogrean & Herciu [94] concluded that digital transformation is one of the business strategies to survive during COVID-19. Innovation, organizational learning, and organizational knowledge are essential to advance the digital transformation of MSMEs [86]. Păunescu & Mátyus [95] argue that production's innovation and adaptation to gain resilience mediate digital transformation. Further research was carried out by Winarsih *et al.* [32] about the

MSMEs digital transformation conceptual framework during COVID-19. They argue that e-wallet, intensive competition, and improving digital knowledge and skills are critical in digital transformation. Priyono *et al.* [30] and Orengo-Serra & Sánchez-Jauregui [96] added that the choice of strategy and the success of digital transformation during the COVID-19 depends on various factors, such as the firms' existing digital capabilities, learning culture, history of digital technology adoption, ability to develop with supporting parties, etc. Klein & Todesco [28] emphasized that COVID-19 accelerated the business digitization process where knowledge management affects the digitization process and business resilience model. Scott and Laws [97] discuss business resilience in three dimensions: survival, adaptation, and innovation; by adjusting its operations, management, and marketing strategies against dramatically changing conditions. This pandemic requires businesses to utilize digital technological development to develop innovations and knowledge management strategies. Due to the COVID-19 pandemic, Casalino *et al.* [98] explain digital transformation as digital resilience by measuring several dimensions: decision-making, organizational change, change management, risks prevention, and knowledge management. Hence, this research summarizes the assumptions that:

H_7: Knowledge Management has a significant influence on Digital Transformation.

H_8: Innovation has a significant influence on Digital Transformation.

H_9: Digital Transformation has a significant influence on Business Resilience.

Business Resilience

Productivity and performance of MSMEs are essential regarding the role of MSMEs in supporting the national economy [14,99–104]. However, the COVID-19 pandemic presents challenges for MSMEs [61]. One way for MSMEs to survive is to take advantage of government assistance [63] to gain business resilience and foster growth [17,28,105]. The business resilience concept during COVID-19 is still understudied. Régnier [106] discusses that business resilience is essential during an economic crisis. In the business context, resilience is defined as the ability of a business to survive, adapt, and grow to be up against turbulence change [107–109]. Ayala & Manzano [72] argue that business resilience is closely related to the resilience of entrepreneurs, which in this study is discussed in the definition of technopreneur. Dahles & Susilowati [110] argue that to survive during a crisis, business resilience depends on the ability of entrepreneurs to seek livelihood strategies. Morisse & Prigge [111] propose the six characteristics of resilience: flexibility, diversity, connectivity, knowledge, redundancy, and robustness. During COVID-19, Casalino *et al.* [98], Kerr [112], and Fitriasari [43] argue about business resilience with three essential elements, namely product excellence, process reliability, and people behavior. In this research scope, people's behavior is seen as part of the entrepreneurial behavior of technopreneurs [113–115]. Another research was conducted by Aldianto *et al.* [116] on business resilience for business startups by using a literature review method; they put forward the factors influencing business resilience. These factors are agile leadership, dynamic capabilities, innovation ambidexterity, knowledge, and technology capabilities. Based on several previous studies, these factors can be summarized in the model of technopreneur and digital transformation [29,40,76,78,82,117]. Thus, this research presumes that:

H_{10}: Technopreneur has a significant influence on Business Resilience.

The conceptual framework of this research is shown in Figure 2.

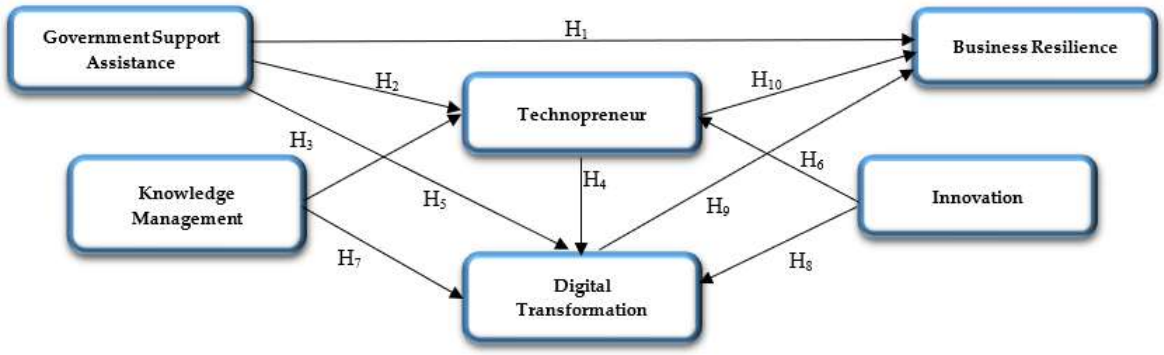

Figure 2. Conceptual Framework

Materials and Methods

This research has three main stages: the initial study stage, the survey stage, and the data analysis stage to test the model's validity quantitatively. The initial study begins with screening and filtering literature from Scopus and WoS databases than creating themes and variables. The next stage is the survey through several processes carried out simultaneously, including designing a questionnaire previous research study and conducting a pilot test.

To test the framework from literature review analysis, this research conducts surveys in six regions in North Sulawesi - Indonesia, with the target number of respondents being a minimum of 50 plus 5 respondents per region to meet the standard minimum number of 30 respondents per region. The population is MSMEs in a coastal area. The sampling technique is the stratified random sampling method. This research uses three statistical tools. First is excel to analyze the systematic literature review and data tabulation. The second is SPSS 22 to run the respondent description analysis. Then the last is for Model testing uses the Partial Least Square (PLS) method [47,48,118,119].

The research questionnaire consists of the respondent profile, the business profile, and questions designed to represent each variable formed in the previous study of business resilience. The results obtained were 322 respondents from the 210 expected. However, not all of these responses could be used for data processing because there were incomplete/valid data. Invalid data were due to the questionnaire being incompletely filled in or biased answers. After eliminating the outliers, the valid data is 301 respondents.

The operational definition of the latent variables and manifest variables (indicators) in this research is shown in Table 1.

RESULTS AND DISCUSSION

Respondent characteristic analysis

Table 2. shows that 63.8% of respondents are male and 36.2% female. The majority of respondents were in the age range 41 - 45 years (i.e., 61.5%, or 185 individuals). The productive age in entrepreneurship varies widely. However, according to Ayala and Manzano [72], based on the profile of the respondents in their research, the average age range of respondents in business resilience is 43.2 years. In addition, several previous studies have argued that age range influences aggregate entrepreneurship [120,121]. Most respondents are entrepreneurs with a

vocational education level or a level equivalent to senior high school (12 years of formal study). Most respondents have an education equivalent to 12 years of formal study (199 individuals, or 66.1%). The Indonesian government has developed a vocational education revitalization policy that has generated collaborative action across several ministries to accelerate improvements in quality for students. Various regional policies contribute to a curriculum emphasizing hard skills improvement [122,123]. The majority of the respondent based on earning is 50-100 million IDR/year. COVID-19 makes most businesses postpone their production or even declare bankruptcy [61,93,124]. Only the strong entrepreneurial spirit can see the opportunities behind the threats and take advantage of technology by transforming the business into a digital one by the new normal that survive or gain resilience [63,125,126].

Table 1. Variables and the convergent validity assessment of the model

Constructs	Items	Factor Loading	Cronbach's Alpha	rho_A	Composite reliability	AVE	Manifest Variable
Business Resilience (BR)	BR1	0.861	0.983	0.985	0.986	0.91	Growth in the number of consumers/customers
[17,28,29,40,43,76,78,82,98,110–112,116,117]	BR2	0.991					Increased production
	BR3	0.996					Employee/owner satisfaction
	BR4	0.995					Perspective of continuity
	BR5	0.893					Increased sales
	BR6	0.934					Business recognition
	BR7	0.996					The ability to pay debts/Liquidity (for MSMEs)
Digital Transformation (DT)	DT1	0.805	0.961	0.965	0.969	0.816	Using current technology for production
	DT2	0.957					Digital platform for marketing
[30,32,36,86,88–91,93,97,98]	DT3	0.924					Fintech
	DT4	0.803					Digitalization implementation between/among departments or/and stakeholders
	DT5	0.952					Distribution efficiency enhancement
	DT6	0.886					Management process
	DT7	0.98					Leadership
Government Support assistance (GSA)	GSA1	0.813	0.967	0.975	0.973	0.804	Training
	GSA2	0.799					Tax cutting
[14,35,43,45,53,55–59]	GSA3	0.679					Direct fund support
	GSA4	0.954					Employee/worker salary payment
	GSA5	0.861					Credit installment deferral assistance
	GSA6	0.956					Public infrastructure
	GSA7	0.988					Ease of access to material for the production
	GSA8	0.982					Ease of access to microcredit
	GSA9	0.986					IT Infrastructure
Innovation (In)	In1	0.888	0.893	0.922	0.919	0.696	Product innovation
[40,64,74,78,81–85]	In2	0.937					Innovation idea from external (Customer or/and Supplier)
	In3	0.81					Process Innovation
	In4	0.841					Marketing Innovation
	In5	0.673					Organizational Innovation
	KM1	0.844	0.937	0.943	0.953	0.802	Personal Knowledge:

Constructs	Items	Factor Loading	Cronbach's Alpha	rho_A	Composite reliability	AVE	Manifest Variable
Knowledge Management (KM) [28,29,44,86,87]	KM2	0.861					a. Education b. Individual Experience c. Individual Skill
	KM3	0.883					Knowledge utilization
	KM4	0.983					Knowledge sharing
	KM5	0.898					
Technopreneur (Th) [29,34,35,40,45,67,70–72,74–78]	Th1	0.801	0.946	0.947	0.96	0.827	Creative skill and innovation regarding technology
	Th2	0.974					A long-term vision-oriented
	Th3	0.946					Independence
	Th4	0.921					Entrepreneurship spirit
	Th5	0.894					Environment

Table 2. Respondent Characteristic

	Frequency	(%)
Gender		
Male	192	63.8
Female	109	36.2
Age		
< 30	6	2.0
30 - 35	5	1.7
36 - 40	65	21.6
41 - 45	185	61.5
46 - 50	28	9.3
> 50	12	4.0
Education		
Primary School	19	6.3
Junior High School	58	19.3
Senior High School	199	66.1
Bachelor	13	4.3
Master and Doctor	12	4.0
Income (In Million IDR/year)		
< 50	18	6.0
50 - 100	166	55.1
100 - 150	57	18.9
150 - 200	12	4.0
200 - 250	12	4.0
> 250	36	12.0

Evaluation of Measurement Models (Outer Mode I)

The evaluation of the measurement model consists of three stages: a convergent.

Convergent Validity Test

Testing the validity of reflective indicators can be done by using the correlation between indicator scores and construct scores. Measurement with reflective indicators shows a change in an indicator in a construct if other indicators in the same construct change. The calculations using the computer program SmartPLS 3.0 are illustrated in table 1. According to Ghozali [118] and Chin [127], a correlation can meet convergent validity if a loading value is greater than 0.5. The output shows in Tables 1 and 4 that the loading factor gives a value above the recommended value equal to 0.5, thus showing that the indicators used in this research have met the convergent validity.

Discriminant Validity Test

Reflective indicators need to be tested for discriminant validity by comparing the values in the cross-loading table. An indicator is declared valid if it has the highest loading factor value to the intended construct compared to the value of the loading factor to other constructs. The result of output Fornell-Larcker Criterion and cross-loading is shown in table 3 and 4

validity test, a discriminant validity test, and a composite reliability test.

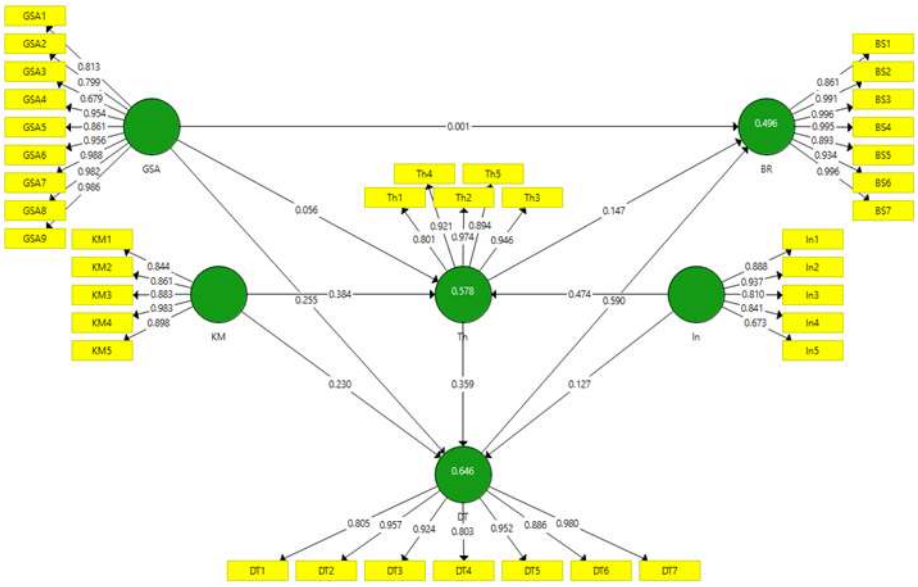

Figure 3. Structural Model Design (Inner Model) of Business Resilience.

Table 3. Fornell-Larcker Criterion

	BS	DT	GSA	In	KM	Th
BS	0.954					
DT	0.697	0.903				
GSA	0.459	0.646	0.897			
In	0.432	0.623	0.642	0.835		
KM	0.869	0.623	0.486	0.407	0.895	
Th	0.572	0.721	0.546	0.666	0.603	0.909

Table 4. Output Cross Loading

	BS	DT	GSA	In	KM	Th
BS1	**0.862**	0.665	0.457	0.409	0.753	0.494
BS2	**0.991**	0.672	0.428	0.396	0.852	0.54
BS3	**0.996**	0.684	0.451	0.411	0.865	0.563
BS4	**0.995**	0.696	0.457	0.415	0.864	0.573
BS5	**0.893**	0.561	0.311	0.341	0.74	0.441
BS6	**0.933**	0.666	0.487	0.482	0.847	0.623
BS7	**0.996**	0.691	0.456	0.417	0.867	0.569
DT1	0.472	**0.805**	0.613	0.565	0.467	0.596
DT2	0.612	**0.957**	0.604	0.602	0.542	0.705
DT3	0.642	**0.924**	0.596	0.574	0.545	0.677
DT4	0.694	**0.803**	0.461	0.482	0.625	0.598
DT5	0.704	**0.952**	0.561	0.528	0.603	0.645
DT6	0.561	**0.886**	0.656	0.6	0.536	0.635
DT7	0.693	**0.98**	0.604	0.591	0.605	0.697
GSA1	0.412	0.474	**0.807**	0.457	0.381	0.396
GSA2	0.288	0.599	**0.806**	0.561	0.373	0.435
GSA3	0.304	0.447	**0.681**	0.552	0.36	0.424
GSA4	0.454	0.572	**0.951**	0.568	0.447	0.474
GSA5	0.455	0.536	**0.856**	0.522	0.43	0.47
GSA6	0.453	0.653	**0.958**	0.65	0.486	0.572
GSA7	0.476	0.648	**0.988**	0.622	0.503	0.548
GSA8	0.416	0.622	**0.983**	0.631	0.46	0.546
GSA9	0.437	0.613	**0.985**	0.593	0.46	0.511
In1	0.337	0.469	0.598	**0.888**	0.304	0.473

	BS	DT	GSA	In	KM	Th
In2	0.343	0.554	0.559	**0.937**	0.294	0.586
In3	0.484	0.615	0.58	**0.81**	0.489	0.665
In4	0.376	0.571	0.497	**0.841**	0.369	0.637
In5	0.122	0.225	0.426	**0.673**	0.085	0.223
KM1	0.812	0.667	0.462	0.351	**0.844**	0.548
KM2	0.772	0.505	0.341	0.317	**0.861**	0.478
KM3	0.714	0.501	0.478	0.429	**0.883**	0.566
KM4	0.843	0.592	0.48	0.388	**0.983**	0.596
KM5	0.733	0.494	0.395	0.327	**0.898**	0.495
Th1	0.573	0.648	0.463	0.525	0.633	**0.799**
Th2	0.506	0.686	0.5	0.644	0.55	**0.975**
Th3	0.487	0.625	0.514	0.616	0.513	**0.947**
Th4	0.512	0.641	0.502	0.591	0.52	**0.921**
Th5	0.518	0.671	0.5	0.643	0.522	**0.895**

Reliability Test

A latent variable can have good reliability if the composite reliability value is more than 0.7 and Cronbach's alpha value is greater than 0.7 [118]. All latent variables measured in this study have Cronbach's Alpha and Composite Reliability values greater than 0.7. Thus, all latent variables are reliable, as shown in table 1.

Evaluation of the Structural Model (Inner Model)

Evaluation of structural models in SEM with PLS is carried out by conducting several tests analyses as follows:

Testing R^2

According to Hair et al. [128] and [48], the value of R^2 depends on the research. However, there is a threshold value as an acceptable minimum level of 0.10. Furthermore, this research uses the category description of the R^2 by Chin [127] and Ghozali [118] as follows:

- R^2 value> 0.7 is categorized as strong
- R^2 value of 0.67 is categorized as substantial
- R^2 value of 0.33 is categorized as moderate
- R^2 value of 0.19 is categorized as weak

The output for the R^2 value shows in table 5.

Test of Effect size f^2

The effect size f^2 shows the change in the R^2 value when a specified exogenous construct is omitted from the model. This indicator helps evaluate whether the omitted construct significantly impacts the endogenous constructs. f^2 result shows in table 6.

Table 5. Output Calculation R^2

	R Square	R Square Adjusted	Description
BR	0.485	0.484	Moderate
DT	0.646	0.642	Moderate
Th	0.576	0.573	Moderate

Table 6. f^2

	BR	DT	GSA	In	KM	Th
BR						
DT	0.269					
GSA	0	0.096				0.004
In		0.02				0.307
KM		0.089				0.262
Th	0.02	0.154				

The effect size f^2 in table 6 confirms that the government support assistant has more effect on digital transformation than on technopreneur. Table 6 also shows that knowledge management and innovation affect technopreneur, technopreneur on digital transformation, and last digital transformation on business resilience. On the contrary, government support assistance does not affect technopreneur and business resilience.

Predictive Relevance Q^2

The predictive relevance Q^2 will measure the predictive capability of the research model. If Q^2 is greater than 0, the PLS-SEM model is predictive of the given endogenous variable under investigation. The predictive relevance Q^2 is shown in table 7.

Goodness of Fit of the Model

Next is the calculation of the Goodness of Fit of the model, abbreviated as GoF. The GoF value in this study is shown in table 8.

Test of Significance

The significance test in SEM models with PLS aims to determine the effects of exogenous variables on endogenous variables. The bootstrapping process use to test the hypothesis using PLS-SEM, as follows:

Table 7. Construct Crossvalidated Redundancy (Q^2)

	SSO	SSE	Q^2 (=1-SSE/SSO)
BR	2107	1173.614	0.443
DT	2107	1005.511	0.523
GSA	2709	2709	
In	1505	1505	
KM	1505	1505	
Th	1505	799.318	0.469

Table 8. The GoF Model

	AVE	R^2	AVE x R^2	$\sqrt{(AVE \times R^2)}$
BR	0.91	0.496	0.45136	0.671833313
DT	0.816	0.646	0.527136	0.726041321
TH	0.827	0.578	0.478006	0.69137978

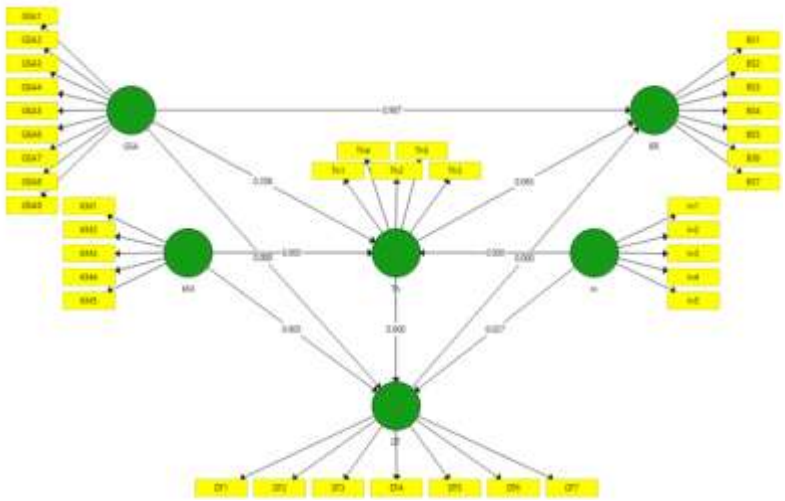

Figure 4. P-Value Result

Figure 4 shows the significance of the constructed variable as regards other variables. This model rejects H_1, H_2, and H_{10} because the p-values are over 0.05.

Another statistic table of this information is available in table 9.

Table 9. Path Coefficients and Hypothesis testing

Hypothesis	Relationship	Std. Beta	Std. Error	*t*-Statistics	*p*-Values	Decision
H_1	**GSA - BR**	0.001	0.064	0.017	0.986	Not supported
H_2	**GSA - Th**	0.056	0.064	0.865	0.388	Not supported
H_3	**GSA - DT**	0.255	0.063	4.015	0	Supported
H_4	**Th - DT**	0.359	0.066	5.439	0	Supported
H_5	**KM - Th**	0.384	0.047	8.123	0	Supported
H_6	**In - Th**	0.474	0.05	9.484	0	Supported
H_7	**KM - DT**	0.23	0.078	2.961	0.003	Supported
H_8	**In - DT**	0.127	0.059	2.165	0.031	Supported
H_9	**DT - BR**	0.59	0.114	5.156	0	Supported
H_{10}	**Th - BR**	0.147	0.077	1.908	0.057	Not supported

Government support assistants do not affect technopreneurs because it will not increase the person or entrepreneur's intention to become technopreneurs. Still, technopreneurs are born out of coercion [67]. Government support assistance is more influential on digital transformation because infrastructure support and government policies impact the business digitization process before and during the pandemic. Government support, such as improving internet network infrastructure, is beneficial for MSMEs, especially during a pandemic [10,12,57,61,124,129]. In addition, there are very few studies on technopreneurs in reputable journals [74]. Thus, the indicators of government support assistance construct are mostly taken from articles related to the role of government in the era of the industrial revolution 4.0 towards MSMEs. Hence, industrial revolution 4.0 is closely related to the business digitization process. Supporting business continuity requires collaboration between the government, entrepreneurs, and the community through sustainable assistance and policies that favor MSMEs by encouraging the digital transformation of MSMEs. The concept of digitization that will be implemented must be oriented to innovation and knowledge. In addition, the role of the internet is essential for MSME to transform their business to strengthen business resilience. The transformation from conventional operational to digital requires an awareness process and does not necessarily become easy and is taken for granted by business actors. It involves a stage of socialization and empowerment by the Government to foster digital transformation. Therefore, the government support assistance construct significantly influences digital transformation [36,45,93] and does not significantly impact technopreneurs [130].

In small businesses, digital transformation does not have to completely transform business forms into digital [30]. However, businesses have to involve elements of information technology, especially the internet and social media, in the business to gain a business resilience [60,131]. Digital transformation is inseparable from the role of technopreneurs, where knowledge management and innovation factors play a significant role in the formation of technopreneur factors [29,40,44,64,78] compared to the direct influence of knowledge management and innovation on digital transformation.

In the relationship between technopreneur and digital transformation, a manager/owner is faced with the formation of strategic management concepts, including thinking about opportunities and ways to build a business by understanding the changes and behavior of modern society. In other words, technopreneurs should have long-term vision-oriented as the highest loading factor for technopreneur

(see table 1). This study found that if businesses adopt the concept of digital transformation in their production process by prioritizing innovation and knowledge, the business tends to last longer and even become competitive.

The results of this study also support research on independence [132,133]. Independence is the basis for making a technopreneur feel more meaningful in giving and showing his work to the community. This independence can motivate technopreneurs to develop a competitive business world in today's challenging market. Technopreneur requires an entrepreneurial spirit to manage a business by utilizing technology that income automatically earns by accomplishing innovation. This result is in line with the research results by Klongthong et al. [78] about technopreneurs, namely the ability to know and innovate in utilizing technological media as the basis and resources for business continuity to seek opportunities for success. An entrepreneur can adapt to various situations and environmental conditions with innovation and knowledge.

Based on the data analysis, the final research model is formed, in which paths that have insignificant values are removed (dropped). Subsequently, the final research model is obtained, as in Figure 4.

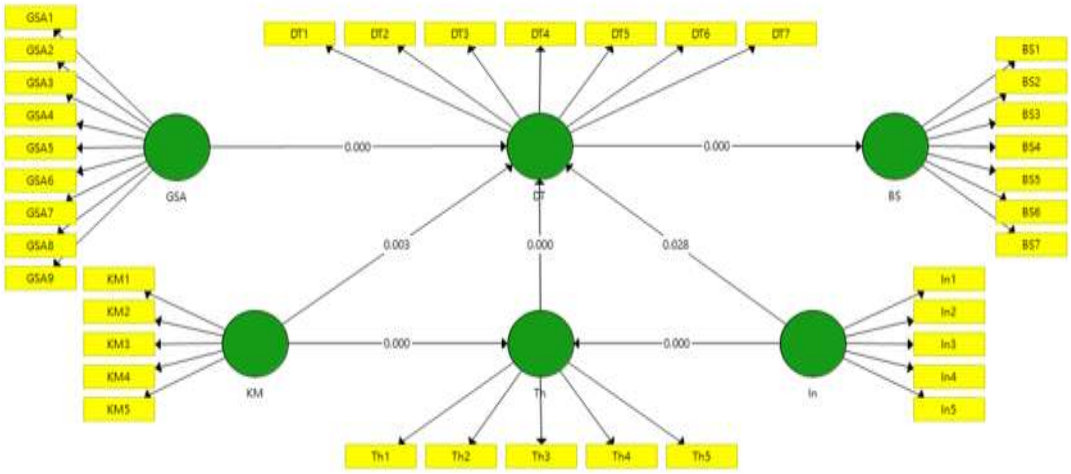

Figure 5. Final Result Model with Path Coefficient and P-Value

The model shown in Figure 4 illustrates a good business resilience model with a digital transformation role to engage the new normal. The excellent digital transformation model is also influenced by innovation and knowledge management on technopreneur.

Limitations and Future Research Directions

This study has several limitations, one of which is generalizing this research. This research is limited to a sample of MSMEs in the coastal area of North Celebes, Indonesia. Thus, further research might be necessary to add a more extensive scope of research to be generalized to other empirical studies.

Furthermore, the limited number of samples in this study and the situation of COVID-19 made this research unable to be generalized to all MSMEs in Indonesia at regular times. Another limitation related to the current pandemic is the research approach. This research is a purely quantitative study using questionnaires in data collection. The restrictions of keeping a distance during the pandemic resulted in the surveyors not meeting personally with

all research respondents to capture the respondents' personal opinions and expression by direct interview, which could be coded and processed using a qualitative approach.

For further research, it may be necessary to analyze the business model for medium to large-scale businesses considering the rapidly changing business competition due to the pandemic in a disruptive era. It will be interesting to examine how the input of knowledge management, innovation, and technopreneur on the digital transformation will affect the performance, productivity, and business resilience. Moreover, further research to analyze demographic factors, such as education, age, and experience, since the level of formal education does not seem to impact technopreneurs and business resilience compared to experience.

Government policies to save MSMEs are effective during and after the pandemic, i.e., in the 'new normal'; these policies include implementing strict health protocols, providing opportunities and encouraging digital services to support MSMEs, encouraging socialization for associations and business actors, simplifying administrative processes, and making efforts to promote changes in business strategies. However, this short-term strategy must be followed by a long-term strategy to ensure that in the future, MSMEs can remain significant leaders in the post-COVID-19 economy. Through collaboration with universities, the government can prepare a road map for developing MSMEs, building digital technology as a platform in the MSME business process, and developing modern MSME business models.

CONCLUSIONS

During a pandemic, a business resilience model is needed to utilize government assistance optimally; one way is through the digital transformation process. This study uses a sample of 301 respondents who are domiciled in the coastal areas of North Celebes province, Indonesia. This study confirms the business resilience model with the latest issues, namely the variable construct of digital transformation and technopreneur; and the role of knowledge management and innovation on technopreneurs and the business digitization process.

This research impacts practitioners and academics on how to model business resilience during the pandemic. This research provides input that the business digitization process can be carried out on large-scale businesses and applied to MSMEs. Furthermore, with the application of the business digitization model, business resilience can be accomplished in an era of disruption such as the industrial revolution 4.0 era. Therefore, this might be a reference for further research. The recommendation to the interested parties such as government and managerial, to prepare a clear road map to develop digital transformation for MSME.

Author Contributions: Conceptualization, A.S.N; Data collection, J.R.T; Formal analysis, A.S.N; Data interpretation and discussion; A.S.N., J.R.T; Funding acquisition, A.S.N; Investigation, H.N.-A.; Statistical Method, A.S.N; Literature review method, J.R.T; Software, J.R.T; Supervision, A.S.N.; Writing—original draft, A.S.N; Writing—review & editing, A.S.N. All authors have read and agreed to the published version of the manuscript.

ACKNOWLEDGMENTS

Conflicts of Interest: The authors declare no conflict of interest.

REFERENCE

[1] Kovács S, Rabbi MF, Máté D. Global Food Security, Economic and Health Risk Assessment of the COVID-19 Epidemic. Mathematics 2021;9:2398. https://doi.org/10.3390/math9192398

.
[2] Tisdell CA. Economic, social and political issues raised by the COVID-19 pandemic. Econ Anal Policy 2020;68:17–28. https://doi.org/10.1016/j.eap.2020.08.002.
[3] Rodrigues M, Franco M, Sousa N, Silva R. COVID 19 and the Business Management Crisis: An Empirical Study in SMEs. Sustainability 2021;13:5912. https://doi.org/10.3390/su13115912.
[4] Han E, Tan MMJ, Turk E, Sridhar D, Leung GM, Shibuya K, et al. Lessons learnt from easing COVID-19 restrictions: an analysis of countries and regions in Asia Pacific and Europe. Lancet 2020;396:1525–34. https://doi.org/10.1016/S0140-6736(20)32007-9.
[5] Bonacini L, Gallo G, Scicchitano S. Working from home and income inequality: risks of a 'new normal' with COVID-19. J Popul Econ 2021;34:303–60. https://doi.org/10.1007/s00148-020-00800-7.
[6] Ibn-Mohammed T, Mustapha KB, Godsell J, Adamu Z, Babatunde KA, Akintade DD, et al. A critical review of the impacts of COVID-19 on the global economy and ecosystems and opportunities for circular economy strategies. Resour Conserv Recycl 2021;164:105169. https://doi.org/10.1016/j.resconrec.2020.105169.
[7] Gereffi G. What does the COVID-19 pandemic teach us about global value chains? The case of medical supplies. J Int Bus Policy 2020;3:287–301. https://doi.org/10.1057/s42214-020-00062-w.
[8] Albert JRG, Abrigo MRM, Quimba FMA, Vizmanos JF V. Poverty, the Middle Class, and Income Distribution amid COVID-19. PIDS Discuss Pap Ser 2020.
[9] Suryahadi A, Al Izzati R, Suryadarma D. Estimating the Impact of Covid-19 on Poverty in Indonesia*. Bull Indones Econ Stud 2020;0:1–34. https://doi.org/10.1080/00074918.2020.1779390.
[10] Purnama SG, Susanna D. Attitude to COVID-19 Prevention With Large-Scale Social Restrictions (PSBB) in Indonesia: Partial Least Squares Structural Equation Modeling. Front Public Heal 2020;8:1–10. https://doi.org/10.3389/fpubh.2020.570394.
[11] Melsom T. Coronavirus (COVID-19) and Indonesia: Modelling the External Financial Shock July 2020. 2020.
[12] Muhyiddin, M., & Nugroho H. A Year of Covid-19: A Long Road to Recovery and Acceleration of Indonesia's Developmen. J Perenc Pembang Indones J Dev Plan 2021;5(1):1–19. https://doi.org/10.36574/jpp.v5i1.
[13] Eggers F. Masters of disasters? Challenges and opportunities for SMEs in times of crisis. J Bus Res 2020;116:199–208. https://doi.org/10.1016/j.jbusres.2020.05.025.
[14] Tumiwa JR, Nagy A. Micro, Small, and Medium Enterprises in Emerging Economies and Economic Transition: A comparative study between Indonesia and Hungary. Int J Entrep Small Bus 2021;43:22–38.
[15] Caiazza R, Phan P, Lehmann E, Etzkowitz H. An absorptive capacity-based systems view of Covid-19 in the small business economy. Int Entrep Manag J 2021;17:1419–39. https://doi.org/10.1007/s11365-021-00753-7.
[16] Fath B, Fiedler A, Sinkovics N, Sinkovics RR, Sullivan-Taylor B. International relationships and

resilience of New Zealand SME exporters during COVID-19. Crit Perspect Int Bus 2021;17:359–79. https://doi.org/10.1108/cpoib-05-2020-0061.

[17] Adekola J, Clelland D. Two sides of the same coin: Business resilience and community resilience. J Contingencies Cris Manag 2020;28:50–60. https://doi.org/10.1111/1468-5973.12275.

[18] Steiner A, Atterton J. The contribution of rural businesses to community resilience. Local Econ 2014;29:228–44. https://doi.org/10.1177/0269094214528853.

[19] PENG C, MA B, ZHANG C. Poverty alleviation through e-commerce: Village involvement and demonstration policies in rural China. J Integr Agric 2021;20:998–1011. https://doi.org/10.1016/S2095-3119(20)63422-0.

[20] HAJI K. E-commerce development in rural and remote areas of BRICS countries. J Integr Agric 2021;20:979–97. https://doi.org/10.1016/S2095-3119(20)63451-7.

[21] Hartungi R. Understanding the success factors of micro-finance institution in a developing country. Int J Soc Econ 2007;34:388–401. https://doi.org/10.1108/03068290710751803.

[22] Paruntu CP, Tumiwa J. Community model in coastal area to eradicate proverty in South Bolaang Mongondow and East Bolaang Mongondow, North Sulawesi. J Asean Stud Marit Issues 2016;2:17–29.

[23] Ilyas IP, Semiawan T. Production-based Education (PBE): The Future Perspective of Education on Manufacturing Excellent. Procedia - Soc Behav Sci 2012;52:5–14. https://doi.org/10.1016/j.sbspro.2012.09.436.

[24] Nurdin M. Center of Technology (COT) for Industrial Product Development through Collaboration and Partnership in Polytechnic Education. Procedia - Soc Behav Sci 2012;52:207–16. https://doi.org/10.1016/j.sbspro.2012.09.457.

[25] Purnomo BR, Adiguna R, Widodo W, Suyatna H, Nusantoro BP. Entrepreneurial resilience during the Covid-19 pandemic: navigating survival, continuity and growth. J Entrep Emerg Econ 2021;13:497–524. https://doi.org/10.1108/JEEE-07-2020-0270.

[26] Hohenstein N-O, Feisel E, Hartmann E, Giunipero L. Research on the phenomenon of supply chain resilience. Int J Phys Distrib Logist Manag 2015;45:90–117. https://doi.org/10.1108/IJPDLM-05-2013-0128.

[27] Mandal S. Impact of supplier innovativeness, top management support and strategic sourcing on supply chain resilience. Int J Product Perform Manag 2020. https://doi.org/10.1108/IJPPM-07-2019-0349.

[28] Klein VB, Todesco JL. COVID-19 crisis and SMEs responses: The role of digital transformation. Knowl Process Manag 2021;28:117–33. https://doi.org/10.1002/kpm.1660.

[29] Vong WT, Kong MLF, Lai CCE, Then PHH, Teo TH. Investigating the Roles of Knowledge Management Practices in Empowering Rural Youth to Bridge the Digital Divide in Rural Sarawak. J Integr Des Process Sci 2017;21:61–79. https://doi.org/10.3233/jid-2017-0012.

[30] Priyono A, Moin A, Putri VNAO.

Identifying digital transformation paths in the business model of smes during the covid-19 pandemic. J Open Innov Technol Mark Complex 2020;6:1–22. https://doi.org/10.3390/joitmc6040104.

[31] Beckmann M, Garkisch M, Zeyen A. Together we are strong? A systematic literature review on how SMEs use relation-based collaboration to operate in rural areas. J Small Bus Entrep 2021;0:1–35. https://doi.org/10.1080/08276331.2021.1874605.

[32] Winarsih, Indriastuti M, Fuad K. Impact of Covid-19 on Digital Transformation and Sustainability in Small and Medium Enterprises (SMEs): A Conceptual Framework. Adv. Intell. Syst. Comput., vol. 1194 AISC, Springer International Publishing; 2021, p. 471–6. https://doi.org/10.1007/978-3-030-50454-0_48.

[33] Elia G, Margherita A, Passiante G. Digital entrepreneurship ecosystem: How digital technologies and collective intelligence are reshaping the entrepreneurial process. Technol Forecast Soc Change 2020;150:119791. https://doi.org/10.1016/j.techfore.2019.119791.

[34] Nambisan S, Wright M, Feldman M. The digital transformation of innovation and entrepreneurship: Progress, challenges and key themes. Res Policy 2019;48:103773. https://doi.org/10.1016/j.respol.2019.03.018.

[35] Kindangen P, Tumiwa JR, Sepang JL. POVERTY ALLEVIATION IN URBAN AREAS OF NORTH SULAWESI, INDONESIA: THE ROLE OF HUMAN RESOURCES. Int J Soc Sci Econ Res 2019;4:1384–95.

[36] Giang NTH, Hai PTT, Tu NTT, Tan PX. Exploring the readiness for digital transformation in a higher education institution towards industrial revolution 4.0. Int J Eng Pedagog 2021;11:4–24. https://doi.org/10.3991/IJEP.V11I2.17515.

[37] Santisteban J, Mauricio D, Nacional U, San M De, Nacional U, San M De. Critical success factors for technology-based startups Orestes Cachay Faculty of Industrial Engineering , 2021;42:397–421.

[38] Venkataraman S. Regional transformation through technological entrepreneurship. J Bus Ventur 2004;19:153–67. https://doi.org/10.1016/j.jbusvent.2003.04.001.

[39] Koe WL. Data on technopreneurial intention among male and female university students: A comparison. Data Br 2020;33:106423. https://doi.org/10.1016/j.dib.2020.106423.

[40] Scarlat C. Technopreneurship - an Emerging Concept. Faima Bus Manaj J 2014;2:5–13. https://doi.org/10.1001/archneur.1991.00530230086029.

[41] Barringer P. Process Reliability Techniques Help Make More Money. Oper. Excell., Hoboken, NJ, USA: John Wiley & Sons, Inc; 2015, p. 213–27. https://doi.org/10.1002/9781118990162.ch13.

[42] He Y, Gu C, He Z, Cui J. Reliability-oriented quality control approach for production process based on RQR chain. Total Qual Manag Bus Excell 2018;29:652–72. https://doi.org/10.1080/14783363.2016.1224086.

[43] Fitriasari F. How do Small and Medium Enterprise (SME) survive the COVID-19 outbreak? J Inov Ekon

2020;5:53–62. https://doi.org/10.22219/jiko.v5i3.11838.

[44] Purnomo A, Septianto A, Sutiksno DU, Hikmawan MI, Kumalasari RD. Technopreneur publication: A bibliometric analysis (2000-2019). Proc 2020 Int Conf Inf Manag Technol ICIMTech 2020 2020:521–6. https://doi.org/10.1109/ICIMTech50083.2020.9211111.

[45] Kholief M. Government innovation 4.0: The roadmap to digital transformation in Egypt. In: L P, M.W P, editors. Towar. Digit. World Ind. X.0 - Proc. 29th Int. Conf. Int. Assoc. Manag. Technol. IAMOT 2020, Cairo: University of Pretoria; 2020, p. 761–84.

[46] Chowdhury M, Prayag G, Orchiston C, Spector S. Postdisaster Social Capital, Adaptive Resilience and Business Performance of Tourism Organizations in Christchurch, New Zealand. J Travel Res 2019;58:1209–26. https://doi.org/10.1177/0047287518794319.

[47] Sarstedt M, Ringle CM, Hair JF. Partial Least Squares Structural Equation Modeling. Handb. Mark. Res., vol. 21, Cham: Springer International Publishing; 2017, p. 1–40. https://doi.org/10.1007/978-3-319-05542-8_15-1.

[48] Hair JF, Risher JJ, Sarstedt M, Ringle CM. When to use and how to report the results of PLS-SEM. Eur Bus Rev 2019;31:2–24. https://doi.org/10.1108/EBR-11-2018-0203.

[49] Paul J, Criado AR. The art of writing literature review: What do we know and what do we need to know? Int Bus Rev 2020;29:101717. https://doi.org/10.1016/j.ibusrev.2020.101717.

[50] Kovács TZ, David F, Nagy A, Szűcs I, Nábrádi A. An Analysis of the Demand-Side, Platform-Based Collaborative Economy: Creation of a Clear Classification Taxonomy. Sustainability 2021;13:2817. https://doi.org/10.3390/su13052817.

[51] Gonzales-Gemio C, Cruz-Cázares C, Parmentier MJ. Responsible innovation in smes: A systematic literature review for a conceptual model. Sustain 2020;12:1–27. https://doi.org/10.3390/su122410232.

[52] Nagy A, Fenyves V, Nábrádi A. Project management systems in agriculture in the northern great plain region of Hungary. Zb Rad 44 Hrvat i 4 Medunar Simp Agron Opatija, Hrvat 16-20 Veljače 2009 2009:223–6.

[53] Hutajulu S, Dhewanto W, Prasetio EA. Two scenarios for 5G deployment in Indonesia. Technol Forecast Soc Change 2020;160. https://doi.org/10.1016/j.techfore.2020.120221.

[54] Nurunnabi M. Recovery planning and resilience of SMEs during the COVID-19: experience from Saudi Arabia. J Account Organ Chang 2020;16:643–53. https://doi.org/10.1108/JAOC-07-2020-0095.

[55] Baldock R, Mason C. Establishing a new UK finance escalator for innovative SMEs: the roles of the Enterprise Capital Funds and Angel Co-Investment Fund. Ventur Cap 2015;17:59–86. https://doi.org/10.1080/13691066.2015.1021025.

[56] Xiang D, Worthington AC. The impact of government financial assistance on the performance and financing of Australian SMEs. Account Res J 2017;30:447–64. https://doi.org/10.1108/ARJ-04-

2014-0034.
[57] Birskyte L, Mingelaite D. Government financial support: Does it improve the performance of small and medium-sized enterprises in Lithuania? Int J Entrep Small Bus 2021;43:142–63. https://doi.org/10.1504/IJESB.2021.115320.
[58] Culkin N. Entrepreneurial universities in the region: the force awakens? Int J Entrep Behav Res 2016;22:4–16. https://doi.org/10.1108/IJEBR-12-2015-0310.
[59] Tumiwa J, Paruntu CP. The Analysis of Human Capital Building and Financial Assistance on Small Medium Enterprises Development in Manado and Tomohon. J ASEAN Stud Marit Issues 2017;3:1–12.
[60] Djalante R, Lassa J, Setiamarga D, Sudjatma A, Indrawan M, Haryanto B, et al. Review and analysis of current responses to COVID-19 in Indonesia: Period of January to March 2020. Prog Disaster Sci 2020;6:100091. https://doi.org/10.1016/j.pdisas.2020.100091.
[61] Hidayatullah DR, Darmawan A, Kallidumban S. Finding the strategy after corona crisis: the new normal and resilient economy growth in indonesia. Internatioal J Econ Business, Entrep 2020;3:64–79.
[62] Surjaningsih N, Utari GAD, Trisnanto B. the Impact of Fiscal Policy on the Output and Inflation. Bul Ekon Monet Dan Perbank 2012;14:367–96. https://doi.org/10.21098/bemp.v14i4.409.
[63] Tambunan T. SME Development in Indonesia: Do Economic Growth and Government Supports Matter? SSRN Electron J 2008;4:111–33. https://doi.org/10.2139/ssrn.1218922.
[64] Chiang LC, Fatt JPT. Government development assistance programmes (GDAPs) for small- and medium-sized enterprises (SMEs) in a knowledge-based economy. Int J Entrep Innov Manag 2004;4:124–37. https://doi.org/10.1504/IJEIM.2004.004720.
[65] Nan W (Vince), Park M. Improving the resilience of SMEs in times of crisis: The impact of mobile money amid Covid-19 in Zambia. J Int Dev 2021. https://doi.org/10.1002/jid.3596.
[66] Tumiwa JR. Fiscal and monetary policies in Indonesia. Econ Work Cap 2020:15–22.
[67] Sommarberg M, Makinen SJ. Technopreneurial characteristics rising from the ashes of creative destruction. PICMET 2018 - Portl Int Conf Manag Eng Technol Manag Technol Entrep Engine Econ Growth, Proc 2018. https://doi.org/10.23919/PICMET.2018.8481846.
[68] Burhan M, Salam MT, Hamdan OA, Tariq H. "Crisis management in the hospitality sector SMEs in Pakistan during COVID-19". Int J Hosp Manag 2021;98:103037. https://doi.org/10.1016/j.ijhm.2021.103037.
[69] Guiliani F, Cisneros L, Saba T, Cachat-Rosset G. Between the devil and the deep blue see: the role of situated optimism. Rev Int PME 2021;34:13–35.
[70] Schumpeter JA, Clemence R V. Essays: On entrepreneurs, innovations, business cycles and the evolution of capitalism. Essays Entrep Innov Bus Cycles Evol Capital 2017:1–341. https://doi.org/10.4324/9781351311489.
[71] Pujanis V, Khairunnisaa S, Meuthia

M. Technopreneurship in Small Travel Entreprises (STEs): A Conceptual Framework of Performance Measurement. Sains Humanika 2015;5:43–9. https://doi.org/https://doi.org/10.11113/sh.v5n2.628.

[72] Ayala JC, Manzano G. The resilience of the entrepreneur. Influence on the success of the business. A longitudinal analysis. J Econ Psychol 2014;42:126–35. https://doi.org/10.1016/j.joep.2014.02.004.

[73] Portuguez Castro M, Gómez Zermeño MG. Being an entrepreneur post-COVID-19 – resilience in times of crisis: a systematic literature review. J Entrep Emerg Econ 2021;13:721–46. https://doi.org/10.1108/JEEE-07-2020-0246.

[74] Abdulgani M, Mantikayan J. Exploring Factors that Affect Technopreneurship: A Literature Review. CCSPC R&D J 2017;1:98–114.

[75] Shamsuddin N, Mohd F. Social media and technopreneurial intention: A model based on technopreneur development. Opcion 2018;34:501–17.

[76] Li L, Su F, Zhang W, Mao JY. Digital transformation by SME entrepreneurs: A capability perspective. Inf Syst J 2018;28:1129–57. https://doi.org/10.1111/isj.12153.

[77] Sulianta F, Sapriya H. User generated content platform as a new media for technopreneur writer in industrial age version 4. Int J High Educ 2019;8:63–76. https://doi.org/10.5430/ijhe.v8n3p63.

[78] Klongthong W, Thavorn J, Thanabodypath W, Dhammathattariya P, Chandrachai A. The influence of entrepreneurial self-efficacy and innovation on firm performance: Evidence from thai startup firms. Humanit Soc Sci Lett 2020;8:450–63. https://doi.org/10.18488/JOURNAL.73.2020.84.450.463.

[79] Dilyard J, Zhao SS, You JJ. Digital innovation and Industry 4.0 for global value chain resilience: Lessons learned and ways forward. THUNDERBIRD Int Bus Rev 2021;63:577–84. https://doi.org/10.1002/tie.22229.

[80] Hrivnák M, Moritz P, Chreneková M. What Kept the Boat Afloat? Sustainability of Employment in Knowledge-Intensive Sectors Due to Government Measures during COVID-19 Pandemic. Sustainability 2021;13:8441. https://doi.org/10.3390/su13158441.

[81] Ruslianti E, Mulyaningrum. An Innovation for the Resilience and Development of MSMEs in Majalengka Regency , Indonesia. Adv. Soc. Sci. Educ. Humanit. Res., vol. 510, 2020, p. 632–43.

[82] El Hilali W, El Manouar A, Janati Idrissi MA. Reaching sustainability during a digital transformation: a PLS approach. Int J Innov Sci 2020;12:52–79. https://doi.org/10.1108/IJIS-08-2019-0083.

[83] Mahmutaj LR, Rocheska S, Krasniqi BA. Complementary relationship between types of innovation in SMEs: The context of Kosovo. Int J Entrep Small Bus 2021;43:252–86. https://doi.org/10.1504/IJESB.2021.115361.

[84] Rivetti F, Migliaccio M, Capasso A. Innovation orientation: An investigation of Italian SMEs producing building materials. Int J Entrep Small Bus 2021;42:187–202. https://doi.org/10.1504/IJESB.2021.112245.

[85] Okuyama M, Sakakura K, Yasui T,

Maeno T. Building an open innovation model over a horizontal network by applying the open innovation theory on SMEs in Japan. From a case study on Shitamachi Bobsleigh Network Project in Ota City, Tokyo. Int J Entrep Small Bus 2021;42:69–92. https://doi.org/10.1504/IJESB.2021.112262.

[86] González-Varona JM, López-Paredes A, Poza D, Acebes F. Building and development of an organizational competence for digital transformation in SMEs. J Ind Eng Manag 2021;14:15–24. https://doi.org/10.3926/jiem.3279.

[87] Pollard D, Svarcova J. Promoting knowledge transfer to Czech SMEs: The role of human resource development in increasing absorptive capacity. Int J Entrep Small Bus 2009;8:499–515. https://doi.org/10.1504/IJESB.2009.025695.

[88] Besson P, Rowe F. Strategizing information systems-enabled organizational transformation: A transdisciplinary review and new directions. J Strateg Inf Syst 2012;21:103–24. https://doi.org/10.1016/j.jsis.2012.05.001.

[89] Doherty NF, King M. From technical to socio-technical change: Tackling the human and organizational aspects of systems development projects. Eur J Inf Syst 2005;14:1–5. https://doi.org/10.1057/palgrave.ejis.3000517.

[90] Bouwman H, Nikou S, de Reuver M. Digitalization, business models, and SMEs: How do business model innovation practices improve performance of digitalizing SMEs? Telecomm Policy 2019;43:101828. https://doi.org/10.1016/j.telpol.2019.101828.

[91] Chen Y-YK, Jaw Y-L, Wu B-L. Effect of digital transformation on organisational performance of SMEs. Internet Res 2016;26:186–212. https://doi.org/10.1108/IntR-12-2013-0265.

[92] Gregurec I, Tomičić Furjan M, Tomičić-Pupek K. The Impact of COVID-19 on Sustainable Business Models in SMEs. Sustainability 2021;13:1098. https://doi.org/10.3390/su13031098.

[93] Pratama V, Santoso I, Mustaniroh SA. Development strategy of SMEs in the new normal era of coronavirus disease 2019 (COVID-19): A literature review. IOP Conf Ser Earth Environ Sci 2021;733. https://doi.org/10.1088/1755-1315/733/1/012058.

[94] Ogrean C, Herciu M. Romania's SMEs on the Way to EU's Twin Transition to Digitalization and Sustainability. Stud Bus Econ 2021;16:282–95. https://doi.org/10.2478/sbe-2021-0040.

[95] Păunescu C, Mátyus E. Resilience measures to dealing with the COVID-19 pandemic Evidence from Romanian micro and small enterprises. Manag Mark Challenges Knowl Soc 2020;15:439–57. https://doi.org/10.2478/mmcks-2020-0026.

[96] Orengo-Serra KL, Sánchez-Jauregui M. Coping with earthquakes and COVID-19: A perspective of customer relationship management. Estud Gerenciales 2021;37:318–31. https://doi.org/10.18046/j.estger.2021.159.4435.

[97] Scott N, Laws E. Tourism crises and disasters: Enhancing understanding of system effects. J Travel Tour Mark 2006;19:149–58. https://doi.org/10.1300/J073v19n02_12.

[98] Casalino N, Zuchowski I, Labrinos N, Nieto ÁLM, Martín-Jiménez JA. Digital strategies and organizational performances of smes in the age of coronavirus: Balancing digital transformation with an effective business resilience. Law Econ Yrly Rev 2020;8:347–80. https://doi.org/10.2139/ssrn.3563426.

[99] Yanto H, Yulianto A, Sebayang LKB, Mulyaga F. Improving the compliance with accounting standards without public accountability (SAK ETAP) by developing organizational culture: A case of Indonesian SMEs. J Appl Bus Res 2017;33:929–40. https://doi.org/10.19030/jabr.v33i5.10016.

[100] Karadag DH. The Role of SMEs and Entrepreneurship on Economic Growth in Emerging Economies within the Post-Crisis Era: an Analysis from Turkey. J Small Bus Entrep Dev 2016;4. https://doi.org/10.15640/jsbed.v4n1a3.

[101] Ulas D. Digital Transformation Process and SMEs. Procedia Comput Sci 2019;158:662–71. https://doi.org/10.1016/j.procs.2019.09.101.

[102] Rovena Tahiti RT, Besa Shahini BS. Strengthening innovation and Technology policies for SME Development in Albania. Contemp Econ 2010;4. https://doi.org/10.5709/ce.1897-9254.o149.

[103] Abbasi K, Alam A, Du M (Anna), Huynh TLD. FinTech, SME efficiency and national culture: Evidence from OECD countries. Technol Forecast Soc Change 2021;163:120454. https://doi.org/10.1016/j.techfore.2020.120454.

[104] Tumiwa JR, Tuegeh ODM, Nagy A. Factor Influencing MSMEs Performance Measurement - A Literature Review TUMIWA. Ann Univ Oradea, Econ Sci 2020;Tom 29:151–62.

[105] Marconatto DAB, Teixeira EG, Peixoto GA, Faccin K. Weathering the storm: what successful SMEs are doing to beat the pandemic. Manag Decis 2021;ahead-of-p. https://doi.org/10.1108/MD-11-2020-1507.

[106] Régnier P. Business Linkages and Resilience of SMEs during the East Asian Crisis: The Role of Networks and Trust between TNCs and Local Suppliers. Trust Antitrust Asian Bus. Alliances, London: Palgrave Macmillan UK; 2004, p. 196–208. https://doi.org/10.1057/9780230523579_8.

[107] Williams N, Vorley T. Economic resilience and entrepreneurship: Lessons from the Sheffield City Region. Entrep Reg Dev 2014;26:257–81. https://doi.org/10.1080/08985626.2014.894129.

[108] Fiksel J. Sustainability and resilience: toward a systems approach. Sustain Sci Pract Policy 2006;2:14–21. https://doi.org/10.1080/15487733.2006.11907980.

[109] Hamel G, Välikangas L. Hamel Quest for Resilience. Harv Bus Rev 2003;81:52-63+131.

[110] Dahles H, Susilowati TP. Business resilience in times of growth and crisis. Ann Tour Res 2015;51:34–50. https://doi.org/10.1016/j.annals.2015.01.002.

[111] Morisse M, Prigge C. Design of a business resilience model for industry 4.0 manufacturers. AMCIS 2017 - Am Conf Inf Syst A Tradit Innov 2017;2017-Augus:1–10.

[112] Kerr H. Organizational Resilience:

Harnessing experience, embracing opportunity. 2015.
[113] Lee J. Discriminant analysis of technology adoption behavior: A case of Internet technologies in small businesses. J Comput Inf Syst 2004;44:57–66. https://doi.org/10.1080/08874417.2004.11647596.
[114] Gartner WB. What are we talking about when we talk about entrepreneurship? J Bus Ventur 1990;5:15–28. https://doi.org/10.1016/0883-9026(90)90023-M.
[115] Bercovitz J, Feldman M. Academic Entrepreneurs: Organizational Change at the Individual Level. Organ Sci 2008;19:69–89. https://doi.org/10.1287/orsc.1070.0295.
[116] Aldianto L, Anggadwita G, Permatasari A, Mirzanti IR, Williamson IO. Toward a business resilience framework for startups. Sustain 2021;13:1–19. https://doi.org/10.3390/su13063132.
[117] Fachrunnisa O, Adhiatma A, Lukman N, Majid NA. Towards SMEs' digital transformation: The role of agile leadership and strategic flexibility. J Small Bus Strateg 2020;30:65–85.
[118] Ghozali I. Structural equation modeling: Metode alternatif dengan partial least square (pls). Badan Penerbit Universitas Diponegoro; 2008.
[119] Hair JF, Howard MC, Nitzl C. Assessing measurement model quality in PLS-SEM using confirmatory composite analysis. J Bus Res 2020;109:101–10. https://doi.org/10.1016/j.jbusres.2019.11.069.
[120] Lévesque M, Minniti M. Age matters: how demographics influence aggregate entrepreneurship. Strateg Entrep J 2011;5:269–84. https://doi.org/10.1002/sej.117.
[121] Fried HO, Tauer LW. Understanding the Entrepreneur : an Index of Entrepreneurial Success. Front Entrep Res 2009;29:1.
[122] Malihah E, Setiyorini HPD. Industry Revolution 4.0: The Challenge for Secondary Education on Tourism and Hospitality in Indonesia. Proc. 5th UPI Int. Conf. Tech. Vocat. Educ. Train. (ICTVET 2018), Paris, France: Atlantis Press; 2019. https://doi.org/10.2991/ictvet-18.2019.106.
[123] Winarno A, Wijijayanti T, Agustina Y, Churiyah M, Basuki A. Integration of vocational school and Small-Medium Enterprises (SMEs) learning: An effort of elevating entrepreneurship spirit based on strength and weakness in East Java. Acad Entrep J 2019;25:1–12.
[124] Olivia S, Gibson J, Nasrudin R. Indonesia in the Time of Covid-19. Bull Indones Econ Stud 2020;56:143–74. https://doi.org/10.1080/00074918.2020.1798581.
[125] Othman AK, Hamzah MI, Suffian A, Zahari M, Amri S. The Influence of Entrepreneurship Education and Experience on Students ' Entrepreneurship Spirit : The Moderating Effects of Internal Locus of Control. Adv Bus Res Int J 2015;1:11–29.
[126] Dressler M, Paunovic I. Converging and diverging business model innovation in regional intersectoral cooperation–exploring wine industry 4.0. Eur J Innov Manag 2020. https://doi.org/10.1108/EJIM-04-2020-0142.
[127] Chin WW. Commentary Issues and Opinion on Structural Equation Modeling Clear Reporting. Mod Methods Bus Res Methodol Bus Manag 1998;22:vii–xvi.

[128] Hair JF, Ringle CM, Sarstedt M. Partial Least Squares Structural Equation Modeling: Rigorous Applications, Better Results and Higher Acceptance. Long Range Plann 2013;46:1–12. https://doi.org/10.1016/j.lrp.2013.01.001.

[129] Munandar MH. Analysis The Effectiveness Of Tax Relaxation Due To Covid-19 Pandemy On Indonesian Economic Defense. Lex Sci Law Rev 2020;4:133–42. https://doi.org/10.15294/lesrev.v4i1.38631.

[130] Pei LK, Noordin KA, Ting YP, Baharudin AS. Failure factors of the Malaysian IT technopreneurship. CSSR 2010 - 2010 Int Conf Sci Soc Res 2010:686–90. https://doi.org/10.1109/CSSR.2010.5773868.

[131] Bartsch S, Weber E, Büttgen M, Huber A. Leadership matters in crisis-induced digital transformation: how to lead service employees effectively during the COVID-19 pandemic. J Serv Manag 2021;32:71–85. https://doi.org/10.1108/JOSM-05-2020-0160.

[132] Suharno, Pambudi NA, Harjanto B. Vocational education in Indonesia: History, development, opportunities, and challenges. Child Youth Serv Rev 2020;115:105092. https://doi.org/10.1016/j.childyouth.2020.105092.

[133] García-Sánchez IM, Gallego-Álvarez I, Zafra-Gómez JL. Do independent, female and specialist directors promote eco-innovation and eco-design in agri-food firms? Bus Strateg Environ 2021;30:1136–52. https://doi.org/10.1002/bse.2676.