

EFFECT OF TECHNOLOGY, ORGANIZATION, AND EXTERNAL ENVIRONMENT ON BUSINESS PERFORMANCE MEDIATED BY THE ADOPTION OF TECHNOLOGY 4.0 IN SMEs

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Abstract

Background – SMEs are very important for a country's economic growth and are recognized as one of the main contributors to economic development, which results in job growth. However, Manding SMEs in Bantul Regency find it difficult to survive in the current economic environment, especially during the current Covid-19 pandemic. This study analyzes the issue of deteriorating performance due to the COVID-19 pandemic in Bantul.

Aim – This study aims to re-analyze the relationship between Technology-Organization-Environment (TOE) and SME business performance.

Design / methodology / approach – This research is a census study with the number of respondents as many as 30 UKM Leather Manding in Bantul, Yogyakarta, Indonesia. The method of data collection is done by distributing questionnaires. The analytical tool used in this research is Partial Least Square (PLS).

Results and Discussion - This study has found a positive and significant relationship with each hypothesis. The results of hypothesis 1 in this study found that technology factors were positively and significantly related to SME business performance. hypothesis 2 has the greatest value compared to the variables of technological factors and external environmental factors. hypothesis 3 has a relatively small original sample value compared to technological factors and organizational. hypothesis 4 in this study indicate that the direction of the relationship is positive and significant. hypothesis 5 found that organizational factors affect SME business performance mediated by the adoption of technology 4.0

Conclusion - The results of the research that have been carried out show that the Leather Manding SME in Bantul has SME business performance which is influenced by the adoption of technology 4.0. On the other hand, the adoption of technology 4.0 itself is influenced by technological factors, organizational factors, and external environmental factors.

Research implication – Provide direction for SME Kulit Manding in Bantul to strengthen and sustain organizational growth by enhancing and collaborating on SME's distinct image, goals, strategies, and core values as well as facilitating consistent relationships within and outside of ICT interactions in order to compete and excel in the leather craft industry.

Limitations – Based on the findings of this study, this study has several limitations, the sample in this study was limited to certain areas, namely Manding, Bantul, Special Region of Yogyakarta. Although this study establishes a cognitive model of the TOE and SMEs business performance consistent with the theoretical basis used, however, based on theoretical aspects, the study of technology adoption 4.0 in SMEs still provides development opportunities to test the cognitive model TOE and SMEs business performance.

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Abstrak

Latar Belakang – UKM sangat penting bagi pertumbuhan ekonomi suatu negara dan diakui sebagai salah satu kontributor utama pembangunan ekonomi, yang menghasilkan pertumbuhan lapangan kerja. Namun, UKM Manding di Kabupaten Bantul merasa kesulitan untuk bertahan di lingkungan ekonomi saat ini, terutama di masa pandemi Covid-19 saat ini. Kajian ini menganalisis isu penurunan kinerja akibat pandemi COVID-19 di Bantul.

Tujuan – Penelitian ini bertujuan untuk menganalisis kembali hubungan antara Technology-Organization-Environment (TOE) dengan kinerja bisnis UKM.

Desain/Metodologi/Pendekatan – Penelitian ini merupakan penelitian sensus dengan jumlah responden sebanyak 30 UKM Kulit Manding di Bantul Yogyakarta, Indonesia. Metode pengumpulan data dilakukan dengan menyebarkan kuesioner. Alat analisis yang digunakan dalam penelitian ini adalah Partial Least Square (PLS).

Hasil dan Pembahasan - Penelitian ini menemukan hubungan positif dan signifikan dengan masing-masing hipotesis. Hasil hipotesis 1 dalam penelitian ini menemukan bahwa faktor teknologi berhubungan positif dan signifikan dengan kinerja bisnis UKM. hipotesis 2 memiliki nilai paling besar dibandingkan dengan variabel faktor teknologi dan faktor lingkungan eksternal. hipotesis 3 memiliki nilai sampel asli yang relatif kecil dibandingkan dengan faktor teknologi dan organisasi. hipotesis 4 dalam penelitian ini menunjukkan bahwa arah hubungan adalah positif dan signifikan. hipotesis 5 menemukan bahwa faktor organisasi mempengaruhi kinerja bisnis UKM yang dimediasi oleh adopsi teknologi 4.0

Kesimpulan - Hasil penelitian yang telah dilakukan menunjukkan bahwa UKM Kulit Manding di Bantul memiliki kinerja bisnis UKM yang dipengaruhi oleh adopsi teknologi 4.0. Di sisi lain, adopsi teknologi 4.0 sendiri dipengaruhi oleh faktor teknologi, faktor organisasi, dan faktor lingkungan eksternal.

Implikasi penelitian – Memberikan arahan bagi UKM Kulit Manding di Bantul untuk memperkuat dan mempertahankan pertumbuhan organisasi dengan meningkatkan dan berkolaborasi pada citra, tujuan, strategi, dan nilai inti UKM yang berbeda serta memfasilitasi hubungan yang konsisten di dalam dan di luar interaksi TIK untuk bersaing dan unggul dalam industri kerajinan kulit.

Batasan Penelitian – Berdasarkan temuan penelitian ini, penelitian ini memiliki beberapa keterbatasan, sampel dalam penelitian ini terbatas pada daerah tertentu yaitu Manding, Bantul, Daerah Istimewa Yogyakarta. Meskipun penelitian ini menetapkan model kognitif kinerja bisnis TOE dan UKM yang konsisten dengan landasan teori yang digunakan, namun berdasarkan aspek teoritis, studi adopsi teknologi 4.0 pada UKM masih memberikan peluang pengembangan untuk menguji model kognitif kinerja bisnis TOE dan UKM.

Kata Kunci : Teknologi, Organisasi, Lingkungan, adopsi, kinerja.

INTRODUCTION

Demographic changes, globalization, resource scarcity, and climate change are megatrends that companies around the world have to deal with (Abele and Reinhart, 2011). These changes have an impact on environmental changes, uncertainty, and complexity that can affect the company's overall strategic environment (Bauer et al., 2019). Industry 4.0 changes the traditional

production system towards digital. The manufacturing sector is closely related to engineering or techniques that apply machinery, equipment and labor in the production process. The manufacturing industry is the backbone of the world economy, while SMEs are the basis of the manufacturing industry (Prause, 2019). Alsharji et al. (2018) say that SMEs are very important for a country's economic growth and are recognized as one of the main



contributors to economic development, which results in job growth. However, Manding SMEs in Bantul Regency find it difficult to survive in the current economic environment, especially during the current Covid-19 pandemic.

This study analyzes the issue of deteriorating performance due to the COVID-19 pandemic in Bantul. According to Apulu & Latham (2011), organizational performance can be observed from the increase in sales, market share and company profitability (Lucia et al., 2014). The results of research conducted by the Yogyakarta Special Region (DIY) Cooperatives and SMEs Service together with Jogja Economic Resilience for Covid-19 (JER-Covid) on micro, small and medium enterprises (SMEs) in DIY affected by the coronavirus pandemic (Covid-19) shows that of the 1,000 respondents of DIY SMEs, it shows that (1) as many as 321 trading business actors are the worst affected, followed by the processing industry as many as 250 business actors, the creative economy 212 percent. (2) Other business sectors are 133 actors and 46 without business category. Meanwhile, the business sectors with the highest percentage ranking are agriculture 16, tourism 8, transportation 5, marine and fishery 4, real estate and property 3, construction 2. (3) JER-covid's research results also show that the performance of SMEs has dropped

drastically from mid-March to June 2020, the income of SMEs has fallen from Rp. 19.3 billion to Rp. 3 billion, or down to 80 percent.

This study focuses on the performance of the Leather Manding UKM in Bantul which is influenced by the adoption of information technology using the TOE theoretical basis in new normal conditions due to the covid-19 pandemic. The initial survey conducted by researchers in January 2021 with several SMEs and Manding Tourism Awareness Groups, Sabdodadi Bantul, shows that there is a decrease in the number of tourist visits, This is due to the increasing competitive pressure and the impact of social distancing set by the government during this period the covid-19 pandemic that prohibits people from visiting tourist areas. The existence of social distancing has an impact on changes in sales patterns of Manding Leather Handicraft SMEs from the beginning made sales online conventional, namely selling directly face to face with consumers, become sales based on digital technology and the internet. TOE is a technology adoption model from Tonatzky and Fleischer (1990) which observes three contexts of SMEs in adopting information technology, namely: the context of technology, the context of the organization and the context of the environment. The technological context includes new technologies that are relevant



to the organization (Alsharji et al., 2018). Technological context is the level of organizational readiness in adopting technology which is proxied with the support of SME managers in adopting technology (Zhu et al., 2006).

According to Okechi and Kepeghom (2013), the organizational context must be supported by an organizational understanding of the characteristics of innovation so that it can assist in redesigning and aligning business activities with the adopted information technology. The environmental context refers to the day-to-day pressures faced by SMEs that cause SMEs to adopt new technologies. The external environmental context is the area in which the company does business, such as where the industry is located, its competitors, regulations, access to resources provided by others, and the governments with which it interacts (Alsharji et al., 2018).

The debate on the results of previous research has also, so the researchers conducted research on TOE in relation to adoption and performance. Differences in the measurements of previous researchers have shown that there is a gap problem in the organizational context. Azadegan and Teich (2010) proxies technology with perceived usefulness and perceived ease of use as reasons for organizations to adopt the technology. On the other hand, Azadegan

and Teich (2010) propose five characteristics of technological innovation, which consist of relative advantage, compatibility, complexity, trialability and observability. Meanwhile, Prause (2019) revealed that the measurement of the technological context consists of relative advantage, complexity, compatibility, and cost.

Another research finding a gap on technology adoption that still needs to be reviewed is that of Martín et al. (2012), which refers to the study conducted by Shankar et al. (2010); Studen and Tiberius (2020), where competitive pressure is considered a significant factor influencing the growth and spread of online commerce. An interesting phenomenon raised by them is related to the finding, which states that the practice of adopting technology causes a loss of productivity, not an increase. However, on the other hand, the study of Martín et al. (2012) and Pateli et al. (2020) state that when firms are involved in intense competition and uncertainty about the actions of their competitors, firms are more likely to adjust their technology strategies.

LITERATURE REVIEW

Technology-Organization-Environment

The framework is an organizational-level theory developed by Tornatzky and Fleischer (1990) to explain the elements that influence technology 4.0 adoption decisions in an enterprise context. The TOE model



framework broadly identifies three elements that influence the adoption process at the enterprise level: organizational factors, technological factors, and environmental factors. According to Lei and Ngai (2012), TOE is the only theoretical framework that covers all the drivers that can influence technology adoption initiatives 4.0. Theory-Based Resource View emphasizes the antecedents of the technological and organizational context. Specifically, this theory provides a framework for explaining the contribution of firm-specific technology/organizational resources and the ability to influence Information Technology initiatives (Chong and Olesen, 2017).

Technological Factors

Due to limited resources, SMEs are required to use and utilize technology for marketing activities (Bhattacharya and Wamba, 2018). The existence of innovative technology, it provides a way to increase the interaction between customers and organizations (Maroufkhani et al., 2020). Based on the study conducted by Qalati et al. (2020), technology factors are used to measure the impact of technology on SME business performance. A number of studies have been conducted at the individual and organizational levels to investigate the effect of technology adoption on performance measures (Odoom et al., 2017). Tornatzky et al., (1990) analyzed data from 202 manufacturing firms to investigate the

interaction between infrastructure and firm performance. Previous researchers found a positive interaction between technology and company performance. Ahmad et al., (2018) state that there is a relationship between technology, individuals, structures, organizations, and management processes. Maduku et al., (2016) stated that technology contributes to company performance. Dutot et al., (2016) suggest that technological innovation is positively related to business performance in SMEs.

H₁: Technological factors influence SME business performance

Organizational Factors

This study uses top management team support as a dimension to develop organizational impact. Steininger et al. (2014) argue that the survival of SMEs is highly dependent on their ability to take advantage of opportunities in the market. Due to their limited resources, the top management team (particularly the chief executive (CEO) and top managers) choose the organization's strategy, and through this strategy, they influence the company's performance. Similarly, Kaplan and Haenlein (2010) state the role of human resources in firm performance and argue that, in a competitive marketplace, members of an organization's core team (CEOs and managers) make key strategic decisions that have an impact on the future direction and overall performance of the firm. Therefore,



this study argues that, due to the highly centralized system, SMEs are usually managed by the owner or chief executive. Steininger et al., (2014) believes that the survival of SMEs is highly dependent on their ability to take advantage of opportunities in the market. because of the source their limited resources, the top management team (especially the head of executives (CEOs) and top managers) choose the organization's strategy, and through these strategies, they affect the company's performance. Likewise, Kaplan and Haenlein (2010) stated the role of human resources in performance and argues that, in a competitive marketplace, core team members organizations (CEOs and managers) make key strategic decisions that impact on the future direction and overall performance of the company. Trainor et al., (2014) studied a sample of 774 Taiwanese-owned business managers in China and found a positive relationship between top management teams and firm performance. Barney (2001) also found a positive relationship between the top management team and organizational performance. Top management support refers to the leadership of companies that increase the significance of technology 4.0 adoption and their commitment to adopting technology 4.0 (Jitpaiboon et al., 2010). If top management works positively to adopt technology 4.0 only, it can reduce

organizational resistance or inhibiting factors for organizations to innovate technology (Tajudeen et al., 2018). Therefore, top management support is an indispensable factor and serves as a strategic resource to improve company performance (Singh et al., 2019).

H₂: Organizational factors influence SME business performance

External Environmental

Factors Environmental impacts help in understanding the factors surrounding the performance of SMEs in the external environment (Haseeb et al., 2019). Competitive intensity arises in conditions where competitors are abundant, and there are few opportunities for growth in the industry (Dias et al., 2020). In addition, the intensity of competition is an important determinant that contributes to environmental hostility. According to Pateli et al., (2020), their study, based on a sample of 182 manufacturing firms located in China, proves the effect of competitive intensity on firm performance. Competitive pressure is when competitors feel the pressure that forces a company to adopt 4.0 technologies that enable it to survive (Seo et al., 2020). In the context of SMEs, it is stated that the higher the number of organizations that are under pressure to compete, the higher their performance will be affected (Tella, 2020). Geurin and Burch (2017) advocate the hypothesis that competitive



pressure has a significant positive relationship with strategic performance. Competitive pressure refers to the pressure felt by competitors in the same industry (Zhu and Kraemer, 2005). Similarly, the study shows that firms are moving toward innovation adoption as competitive pressures increase. In addition, technological innovation is an approach that focuses on new ideas and knowledge generated from the environment outside the company, such as competitive pressures (Dokukina and Petrovskaya, 2019). Therefore, in order to maintain a competitive position, SMEs should adopt technology 4.0 to gain maximum market share both locally and internationally, these activities increase the level of customer trust and help companies to increase sales to repay the investment in short term (Gupta et al. al., 2013) which ultimately improves company's performance (Henseler et al., 2019).

H₃: External environmental factors affect SME business performance

Technology Adoption 4.0

The current application of adoption theory comes from the Ryan and Gross hybrid study in 1943, resulting in four aspects of adoption theory (Lupo, 2015). The four aspects of adoption theory include how the innovation is initiated, the channel of communication of the innovation, the timing as defined by the degree of adoption formed, and the socioeconomic characteristics of the

adopter category. Factors that influence adoption rates include observability, relative advantage, complexity, and compatibility (Rogers, 2003). Innovation adoption theory suggests that increased sales, increased customer connections, and reduced costs are positively related to the use of social media marketing; however, scholars debate the level of growth achieved through social media. In the context of adoption, Rogers (2003) defines innovation as a practice that is considered new by an individual. Not much importance is placed on whether the innovation is truly new; rather, what matters is whether the individual perceives the innovation to be new (Lupo, 2015; Rogers, 2003). New technologies or innovations do not have to be new to the society. Instead, technology may be new in the eyes of the adopter (Lupo, 2015). Adoption theory has application in adopting marketing strategy innovation as well as material innovation. For some small businesses, the adoption of technology 4.0 can be considered as an innovation to use in their future business strategy.

Olanrewaju et al., (2020) suggested the mediating role of technology 4.0 adoption between the TOE model and the performance of SMEs. Several researchers have found corporate social media adoption to be beneficial, and some have identified a positive relationship between social media adoption and corporate performance



(Braojos-Gomez et al., 2015). Quayle and Christiansen (2004); Terence and Soufani (2003) also say that the adoption of technology 4.0 can reduce operational costs, improve service to customers, increase the speed of response between producers and customers, producers and suppliers of inputs, increase market intelligence, and improve relationships With trading partners. The benefits of this technology are the motivation for SMEs to adopt these facilities.

H₄: Technological factors affect SME business performance mediated by the SME business performance

H₅: Organizational factors affect SME business performance mediated by the adoption of technology 4.0

H₆: External environmental factors affect SME business performance which is mediated by the adoption of technology 4.0.

SME Business Performance

Business performance is defined as business performance as measured by key measurements. This operational measurement of performance is linked to the success and profitability of products and services, product mix and portfolio, output as well as productivity, etc. Many definitions of firm performance have been suggested in many studies in the past (Barney, 2001), with most of them often referring to the efficiency and effectiveness of the firm in utilizing its resources in generating economic results. Varis and Littunen (2010)

argue that the reason for companies to activate innovation actions is to increase the functionality and success of the company. Another reason for innovation is the company's desire to gain increased business performance and increased competitiveness. Alam et al., (2013) have found that company innovation has a greater influence on business performance. Also, he investigated the impact of innovative activities on company performance by measuring sales revenue, market share, and profit level.

RESEARCH METHOD

Based on the research objective, this research is research to test the hypothesis. Hypothesis testing is research that explains the relationship between the dependent and independent variables or other variables that influence one variable to another. However, based on the time horizon, this study is also classified as a one-time or cross-sectional study. This research was conducted using quantitative data. The survey approach is carried out by collecting information from a sample by asking through a questionnaire or interview so that later it will describe various aspects of the population. Because this study has a population below 100, the sample is taken from the entire existing population, so it is called a population study or census (Arikunto, 2013). The population in this study were all UKM Kulit Manding located in



Bantul, Yogyakarta, Indonesia. The total population in this study amounted to 30 SMEs. The theoretical framework of this research consists of five constructs; all constructs were measured with the help of various items which were adapted from previous research because the validity and reliability of the items were well established. The author uses a five-point Likert scale that ranges from 1 (strongly disagree) to 5 (strongly agree).

FINDINGS AND DISCUSSION

Results Characteristics of Respondents

The object of this research is the owner or manager of the UKM Kulit Manding in Bantul. The number of questionnaires distributed both online has a target of being filled out and returned by 32 respondents. The number of respondents obtained in this study was 30 respondents. Thus, the number of respondents obtained is 93.75% of the targeted number of respondents. The following Table 1 shows the characteristics of respondents in this study.

Quantitative Analysis of Respondents

The analysis technique used in this research is Partial Least Square (PLS). PLS is one of the Structural Equation Modeling (SEM) techniques that is able to analyze latent variables, indicator variables, and measurement errors directly. PLS can be used with small samples and can be applied

to all data scales. The outer model or test of reflective indicators is evaluated through convergent validity, discriminant validity, and AVE. Meanwhile, the reliability test is seen from the composite reliability and Cronbach alpha values. Valid and reliable data is > 0.7 , and the expected AVE value is > 0.5 ; each construct shown in Table 2 has criteria above the expected standard.

Meanwhile, discriminant validity is evaluated by comparing the loading value on the intended construct, which must be greater than the loading value with other constructs. Table 3 presents the results of the discriminant validity test, which shows that each loading value on the intended construct is greater than the loading value of the other constructs.

The results of quantitative analysis in this study indicate that all hypotheses have a positive and significant effect. The value of the original sample on H_1 (0.542), H_2 (0.799), H_3 (0.049), H_4 (0.489), H_5 (0.312), and H_6 (0.243) has a positive value so that it shows a positive relationship. On the other hand, the value of t statistics has a number > 1.960 and p-values $> 5\%$. This means the hypothesis H_1 (t-value = 2.162 / p-value = 0.031), H_2 (t-value = 8.162 / p-value = 0.000), H_3 (t-value = 4.162 / p-value = 0.001), H_4 (t-value = 2.152 / p-value = 0.000), H_5 (t-value = 3.169 / p-value = 0.000) and H_6 (t-value = 6.598 / p-value = 0.000) are supported.



Table 1
 Characteristics of Respondents

Characteristics	Amount	%
Position:		
Owner	4	13.3%
Owner and Manager	26	86.7%
Length of operation:		
5 years	18	60 %
5 years	12	40 %
Last education:		
Elementary/junior high school	4	13,3 %
high school	9	30 %
Diploma/Bachelor	17	56,7 %
Number of employees:		
1 – 4 people	2	6,7%
5 – 10 people	5	16.7%
11 – 19 people	16	53.3%
20 – 30 people	7	23.3%
Average turnover per year:		
1 to 50 million (rupiah)	9	30 %
50 to 300 million (rupiah)	8	26.7 %
300 to 500 million (rupiah)	12	40 %
500 to 2.5 billion (rupiah)	1	3.3% %
Length of time to adopt technology / e-commerce / social media:		
1 – 12 months	16	53.3%
1 – 3 years	10	33.4%
3 years	4	13.3%
Types of e-commerce / social media:		
Marketplace (Shopee, Tokopedia, Bukalapak, OLX, etc.)	22	73.4%
Website / Blog	1	3,3 %
Gojek / Grab	1	3,3 %
Instagram	6	20 %

Source : Research data analysis, 2022

Table 2
 Construct Reliability and Validity

Latent Variable	Measurement Item	Outer Loading	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Technological Factors (X1)	KT1	0.710	0,786	0,838	0,596
	KT2	0.803			
	KT3	0.775			
	KT4	0.821			
	KT5	0.723			
	KT6	0.892			
	KT7	0.725			
	KT8	0.816			
	KT9	0.782			

Latent Variable	Measurement Item	Outer Loading	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Organizational Factors (X2)	KT10	0.916	0,853	0,887	0,535
	KO1	0.846			
	KO2	0.787			
	KO3	0.770			
	KO4	0.813			
	KO5	0.825			
	KO6	0.878			
External Environmental Factors (X3)	KL1	0.876	0,804	0,860	0,572
	KL2	0.899			
	KL3	0.909			
	KL4	0.732			
	KL5	0.782			
Adoption of Technology 4.0 (Z)	AT1	0.796	0,739	0,800	0,511
	AT2	0.718			
	AT3	0.862			
	AT4	0.883			
SME business performance (Y)	KB1	0.745	0,921	0,938	0,687
	KB2	0.918			
	KB3	0.916			
	KB4	0.914			
	KB5	0.896			
	KB6	0.757			
	KB7	0.868			

Source : Research data analysis, 2022

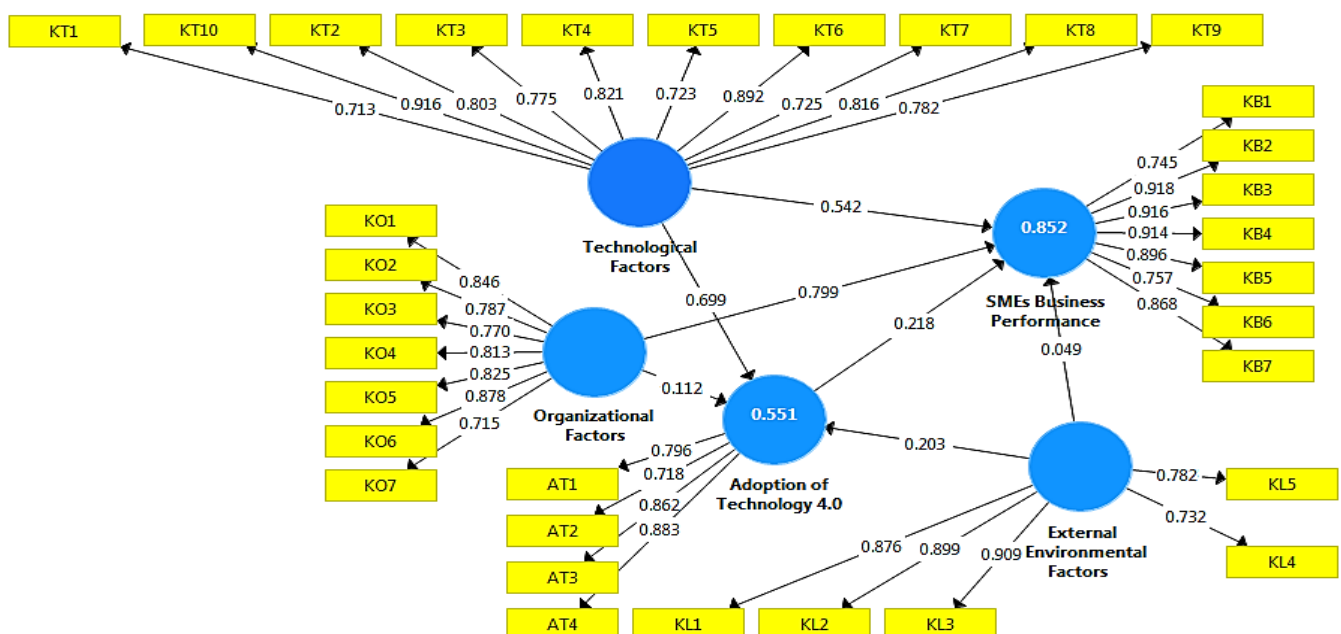


Figure 1. Test of algorithm models results



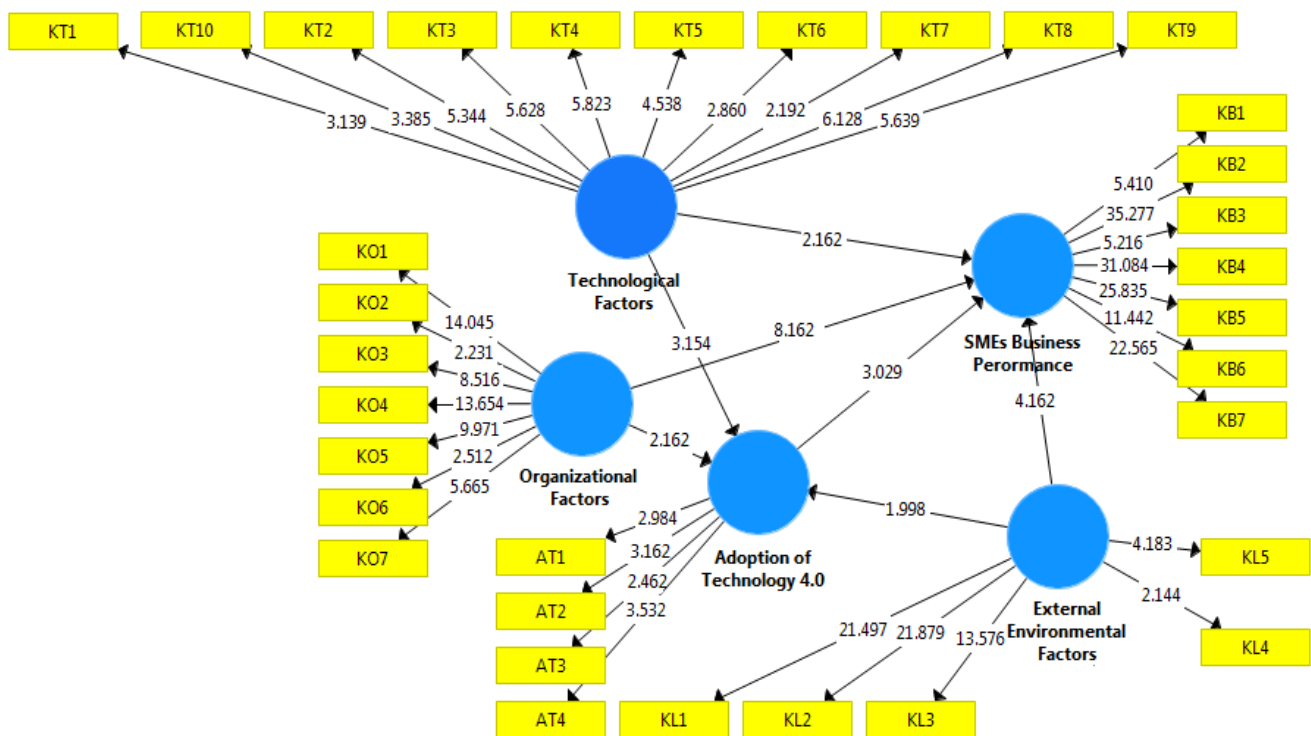


Figure 2. Test results of bootstrapping models

Table 3
 Cross Loading Factor

	Adoption of Technology 4.0	External Environmental Factors	Organizational Factors	Technological Factors	SME business performance
AT1	0,796	-0,096	-0,248	0,602	-0,332
AT2	0,718	-0,177	-0,012	0,307	-0,051
AT3	0,862	0,141	0,265	0,206	0,294
AT4	0,883	-0,520	-0,357	0,683	-0,424
KB1	-0,223	0,555	0,705	-0,256	0,745
KB2	-0,373	0,616	0,721	-0,463	0,918
KB3	-0,204	0,438	0,731	-0,167	0,916
KB4	-0,372	0,652	0,798	-0,455	0,914
KB5	-0,481	0,754	0,790	-0,556	0,896
KB6	-0,335	0,606	0,617	-0,413	0,757
KB7	-0,338	0,731	0,843	-0,462	0,868
KL1	-0,445	0,876	0,686	-0,419	0,705
KL2	-0,297	0,899	0,721	-0,477	0,767
KL3	-0,211	0,909	0,742	-0,304	0,649
KL4	-0,174	0,732	0,392	-0,012	0,199
KL5	-0,269	0,782	0,293	-0,050	0,241

KO1	-0,204	0,584	0,846	-0,224	0,759
KO2	-0,162	0,256	0,787	-0,139	0,387
KO3	-0,143	0,655	0,770	-0,373	0,726
KO4	-0,362	0,722	0,813	-0,454	0,649
KO5	-0,278	0,697	0,825	-0,247	0,709
KO6	-0,230	0,300	0,878	-0,104	0,282
KO7	-0,248	0,621	0,715	-0,082	0,668
KT1	0,132	-0,206	-0,032	0,713	-0,036
KT10	0,416	-0,232	-0,051	0,916	-0,165
KT2	0,614	-0,150	-0,194	0,803	-0,317
KT3	0,570	-0,278	-0,217	0,775	-0,358
KT4	0,686	-0,329	-0,242	0,821	-0,406
KT5	0,476	-0,275	-0,184	0,723	-0,263
KT6	0,357	-0,398	-0,306	0,892	-0,348
KT7	0,259	-0,240	-0,316	0,725	-0,306
KT8	-0,108	-0,160	-0,211	0,816	-0,201
KT9	0,590	-0,374	-0,395	0,782	-0,496

Source : Research data analysis, 2022

Table 4
 Path Coefficients

Hypothesis	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P-Values	Supported
Technological factors → SME business performance	0.542	0.197	0.122	2.162	0.031	Yes
Organizational factors → SME business performance	0.799	0.784	0.156	8.162	0.000	Yes
External Environmental Factors → SME business performance	0.049	0.060	0.139	4,162	0,001	Yes
Technological factors → Adoption of Technology 4.0 → SME business performance	0.489	0.499	0.189	2.152	0.000	Yes
Organizational factors → Adoption of Technology 4.0 → SME business performance	0.312	0.116	0.283	3.169	0.000	Yes
External Environmental Factors → Adoption of Technology 4.0 → SME business performance	0,243	0.471	0, 254	6.598	0.000	Yes

Source : Research data analysis, 2022



This study has found a positive and significant relationship with each hypothesis. The results of hypothesis 1 in this study are in line with the research of Dutot et al., (2016) who also found that technology factors were positively and significantly related to SME business performance. According to Okechi and Kepeghom (2013), organizations must demonstrate an understanding of the characteristics of Information and Communication Technology (ICT) innovations that assist in redesigning and aligning business activities to be integrated into current ICT service applications and systems to improve business performance SMEs. Therefore, Leather Manding SMEs in Bantul must be able to integrate ICT with existing business services and meet end-user requirements.

The value of the original sample in hypothesis 2 has the greatest value compared to the variables of technological factors and external environmental factors. This implies that the Leather Manding UKM has human resources who have more knowledge and attention to the adoption of technology 4.0. In addition, the top management support in this study is the owner and manager of the Leather Manding UKM; it can be said to have a high awareness of the adoption of technology 4.0. This will also have an impact on employee motivation towards the adoption of

technology 4.0, which will improve SME business performance. This study is in line with the findings of Trainor et al., (2014); Barney (2001), who found that organizational factors have a positive and significant effect on the business performance of SMEs. Leather Manding SMEs in Bantul have used the marketplace to improve customer relationships while improving relations between SMEs and other SMEs. By establishing a cooperative relationship between SMEs will increase the profitability of SMEs.

This research is in line with the research of Tella (2020); Geurin and Burch (2017), which found that external environmental factors had a positive and significant effect on SME business performance. However, hypothesis 3 in this study has a relatively small original sample value compared to technological factors and organizational, so it is necessary to pay more attention to external environmental factors, especially competitive intensity and competitive pressure in the leather industry. Admittedly, SMEs in developing countries have limited funds and resources to operate and sustain increased competition. Therefore, in order to compete and excel in the leathercraft industry, the Leather Manding UKM in Bantul must further improve the overall business performance of the UKM. Leather Manding UKM in Bantul can allocate a larger budget and provide employee training,



especially in terms of technology. This is done so that the implementation of SME business performance can be effective and efficient.

The results of hypothesis 4 in this study indicate that the direction of the relationship is positive and significant. This study is in line with the research of Olanrewaju et al., (2020) and Braojos-Gomez et al., (2015), who found that technological factors affect SME business performance mediated by the adoption of technology 4.0. Similarly, Olanrewaju et al., (2020) have also demonstrated the mediating role of technology 4.0 adoption between the TOE model and SME business performance. Several researchers have found corporate social media adoption to be beneficial, and some have identified a positive relationship between social media adoption and corporate performance (Braojos-Gomez et al., 2015). Thus, the adoption of technology 4.0 is important for the Leather Manding UKM in Bantul. This is because it can reduce operating costs, improve service to customers, increase the speed of response between producers and customers, producers and suppliers of inputs, increase market intelligence, and improve relations with trading partners. The benefits of this technology are the motivation for Leather Manding SMEs in Bantul to adopt 4.0 technology facilities, thereby improving their business performance.

The results of hypothesis 5 in this study are in line with research conducted by (Tajudeen et al., 2018); (Singh et al., 2019), which found that organizational factors affect SME business performance mediated by the adoption of technology 4.0. If an organization works positively to adopt technology 4.0, it will be able to reduce organizational resistance or inhibiting factors for organizations to innovate technology (Tajudeen et al., 2018). Singh et al., (2019) also said that top management support is an indispensable factor and serves as a strategic resource to improve company performance. Therefore, Leather Manding UKM in Bantul can increase top management support for technological innovations that can be applied to make strategic and operational decisions. Furthermore, management support can be reflected to provide awareness of how open innovation can further enhance organizational innovation. By increasing these organizational factors, it will affect the decision to adopt technology 4.0 so as to improve the business performance of the Leather Manding UKM in Bantul.

This research is consistently in line with the findings of Henseler et al. (2019) which also show a positive relationship to the relationship of external environmental factors and SME business performance mediated by the adoption of technology 4.0. The findings of this study reveal that some



SMEs adopt a new technology simply because others in the market are adopting it. In addition, some are adopted for fear of losing customers and falling behind rivals. Important technological innovations are carried out by the Leather Manding UKM in Bantul. This is because technological innovation is an approach that focuses on new ideas and knowledge generated from the environment outside the company, such as competitive pressures (Dokukina and Petrovskaya, 2019). Therefore, to maintain a competitive position, Leather Manding SMEs in Bantul must adopt technology 4.0 to gain maximum market share both locally and internationally. These activities increase the level of customer trust and help companies increase sales to repay the investment in the long run. Gupta et al., (2013) ultimately improve the company's performance (Henseler et al., 2019).

CONCLUSION

Overall, the overall hypothesis in this study is positively and significantly supported. The research that has been done shows that the Leather Manding SME in Bantul has the SME business performance which is influenced by the adoption of technology 4.0. On the other hand, the adoption of technology 4.0 itself is controlled by technological factors, organizational factors, and external environmental factors.

RESEARCH IMPLICATION

Based on the findings of this study, this study has several limitations, so that researchers can provide suggestions that are expected to be useful for further research. First, the sample in this study was limited to certain areas, namely Manding, Bantul, Special Region of Yogyakarta. Therefore, the generalization of the cognitive model of combining TOE theory and SME business performance still needs to be further validated in other areas. The differences in the characteristics of each region or region in terms of culture, demographics, infrastructure, and product availability between regions provide an opportunity for further researchers to conduct further empirical research on the adoption of technology 4.0 in Indonesia.

Second, although this study establishes a cognitive model of the TOE and SMEs business performance consistent with the theoretical basis used, however, based on theoretical aspects, the study of technology adoption 4.0 in SMEs still provides development opportunities to test the cognitive model TOE and SMEs business performance. In contexts such as e-commerce, cloud computing, enterprise resource planning, e-government, etc. Researchers can further investigate the relationship between contentious TOE factors, enterprise resource planning, e-government, etc. In addition, further



researchers can also add other influences besides the TOE model that affect the business performance of SMEs.

Third, in this study, organizational factors have the most dominant influence compared to other variables such as technological factors and external environmental factors. This shows that the SME Kulit Manding in Bantul needs to strengthen and sustain organizational growth by enhancing and collaborating on the distinct image of SMEs, goals, strategies, and core values and facilitating consistent relationships within and outside of ICT interactions. On the other

hand, external environmental factors have the least influence compared to technological factors and organizational factors. Therefore, in order to compete and excel in the leathercraft industry, the Leather Manding UKM in Bantul must further improve the overall business performance of the UKM. Leather Manding UKM in Bantul can allocate a larger budget and provide employee training, especially in terms of technology. This is done so that the implementation of SME business performance can be effective and efficient.

DAFTAR PUSTAKA

- Abele, Eberhard and Reinhart, Gunther. (2011). *Zukunft der Produktion: Herausforderungen, Forschungsfelder, Chancen*.
- Ahmad, S.Z.; Ahmad, N.; Bakar, A.R.A. (2018). Reflections of entrepreneurs of small and medium-sized enterprises concerning the adoption of social media and its impact on performance outcomes: Evidence from the UAE. *Telemat. Inform.* 2018,35, 6–17.
- Alam, Syed and Arumugam, Vijayesvaran & Md Nor, Nor Ghani & Kaliappan, Pushpa & Fang, Lee. (2013). Relationships between Innovation Capabilities, Business Performance, Marketing Performance and Financial Performance: A Literature Review. *Business and Management Horizons*. 1. 10.5296/bmh.v1i1.3415.
- Alsharji, A., Ahmad, S., Abu Bakar, Abdul Rahim. (2018). Understanding social media adoption in SMEs: Empirical evidence from the United Arab Emirates. *Journal of Entrepreneurship in Emerging Economies*. 10. 00-00. 10.1108/JEEE-08-2017-0058.
- Apulu, Idiseemi and Latham, Ann. (2011). Drivers for Information and Communication Technology Adoption: A Case Study of Nigerian Small and Medium Sized Enterprises. *International Journal of Business and Management*. 6. 10.5539/ijbm.v6n5p51.
- Azadegan, Arash and Teich, Jeffrey. (2010). Effective benchmarking of innovation adoptions: A theoretical framework for e-procurement technologies. *Journal of Operations Research International Journal of Technology Management Transactions on Operational Research*. 17. 10.1108/14635771011060558.
- Barney, J.B. (2001). Resource-based theories of competitive advantage: A ten-year retrospective on the resource-based view. *J. Manag.* 2001,27, 643–650.



- Bauer, S.E., U. Im, K. Mezuman, and C.Y. Gao. (2019). Desert dust, industrialization and agricultural fires: Health impacts of outdoor air pollution in Africa. *J. Geophys. Res. Atmos.*, 124, no. 7, 4104-4120, doi:10.1029/2018JD029336.
- Bhattacharya, M.; Wamba, S.F. A. (2018). Conceptual framework of RFID adoption in retail using TOE framework. In *Technology Adoption and Social Issues: Concepts, Methodologies, Tools, and Applications*; IGI Global: London, UK, 2018; pp. 69–102.
- Braojos-Gomez, J.; Benitez-Amado, J.; Llorens-Montes, F.J. How do small firms learn to develop a social media competence? *Int. J. Inf. Manag.* 2015, 35, 443–458.
- Chong, Josephine L.L., and Olesen, Karin (2017). “A Technology-Organization-Environment Perspective on Eco-effectiveness: A Meta-analysis”. *Australasian Journal of Information Systems*. Vol 21, pp. 1-26.
- Dias Canedo, E.; Morais do Vale, A.P.; Patrão, R.L.; Camargo de Souza, L.; Machado Gravina, R.; Eloy dos Reis, V.; Lúcio Lopes Mendonça, F.; de Sousa, R.T. (2020). Information and Communication Technology (ICT) Governance Processes: A Case Study. *Information* 2020, 11, 462.
- Dokukina, A.A.; Petrovskaya, I.A. Open Innovation as a Business Performance Accelerator: Challenges and Opportunities for the Firms' Competitive Strategy. In *Proceedings of the International Science and Technology Conference “FarEastCon 2019”*, Vladivostok, Russia, 1–4 October 2019; pp. 275–286.
- Dutot, V.; Bergeron, F.; Raymond, L. (2016). Information management for the internationalization of SMEs: An exploratory study based on a strategic alignment perspective. *Int. J. Inf. Manag.* 2014, 34, 672–681.
- Geurin, A.N.; Burch, L.M. User-generated branding via social media: An examination of six running brands. *Sport Manag. Rev.* 2017, 20, 273–284.
- Gupta, P.; Seetharaman, A.; Raj, J.R. The usage and adoption of cloud computing by small and medium businesses. *Int. J. Inf. Manag.* 2013, 33, 861–874.
- Haseeb, M.; Hussain, H.I.; Ślusarczyk, B.; Jermisittiparsert, K. (2019). Industry 4.0: A solution towards technology challenges of sustainable business performance. *Soc. Sci.* 2019, 8, 154.
- Henseler, J.; Ringle, C.M.; Sinkovics, R.R. Exploration/exploitation innovation and firm performance: The mediation of entrepreneurial orientation and moderation of competitive intensity. *J. Asia Bus. Stud.* 2019, 13, 489–506.
- Jitpaiboon, T.; Vonderembse, M.; Asree, S. (2010). The influence of top management support and information technology (IT) utilization on supply chain integration (SCI). *Calif. J. Oper. Manag.* 2010, 8, 1–19.
- Kaplan, A.M.; Haenlein, M. (2010). Users of the world, unite! The challenges and opportunities of Social Media. *Bus. Horiz.* 2010, 53, 59–68.

- Lei, C.F., & Ngai, E. W. T. (2012). "Green IS assimilation: A theoretical framework and research agenda". In Proceedings of American Conference on Information Systems.
- Lupo, Crystal. (2015). Adoption of Innovation in Small-Scale Forestry: The Case of Portable Sawmill Based Microenterprises. *Social change*. 7. 10.5590/JOSC.2015.07.1.03.
- Maduku, D.K.; Mpinganjira, M.; Duh, H. (2016). Understanding mobile marketing adoption intention by South African SMEs: A multi-perspective framework. *Int. J. Inf. Manag.* 2016,36, 711–723.
- Maroufkhani, P.; Tseng, M.-L.; Iranmanesh, M.; Ismail, W.K.W.; Khalid, H. (2020). Big data analytics adoption: Determinants and performances among small to medium-sized enterprises. *Int. J. Inf. Manag.* 2020,54, 102190.
- Martín, S.S., López-Catalán, B. and Ramón-Jerónimo, M.A. (2012). Factors determining firms' perceived performance of mobile commerce. *Industrial Management & Data Systems*, 112(6), 946-963
- Odoom, R.; Anning-Dorson, T.; Acheampong, G. (2017). Antecedents of social media usage and performance benefits in small-andmedium-sized enterprises (SMEs). *J. Enterp. Inf. Manag.* 2017,30, 383–399.
- Okechi, O., & Kepeghom, O. M. (2013). Empirical evaluation of customers' use of electronic banking systems in Nigeria. *African journal of computing & ICT*, 6(1), 7-20.
- Olanrewaju, A. S. T., Hossain, M. A., Whiteside, N., & Mercieca, P. (2020). Social media and entrepreneurship research: A literature review. *International Journal of Information Management*, 50, 90-110.
- Pateli, A.; Mylonas, N.; Spyrou, A. (2020). Organizational Adoption of Social Media in the Hospitality Industry: An Integrated Approach Based on DIT and TOE Frameworks. *Sustainability* 2020,12, 7132.
- Prause, M. (2019). Challenges of Industry 4.0 Technology Adoption for SMEs: The Case of Japan. <https://doi.org/10.3390/su11205807>
- Qalati, S., li, W., Ahmed, N., Mirani, M., Khan, A. (2020). Examining the Factors Affecting SME Performance: The Mediating Role of Social Media Adoption. *Sustainability*. 13. 1-24. 10.3390/su13010075.
- Quayle, M.; Christiansen, J.K. Business Issues in the 21st Century: An Empirical Study of E-Commerce Adoption in UK and Denmark SMEs. *Electron. Commer. Small Medium Sized Enterp.* 2004, 53–68.
- Rogers, E. (2003). *Diffusion of innovations* (5th ed.). New York, NY: The Free Press.
- Seo, S.-W.; Kim, H.-C.; Zhu, Z.-Y.; Lee, J.-T. (2020). What Makes Hotel Chefs in Korea Interact with SNS Community at Work? Modeling the Interplay between Social Capital and Job Satisfaction by the Level of Customer Orientation. *Int. J. Environ. Res. Public Health*, 17, 7129.



- Shankar, V., Venkatesh, A., Hofacker, C. & Naik, P.2010. Mobile marketing in the retailing environment: Current insights and future research avenues. *Journal of Interactive Marketing*, 24(2), 111–20.
- Singh, S.K.; Del Giudice, M.; Tarba, S.Y.; De Bernardi, P. (2019). Top Management Team Shared Leadership, Market-Oriented Culture, Innovation Capability, and Firm Performance. *IEEE Trans. Eng. Manag.* 1–11.
- Steininger, D.M.; Lorch, M.; Veit, D.J. (2014). The Bandwagon effect in digital environments: An experimental study on Kickstarter. *com.Multikonferenz Birtschaftsinformatik 2014*, 2014, 546–556.
- Studen, L.; Tiberius, V. Social Media, Quo Vadis? Prospective Development and Implications. *Future Internet* 2020,12, 146.
- Tajudeen, F.P.; Jaafar, N.I.; Ainin, S. (2018). Understanding the impact of social media usage among organizations. *Inf. Manag.* 2018, 55, 308–321.
- Tella, A.; Ukwoma, S.C.; Adeniyi, I.K. (2020). A two models modification for determining cloud computing adoption for web-based services in academic libraries in Nigeria. *J. Acad. Librariansh*,46, 102255.
- Terence, T.; Soufani, K. Business Strategies for Small Firms in the New Economy. *J. Small Bus. Enterp. Dev.* 2003,10, 306–320.
- Tornatzky, L.G. and Fleischer, M. (1990) *The Processes of Technological Innovation*. Lexington Books, Lexington.
- Trainor, K.J.; Andzulis, J.M.; Rapp, A.; Agnihotri, R. (2014). Social media technology usage and customer relationship performance: A capabilities-based examination of social CRM. *J. Bus. Res.* 2014,67, 1201–1208.
- Varis, M., and Littunen, H. (2010). Types of innovation, sources of information and performance in entrepreneurial SMEs. *European Journal of Innovation Management*.
- Zhu, K.; Kraemer, K.L. Post-adoption variations in usage and value of e-business by organizations: Cross-country evidence from the retail industry. *Inf. Syst. Res.* 2005,16, 61–84.