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THE ADOPTION OF ICT TO IMPROVE THE PERFORMANCE OF SMES IN DIGITAL ERA

Faisol[1*], Suhardi[2], Puji Astuti[3], Subagyo[4]

[1] Faculty of Economics and Bisnis, Universitas Nusantara PGRI Kediri, East Java, Indonesia
[2] Faculty of Economics and Bisnis, Universitas Nusantara PGRI Kediri, East Java, Indonesia
[3] Faculty of Economics and Bisnis, Universitas Nusantara PGRI Kediri, East Java, Indonesia

*Corresponding Author: faisol@unpkdr.ac.id

Abstract: : During the Digital Era, scientific research on information and communication technologies (ICT) and its impact on economic, social, and human development became a major focus. The importance of gaining and exploiting the positive outcomes (productivity growth, organization expansion, efficiency, effectiveness, competitiveness, and so on) of ICT adoption and implementation in various organizations has been demonstrated by theoretical and empirical studies. As a result, the purpose of this research is to review the literature on the potential implications of ICT on the performance of SMEs. Data about 145 small enterprises was gathered through a survey. The information gathered was examined using SEM-PLS. The finding revealed that the adoption of ICT had significant impact on driving the internal and external capabilities on the performance of SMEs. This study suggests that the adoption ICT such as computer technology, communication technology, and media technology are an important factor influencing SME business performance in this era.

Keywords: ICT, SMEs, Digital Era

1. Introduction

In many nations, Small and Medium Enterprises (SMEs) have become the economic backbone, as they provide jobs and contribute considerably to GDP. According to (Wahab et al. 2020), SMEs create 60% of manufacturing jobs and contribute no less than 50% of average GDP in high-income nations. In low-income nations, SMEs play a critical role in reducing poverty and fostering economic development. (Abisuga-Oyekunle, Patra, and Muchie 2020) found that aid SMEs' development based on three arguments: SMEs increase market competitiveness and entrepreneurship, which have a positive impact on the economy, generate innovation, and contribute to cumulative productivity growth. (Manzoor et al. 2019) says that SMEs are more innovative and responsive than huge corporations because they deal with specialised markets. In the open markets and globalization allow SMEs to expand their potential market share while also increasing market competition. But in digital era, (Kumar, Syed, and Pandey 2021) found many of the problems that are still arising for SMEs include: (i) How to take advantage of a large consumer base? (ii) How can a small business improve its market share with limited resources? (iii) How can marketing expenditures be reduced? (iv) How to get more production with less cost? (v) How to improve the brand's market presence and exposure?

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Considering the numerous issues that have arisen, (Wahab et al. 2020); (Mabula, Dongping, and Mwakapala 2020) stated one of the key criteria for SMEs' success in global competition is their use of information communication and technology (ICT), in terms of external and internal supporting business activities, ICT and its diverse applications provide SMEs with numerous benefits (OECD 2020). SMEs may use the internet to acquire a wealth of information and implement ICT applications to improve their management systems. Others (Tarutė and Gatautis 2014); (Rozmi et al. 2020) claims that using technology can assist SMEs in overcoming a variety of obstacles. COVID-19 has identified a variety of SMEs' difficulties, all of which can be overcome with technology. This argument supported by (Liu X 2020); (Kumar, Syed, and & Pandey 2020) that technology adoption, in whatever form, can aid companies in their quest for long-term development and problem-solving.

Then, (Sepehrdoust and Ghorbanseresht 2019) discovered that (Hanclova et al. 2015) analysed the contribution of ICT investment on economic growth in developing economies of petroleum exporting countries (OPEC) for the period 2002-2015, revealing that ICT investment accounted for half of the economic growth in developing countries. The authors also cite World Bank studies on a sample of 30 000 businesses in 50 developing countries, which found that companies that use ICT grow faster in terms of sales, productivity, and growth. (Hanclova et al. 2015); (Bouwman et al. 2018) supported this finding and argued that "There is some empirical evidence that small enterprises adopting ICT have greater outreach and profitability, and hence can better position themselves for more wholesale expansion," Surprisingly, ICT is not just a growth engine; it also serves as a growth supporter to a great extent.
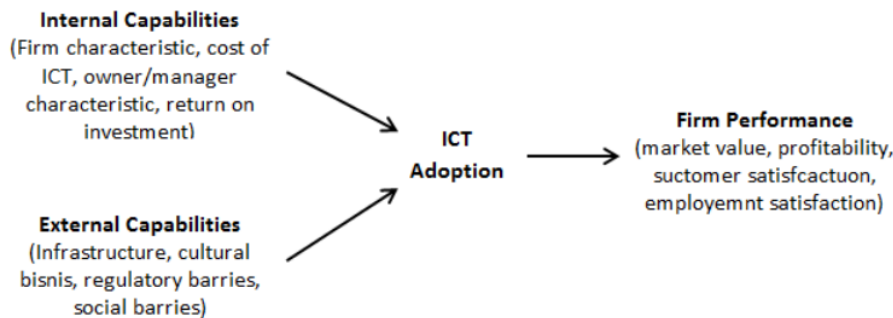
However, most study focuses on the direct and easily observable benefits of ICTs (such as growth, productivity, profits, and so on), while indirect effects, **particularly the resource capabilities on ICT adoption, are often understudied.** Connecting all of the above to the common goals of SMEs (competitiveness, higher profits, customer and employee satisfaction, social performance, and so on), it can be suggested that special attention be paid to the direct and indirect effects of ICT on SMEs' performance – this should be investigated further through this research.

So, In this paper, the researchers explore the adoption of ICT to drive the internal and external capabilities on the performance of SMEs, and there will be a discussion on dimensions of internal capabilities dan external capabilities such effectiveness, intangible benefits that can effect on SMEs performance through ICT adoption.

2. Literature Review

Background information on theory

The theoretical approaches and focuses used in small firm in e-business research is diverse. technology acceptance model (Devos, Landeghem, and Deschoolmeester 2012), the diffusion of innovations approach (Parker and Castleman 2009), the framework of technology-organization-environment (Baker 2012), and resource-based theory (RBT) (J. B. Barney 2012) are one of the most extensively used theories in SMEs' study on information systems. While this theoretical approach provides a prism through which to examine SMEs' adoption of ICT and their contributions, the majority of this research is conducted in industrialized economies. Furthermore, there is a tendency in the literature to look at the factors that influence ICT adoption and use selectively (Ramdani, Chevers, and Williams 2013). In this study, we apply the RBT framework to analyze the ability of company resources that affect ICT adoption and their impact on SMEs' performance. A research concept can be constructed based on this theory and various empirical findings as follows:

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Figure1 : The research concept
Source: modified by author (2022

The adoption of ICT

ICT adoption is considered as a tool for enterprises to compete on a global scale with higher efficiency and closer customer and supplier ties, (Beynon, Munday, and Roche 2021). As a result, ICT adoption is increasingly recognized as a prerequisite for SMEs to regard information and communication technology as a crucial tool in their operations in order to obtain a competitive advantage in the global market (Sani et al. 2021). Several academics have also attempted to determine the influence of ICT adoption in the private sector and to comprehend the important components for successful business development (Haug et al. 2020); (Mabula, Dongping, and Mwakapala 2020). As a result, according to (Manochehri, Al-Esmail, and Ashrafi 2012), at least three conditions must be met and exist in order to benefit from ICT adoption, provide better services, and explore new business opportunities: (i) infrastructure; (ii) skilled ICT personnel; and (iii) a budget for ICT investment. These three aspects are also known as sources of a company's internal and external capabilities, which will lead to an improvement in SMEs' performance. Therefore, the first hypothesis can be stated as follows:

H_1 = Internal capabilities directly have a significant effect on ICT adoption
H_2 = External capabilities directly have a significant effect on ICT adoption
H_3 = Internal capabilities directly have a significant effect on SMEs performance
H_4 = External capabilities directly have a significant effect on SMEs performance

The Impact of ICT adoption in SMEs

In developing countries, the SME sector plays a critical role in economic development, poverty alleviation, and job creation. In many nations, the SME sector outperforms the average national economic growth rate and contributes significantly to employment creation (Higón 2012); (Manzoor et al. 2019). ICT adoption appears to have a positive impact on productivity, either directly or indirectly depending on the industry, according to (Ollo-López and Aramendía-Muneta 2012), and has tremendous potential to boost long-term development. Additionally, the use of e-mail, e-commerce, and social media networks has decreased the amount of physical transportation required for letter delivery, banking, advertising, and purchasing things (Dehgani and Jafari Navimipour 2019); (Cataldo, Pino, and McQueen 2020). (Consoli 2012) reviewed the scientific literature on the influence of ICT on businesses and divided the main effects into four categories (Fig. 1): performance, growth, expansion, and new products.
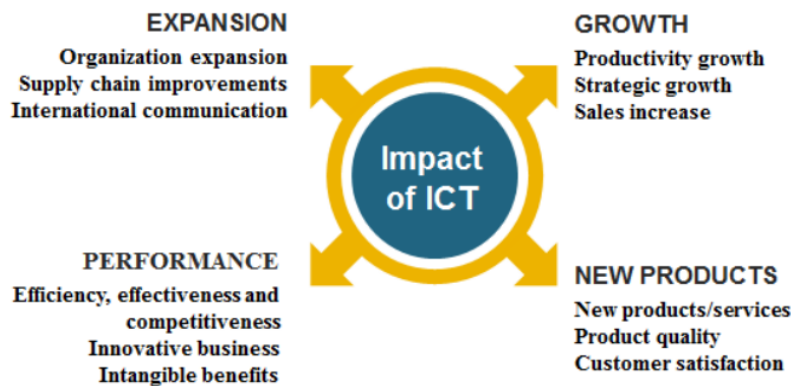
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EXPANSION

Organization expansion
Supply chain improvements
International communication

GROWTH

Productivity growth
Strategic growth
Sales increase

Impact of ICT

PERFORMANCE

Efficiency, effectiveness and competitiveness
Innovative business
Intangible benefits

NEW PRODUCTS

New products/services
Product quality
Customer satisfaction

Figure 2 : Impact of ICT on Business Organization
Source: (Consoli 2012), modified (2022)

Figure 2. depicted the four categories of primary effect of ICT. Each category has multiple dimensions, such as efficiency, production, product quality, and others. According to some studies, ICT investment has a significant impact on labor force productivity and economic growth (Mohsen et al. 2021); (Kazakov, Ruiz-Alba, and Muñoz 2020). It is also recognized that ICT facilitates trade in services and increases manufacturing productivity. (Yoon, Sung, and Ryu 2020); (Pisar and Tomaskova 2020) many studies confirm that ICT has a positive and significant impact on productivity. Furthermore, other studies have shown that productivity benefits are not only quite large and profitable, but are also growing in both the commercial and government sectors. The first hypothesis of this study, based on some of the evidence presented above, can be summarized as follows:

H_5 = ICD Adoption has a significant effect on SMEs performance

The direct and indirect impacts of ICT on SMEs

According to studies, the impact of ICT on business performance varies depending on the technology utilized and the degree of adoption (Cardona, Kretschmer, and Strobel 2013); (Mei, Zhang, and Chen 2019). Furthermore, (Bayo-Moriones, Billón, and Lera-López 2013) looked at the impact of internal and external capabilities on operational strategy and then firm performance (Fig. 3).
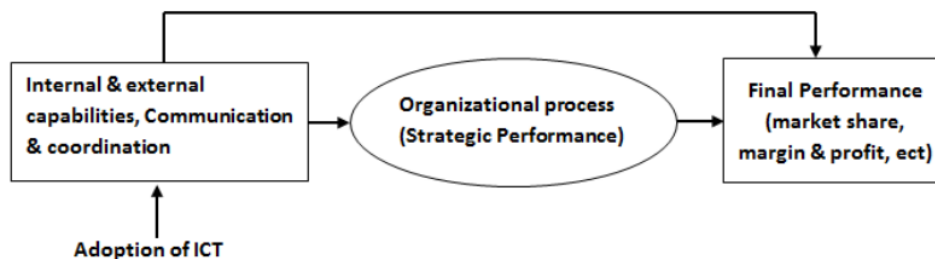
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│                                                             │
┌──────────────────┐     ┌──────────────────┐     ┌──────────────────┐
│ Internal & external │    │ Organizational process │  │ Final Performance │
│ capabilities, Communication │  │ (Strategic Performance) │  │ (market share,   │
│ & coordination   │ →   │                  │  →  │ margin & profit, ect) │
└──────────────────┘     └──────────────────┘     └──────────────────┘
        ↑
┌──────────────────┐
│ Adoption of ICT  │
└──────────────────┘
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Figure 3 : Relation among internal and external capabilities and ICT adoption and final performance
Source: (Bayo-Moriones, Billón, and Lera-López 2013) modified (2022)

Figure 2 depicts model in which the amount of ICT has a substantial impact on improving communication. This effect is proportional to the amount of ICT used. Adoption of TK can improve communication, which can lead to higher operational performance (positive impact of ICT). As a result, increased communication and operational success are linked to SMEs' overall performance. Explicitly, the strategy taken in this study highlights the importance of the direct and indirect effects of ICT on SMEs' performance in relation to competitiveness components. As a result, this could imply that SME performance and its dimensions are linked to other clusters of ICT's key effects in the private sector.

H_6 = ICT Adoption has a significant effect in mediating internal capabilities on SMEs performance

H_7 = ICT Adoption has a significant effect in mediating external capabilities on SMEs performance

3. Method

Population
This study's population consists of 200 small and medium-sized enterprises (SMEs) in Karisedanan Kediri, East Java, Indonesia. These small and medium-sized businesses, which include furniture, batik, food processing, and ceramics, are concentrated in Kediri, Nganjuk, Blitar, Tulungagung, and Trenggalek.

Sample dan Data Collection
This research was carried out in SMEs in the Karesidenan Kediri area, which included Kediri, Nganjuk, Tulungagung, Blitar, and Trenggalek. A total of 145 surveys were collected after questionnaires were distributed to 200 owners of small industrial clusters. The questionnaires have 16 Likert scale indicators, ranging from 1 (strongly disagree) to 5 (strongly agree). Data was collected by distributing questionnaires to several clusters in the Karesidinan Kedriri area. The questionnaires were divided into two parts: questions about respondents' characteristics and questions about the primary factors. Table 1 shows the following characteristics:

Table 1. The profiles of respondents

Location	Cluster	N=145	Category	Frequency	%
Kediri region	Batik Handicraft	10	*Gender*		
	Food Processing	20	Male	90	62.1%
Kediri city	Batik Handicraft	10	Female	55	37.9%
	Food Processing	15	*Age of SMEs*		
Blitar region	Batik Handicraft	8	1-5	15	10.3%
	Food Processing	10	6-10	60	41.4%
Blitar city	Batik Handicraft	7	11-15	65	44.8%
	Food Processing	15	> 15	5	3.4%
Tulungagung	Ceramic processing	10	*Number of employees*		
	Furnitures	15	1-4 (micro enterprises)	60	41.4%
Trenggalek	Ceramic processing	10	5-19 (small enterprises)	70	48.3%
	Furniture	15	20-99 (medium enterprises)	15	10.3%

Source: primary data, 2022

Table 1 shows that the enterprises are distributed in furniture, batik handicraft, food processing, and ceramic clusters in Kediri, Blitar, Tulungagung, and Trenggalek, respectively. Male entrepreneurs (62.1 percent) outnumber female entrepreneurs in the business, according to the report (37.9 percent for females). Around 89.7% of entrepreneurs are in charge of micro and small businesses, while 10.3% are in charge of medium businesses.

Variables and Indicators

This research consists of two exogenous constructs such internal capability (IC), and external capability (EC), and two endogenous constructs organizational process (OP), SMEs Performance (SP)). All these constructs were measured based on observed variables Table 2.

Table 2. Variables and items of indicators

Internal Capabilities (IC)	ICT Adoption (ICT)
IC01 - Owner/manager characteristic	ICT01 - the firm use computer
IC02 - Firm characteristic	ICT02 - the firm accepts or has received order via internet
IC03 - Cost of adoption and implementation	ICT03 - an index of service offered online
IC04 - Return on investment	ICT04 - the share of sales (turnover) due to transactions over internet including a website, and email
External Capabilities (EC)	SMEs' Performance (SP)
CC01 - Infrastructure	SP01 - profitability (return an assets, net income)
CC02 - Social barriess	SP02 - market value (asset growth, market share growth
CC03 - Cultural barriess	SP03 - customer satisfaction (number of complaints, repurchases rate)
CC04 - Political, legal and regulatory barries	SP04 - employment satisfaction (turn over, wages and reward policies

Source: primary data,2022

Techniques of Analysis

Using Partial Least Squares Equation Modeling (PLS-SEM), the acquired data was statistically examined. However, this method is not a universal fit criterion. As a result, (Joseph F. Hair Jr., G. Tomas, M. Hult, Christian M. Ringle 2014); (Richter et al. 2015)developed a set of criteria for evaluating a partial model's structure. This criterion can be implemented in two steps: the outer model's assessment, which checks latent variable indicators, and the inner model's evaluation, which looks at the effect of one latent variable on other latent variables.

This study used the partial least squares structural equation modelling (PLS-SEM) method, which is widely utilized by economists and other researchers to analyse the causal relationship and impact of unobservable variables (Mourad and Valette-Florence 2016). PLS-SEM has been used in a variety of other areas of research, including management information systems, accounting, and operations management (Faisol 2017); (Amin Tohari, Faisol Faisol 2021); (Faisol., Astuti, P., Winarko 2021) because of various reasons, the first; it works well in research with small sample sizes, few dependent variables, and a large number of independent factors (Hair, Ringle, and Sarstedt 2012).Second, it is appropriate if a study is in the early stages of theory development (Ribau, Moreira, and Raposo 2017). Third, PLS-SEM allows academics to evaluate measurement models alongside structural models, allowing them to apply more complicated research models that incorporate both mediating linkages and causal relationships (Lee et al. 2011). In this research, we employ the SMART-PLS 3.0 program to test the impact of information communication and technology (ICT) adoption in driving the strategic performance or organizatonal process on final performance of SMEs.

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4. Result and Discussion

The measurement model

Validity and reliability tests were used as the measuring model in this investigation. Convergent and discriminant validity are two types of validity. Convergent validity, which shows the loading factor (λ) and the average variance extracted (AVE), and discriminant validity, which shows the Fornel-Larcker criterion and cross-loading values. The composite reliability (CR) and Cronbach's alpha (α) values are displayed by the reliability test. Each indicator in the model must meet the convergent validity criteria, which require absolute loading factors of > 0,5. If any indicators fail to meet the convergent validity criteria, they are removed from the model. Some references (Joseph F. Hair Jr., G. Tomas, M. Hult, Christian M. Ringle 2014); (Hair, Ringle, and Sarstedt 2013) imply that the values for, AVE, α and CR should all be larger than 0.6, whereas the score for should be greater than 0.5. The outcome of the measurement model is shown in Table 3:

Table 3. The measurement model result

Constructs	Convergent Validity		AVE	Reliability	
	λ	significance		α	CR
Internal Capabilities			0.569	0.752	0.841
IC01	0.740	***			
IC02	0.768	***			
IC03	0.749	***			
IC04	0.761	***			
External Capabilities			0.855	0.916	0.946
EC01	0944	***			
EC02	0.906	***			
EC03	0.923	***			
EC04	deleted				
ICT Adoption (ICT)			0.524	0.704	0.815
ICT01	0.680	***			
ICT02	0.762	***			
ICT03	0.715	***			
ICT04	0.736	***			
SMEs' Performance (SP)			0.732	0.880	0.916
SP01	0.850	***			
SP02	0.892	***			
SP03	0.830	***			
SP04	0.850	***			

Source: processed, 2021

Discriminant Validity

Cross-loading and the Fornell-Larcker criterion were employed to test concept discriminant validity (Fornell and Larcker 1981). The correlation value between variables that are related to each other is known as Fornell Larcker. According to the assessment, this value cannot be lower than the other values. Alternatively, a variable's correlation value with itself must be higher than the correlation value of other variables. The correlation value between indicators and variables is referred to as cross loading. Indicators with a greater correlation value than the other factors must influence the variable. The values of the discriminant validity summary are shown in Table 4.

Table 4. The discriminant validity summary.

	External capabilities	ICT adoption	Internal capabilities	SMEs' performance
External capabilities	0.925			
ICT Adoption	0.652	0.731		
Internal capabilities	0.799	0.684	0.755	
SMEs Performance	0.454	0.724	0.447	0.856

Source: SEM-PLS, processed (2021)

The structural model

The purpose of this part is to show the structural model's outcomes. *R-Square, T-statistic value, Path coefficient, Predictive Relevance,* and *Model Fit* are some of the criteria used to evaluate the structural model. The structural model's measurements are shown in Figure 4 below:
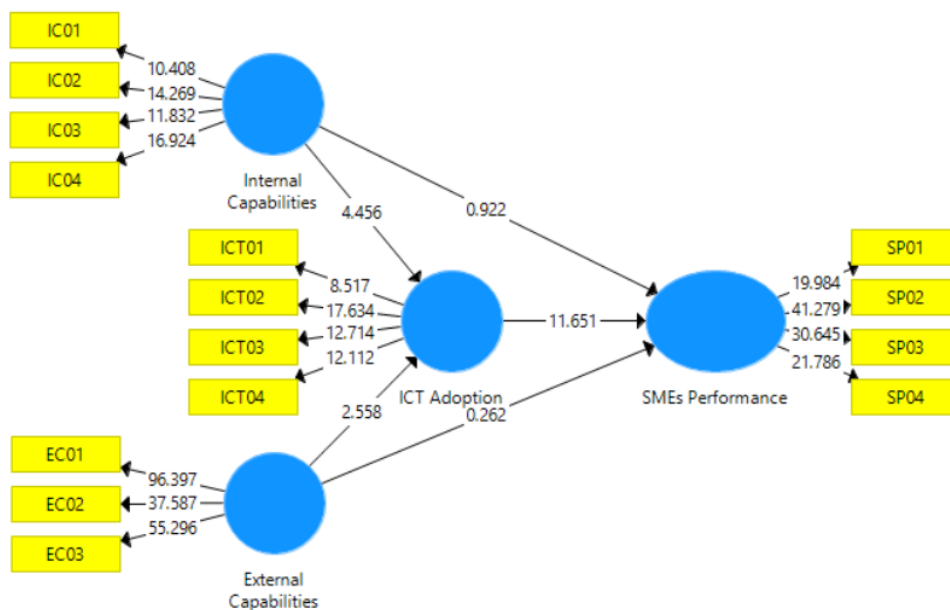
Figure 4 : The result of structural model
Source: SEM-PLS modified (2022)

R-Square value measurement: In the PLS model, squared correlation values of 0.68, 0.32, and 0.19 are considered substantial, moderate, and weak, respectively (Chin 2010). Each latent endogenous construct displayed in figure 3 has an R^2 value better than 0.3, which is considered significant.

Path coefficient and T-statistics values: Table 5 shows the path coefficient and T-statistics values. With a correlation of = 0.792 and a p-value of 0.000, the association between ICT adoption and SMEs' performance was found to be significant. It has a direct and considerable positive impact on the performance of SMEs. ICT adoption has a positive impact in driving the external resources on SMEs performance with the coefficient of 0.231 and p-value (0.016). And ICT adoption also has a significant impact in meditating the internal resources on SMEs performance with the coefficient of 0.357 and p-value (0.000).

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Predictive relevance of the model: Q2 statistics are used to assess the quality of the PLS path model. The model can predict by blindfolding itself and repeating the observed values (Tenenhaus et al. 2005). In the structural equation model, a Q2 greater than zero indicates that the model is predictive, whereas a Q2 less than zero indicates that the model is not predictive (Chin 2010). Values of 0.02, 0.15, and 0.35, as a relative measure of predictive significance, imply that an exogenous has a moderate, medium, or large predictive importance for a given endogenous construct. Two forms of Q^2 statistics can be computed utilizing blindfolding procedures: *cross-validated communality and cross-validated redundancy*. The predictive relevance of ICT adoption variable in the path model is 0.237, indicating that the constructs of relational and ICT adoption has a medium predictive relevance on the SMEs performance. The predictive relevance of SMEs performance (SP) is 0.358, indicating that all variables of internal capabilities, external capabilities and ICT adoption have a high predictive relevance on SMEs' success.

To validate the PLS path model globally, ***model fit or Goodness of Fit (GoF)*** is utilized as an index for the overall fit of the model (Tenenhaus et al. 2005). The geometric mean of average communality and average R2 is GoF. The cut-off values for global validation of the PLS path model are between 0 and 1, resulting in GoF small= 0.1, GoF medium = 0.25, and GoF big = 0.36. (Akter *et al* 2011).. The global fit index for this model is 0.540, indicating that empirical data matches the model fairly well.

Assessment of hypothesis result

Table 5 shows the variable of internal and external capabilities directly influence significantly on ICT adoption. Statistically demonstrated (β = 0.451; p-value = 0.000); (β = 0.292; p-value = 0.001). As such hypothesis H_1 and H_2 are supported. But, internal and external capabilities dot not directly impact on firm performance. Statistically demonstrated (β = 0.124; p-value = 0.357); (β = 0.036; p-value = 0.794). As such hypothesis H_3 and H_4 are not supported. In detail is depicted in Table 5 as follows;

Table 5 Hypothesis testing

	Category	β	Mean	SD	T-statistics	P-Values	H-Results
H_1	IC = > ICT adoption	0.451	0.459	0.101	4.456	0.000	Accepted
H_2	EC => ICT adoption	0.292	0.283	0.114	2.558	0.001	Accepted
H_3	IC => SMEs performance	0.124	0.131	0.134	0.922	0.357	Rejected
H_4	EC => SMEs performance	0.036	0.0045	0.137	0.262	0.794	Rejected
H_5	ICT adoption = > SP	0.792	0.800	0.070	11.306	0.000	Accepted
H_6	EC = > ICT adoption = > SP	0.231	0.226	0.095	2.426	0.016	Accepted
H_7	IC = > ICT adoption = > SP	0.357	0.367	0.092	3.901	0.000	Accepted

Source: SEM-PLS, processed (2022)

(note: IC = internal capabilities; EC = external capabilities; ICT = information communication and technology; SP = SMEs performance)

Discussion

According to the findings, ICT adoption has a considerable beneficial association with SMEs' business performance. SME enterprises with high resource intensity including infrastructure capabilities, adoption costs, social barriess, and cultural barriess, might affect the accuracy of ICT adoption, which can subsequently greatly affect and improve business performance. Firms can profit from ICT adoption by lowering business transaction costs, improving service operations, expanding business options, better understanding client requirements, lowering communication obstacles, and obtaining knowledge about unique consumer wants and

external competitors. The findings also revealed that ICT adoption has a considerable positive influence in mediating the internal and external capabilities of enterprises in increasing SMEs performance. This findings in line with the result of previous studies (Mabula, Dongping, and Mwakapala 2020);(Rozmi et al. 2020); (Rădulescu et al. 2020);(Wahab et al. 2020).

These result indicated that the higher resource capabilities drive the higher level of ICT adoption and then boost the higher level of business performance. This effect has been explained and supported by the Resource-Based Theory (RBT) in which companies with scarce resources and capabilities must have enormous, extraordinary, unique and irreplaceable value or imitated by competitors (J. B. Barney 2012). On the other hand, it will help the company to develop and implement strategies that have the effect of lowering the company's net costs and increasing the company's net income (J. Barney 1991); (Alvarez and Barney 2008); (J. B. Barney, Ketchen, and Wright 2011).

5. Conclusions

In conclusion, this study has a significant impact of ICT adopt to boost the SMEs in contributing the country's economic growth by 2022. As a result, by examining ICT adoption among SMEs in Indonesia, particularly those operating in Karisedenan Kediri, this study has filled a knowledge gap by bolstering the scant empirical evidence. The current state of ICT adoption in boosting corporate performance is described in this study. This research can also aid SMEs' top management by providing a new strategy to dealing with difficulties related to business performance. It is suggested that more research be done to compare the research findings from the manufacturing, services, and agriculture sectors. These three sectors have been considered as the most significant in promoting the expansion of Indonesian SMEs performance. The findings of the study are anticipated to reveal further and more detailed information on the study.

Acknowledgements

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