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Research article

Knowledge Resources, ICT, and Their Links With SME Performance: The Role of Absorptive Capacity

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Abstract.
In the industrial revolution 4.0, firms and SMEs are required to have dynamic capabilities to respond to environmental changes and increasing competitive pressures. Reconfiguring ICT and knowledge resources and capabilities is a must for firms in order to achieve performance and competitive advantages. This study aimed to bridge the research gap between knowledge resources and performance with absorptive capacity as an intervening variable. Moreover, this study also examined the effect of knowledge resources and ICT on absorptive capacity and performance. This study collected primary data from SMEs in Jepara, Rembang, and Semarang, Indonesia, through questionnaires, in-depth interviews, and focus group discussions. 285 SME owners participated. The data were analyzed employing SEM with multiple regression, which revealed that ICT significantly affected absorptive capacity and SME performance. Knowledge resources had a significant effect on absorptive capacity and SME performance. Furthermore, absorptive capacity had a significant effect on SMEs performance.

Keywords: knowledge resource, ICT, dynamic capability, performance, SMEs

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1. Introduction

According to resource-based theory, an organization is required to improve its excellent resource capabilities that are unique and difficult for another organization to emulate. Firms and Small and Medium Enterprises (SMEs) must improve their human resource qualities to grasp the digital economy, science, and technology in improving their performances. Future human resources are essential to the success of innovations applied in routine processes and practices [1].The achieved new knowledge sources will be associated with previously obtained knowledge resources [2].

SMEs in Indonesia are the spearhead of the economy in the era of the 1997-1998 economic crisis. However, with the COVID-19 pandemic in 2020-2021, many companies and SMEs experienced a decline in their sales performance and stopped their

production. SMEs that exist during the COVID-19 pandemic are SMEs that have used ICT technology in their marketing process. The number of MKM in Indonesia in 2018 was 64.19 million with a labor absorption capacity of 117 million workers who contributed to the national gross domestic product of Rp. 8.573 trillion . The composition of the total SMEs is 63.35 million micro businesses, 783,132 small businesses, and 60,702 medium-sized businesses. In ASEAN, SMEs absorb 51.7% – 97.2% of the workforce, contributing to gross domestic product by 24% – 61%.

ICT capability is another competence that every organization must have, particularly in Industry 4.0, which is based on digital technology. ICT contributes to the creation, integration, development, and improvement of crucial resources and dynamic capabilities in E-business, E-commerce, new manufacturing methods, new services, new business models, and effective ways to improve supply chain management, customer relation management, and decision-making process. [3]. ICT also offers significant advantages to firms, such as assisting them in introducing new products and services, becoming even more customer-oriented, and responding more effectively to market changes [4].

Knowledge is a long-term strategic resource for organizations, including small and medium enterprises, in establishing and maintaining competitiveness and competitive advantage [5]. In an increasingly dynamic and competitive global economy, organizations' research and development need to manage knowledge resources effectively. [6] reveals that the firm's knowledge-based theory assumes that knowledge is the most important and strategic company resource. It has been proven that organizational knowledge and the acquisition of new knowledge can lead to a competitive advantage [7-8].

Many researchers have conducted studies on the importance of knowledge in improving organizational performance, but some research findings continue to arouse debate and controversy. The study conducted by [9-10] discovered that knowledge does not improve organizational performance, but a study conducted by [11, 12] found that knowledge is an important and influential factor in improving performance.

Absorptive capacity refers to the ability of a firm to recognize new external value and information, assimilate it, and apply it to improve the firm's goals and performance [2]. To improve innovation performance, [13] classify the absorptive capacity (ACAP) dimension into two parts: the ability to identify the knowledge required and the processes and routines that allow for the analysis, processing, and understanding of the acquired knowledge. The absorptive capacity is then achieved further related to how external knowledge is applied and exploited [13].

Based on the previous studies on the knowledge-performance gap, this study developed the previous research models by introducing organizational absorptive capacity as an intervening variable between knowledge resource and ICT capability. This study aimed to look into the effect of knowledge resources and ICT on SMEs' absorptive capacity and performance.

2. Literature Review and Hypothesis Development

2.1. Absorptive Capacity

Absorptive capacity is defined as the ability of a firm to recognize new information, assimilate it, and apply it for commercial purposes [14]. Whereas [13] classify it as a potential absorptive capacity (PACAP), which consists of acquisition and assimilation, ACAP is divided into potential absorptive capacity (PACAP), which consists of acquisition and assimilation, and realizes ACAP, which consists of processing and exploitation. Absorptive capacity is a set of organizational routines that enables a firm to acquire, assimilate, transform, and exploit external knowledge from external networks to generate dynamic organizational capabilities. Absorptive capacity is the ability of a firm to employ external knowledge, whereas [15] describe it as the skills required to modify the implicit components of acquired knowledge to meet local needs. The intensity of its learning efforts determines the ability of a firm to learn and solve problems dynamically. According to the findings of [16] study, absorptive capacity moderates the effect between knowledge properties and innovation performance.

2.2. ICT Capabilities

[17] define ICT capability as the ability of a firm to use various technologies ranging from basic to highly sophisticated to achieve the firm's goals. There are three dimensions of ICT capabilities: ICT to improve internal operational efficiency, ICT to establish collaboration with external partners [18], and ICT to hold a firm's internal and external communication [19]. SMEs with limited internal resources typically employ ICT to introduce new products and services, be more customer-oriented, and better respond to market changes by developing their employees' competencies and skills through access to new information. ICT is also used to establish and maintain collaboration with external partners such as customers, suppliers, and other external actors [18].

ICT-oriented firms can use intranet and extranet to achieve a constant inflow and outflow of information, resulting in better learning opportunities [20]. Intranet serves as a valuable communication platform for employees to share information, ideas, and knowledge. Meanwhile, extranet improves the firm's communication with new and existing partners [20]. SMEs will find it easier to manage many business relationships as internal and external communication improves. Several studies argue that ICT proficiency is more important in improving high-level skills than influencing performance [21]. The findings indicate that ICT capabilities affect increasing dynamic capability [17] discovered that the three components of ICT affect dynamic capabilities, including absorptive capability, adaptive capability, and innovation capability. [22] also revealed that ICT has a significant positive effect on organizational performance. The use of information and communication technology directly affects operational performance but does not affect strategic performance [23].

H1: ICT capabilities affect absorptive capacity.

2.3. H2: ICT capabilities affect performance.Knowledge Resource

Knowledge resources can be embedded in organizational processes and routine activities. Exploring previous knowledge resources can lead to the discovery of new sources of knowledge [14]. Therefore, combining existing knowledge resources into knowledge resource storage can improve dynamic capabilities and performance. According to [17], knowledge is the primary strategic resource for a firm to create and connect resources to achieve the desired results. According to [24], the firm's particular implicit knowledge will be a source of competitive advantage since it is difficult to imitate and autonomously acquired from the market. Kale and Singh [6] found that individual experiences associated with partnerships offer knowledge acquisition, generate new knowledge, develop partnership management capabilities, and enhance dynamic capabilities. In their study, [25] discovered a significant effect between knowledge resources and relational and transactional performance. Knowledge resources are important for an organization to run in order to respond to business opportunities and a dynamic environment and improve organizational performance. Firms with knowledge resources will be more competitive, improving their performance, and achieving a competitive advantage in a highly competitive market

H3: Knowledge resources affect absorptive capacity.

H4: Knowledge resources affect performance.

According to the findings of [16] study, absorptive capacity moderates the effect between knowledge properties and innovation performance. [26] discovered that organizational absorptive capacity can enhance innovation performance.

H5: Absorptive capacity affects performance.

3. Methods

4. Sample

The sample in this study is made up of small and medium enterprises (SMEs) actors in the batik fashion industry from four regencies or cities in Central Java, namely Jepara, Semarang-Rembang, and Banten, with a total of 300 respondents, with 75 from each region. The number of questionnaires distributed was 300 entrepreneurs of batik fashion SMEs, with 285 returned (95% response rate). The sampling method used was purposive sampling based on the consideration of batik fashion SMEs that have been operating for at least five years, still exist today, and are located in areas with many developing batik fashion SMEs

4.1. Data Collection

Data were gathered through the use of questionnaires, interviews, and focus group discussions. The questionnaires distributed comprised closed and open questions reflecting ICT capabilities, knowledge resources, dynamic capabilities, and SMEs performance when filling out the questionnaires. Focus group discussions were conducted further to explore the phenomenon and implementation in the field. Before distributing the questionnaires to the respondents, a pre-test was carried out in which 30 SMEs beyond the research respondents answered the questionnaires. The pre-test result indicated that the questionnaires were appropriate and easy for respondents to understand.

The data collection stages were conducted by inviting batik fashion SME actors from each region who met the previously determined criteria to a discussion forum moderated by cooperative and SME service staffs from each region and a surveyor team from researchers. Researchers and cooperative and SME service staffs offered assistance on the objectives and instructions for completing the questionnaires. After each respondent completed the questionnaire, the research team was assisted by surveyors to conduct interviews.

5. Measurement

ICT capability variable is measured by Internal ICT efficiency, ICT collaboration, and ICT communication. This measurement comes from Parida et al., [8] study that knowledge resource is measured by understanding how customers perceive the firm's products, promotions, and market segments as well as having a thorough understanding of the promotion of the firm's competitors and customers of the firm's competitors. Sales, income, and profit measure organizational performance variables. It comes from Chien and Tsai [4], suggesting that all indicators of each variable are scored on a scale of 1 (strongly disagree) to 7 (strongly agree).

6. Results and Discussion

Table 1: Results of Validity and Reliability Test.

Variable & Indicator	Correlation (r)	Sig	
ICT			
ICT1	0.820**	0.000	Valid
ICT2	0.809**	0.000	Valid
ICT3	0.817**	0.000	Valid
ICT4	0.788**	0.000	Valid
Knowledge resource			
KR1	0.786**	0.000	Valid
KR2	0.828**	0.000	Valid
KR3	0.791**	0.000	Valid
KR4	0.737**	0.000	Valid
Absorptive Capacity			
ABSORB1	0.813**	0.000	Valid
ABSORB2	0.790**	0.000	Valid
ABSORB3	0.811**	0.000	Valid
ABSORB4	0.780**	0.000	Valid
Performance			
P1	0.763**	0.000	Valid
P2	0.760**	0.000	Valid
P3	0.815**	0.000	Valid
P4	0.787**	0.000	Valid

Table 2 shows the results of hypothesis testing. H1 is accepted; there is a significant effect of ICT abilities (ICT internal efficiency, ICT collaboration, and ICT communication)

Table 2: Results of Hypothesis Test.

Hypothesis	β	S.E.	t	Sig	Kesimpulan
H1. ICT → absorptive capacity	0.168	0.054	3.112	0.002	H1 accepted
H2. ICT → Performance	0.179	0.045	3.991	0.000	H2 accepted
H3. Knowledge resource → Absorptive capacity	0.206	0,058	3.538	0.000	H3 accepted
H4. Knowledge resource → Performance	0.141	0.049	2.882	0.004	H4 accepted
H5. Absorptive capacity→ Performance	0.223	0.049	4.571	0.000	H5 accepted

and absorptive capacity (β= 0.168, p ≤ 0.05). H2 is also accepted; ICT affects organizational performance (β= 0.179, p ≤ 0.05). These results suggest that the ability to manage ICT, either ICT internal efficiency, collaboration, or good communication within the organization, will assist organizations in reconfiguring their resources in order to adapt to changes in the existing environment, particularly in the industrial era 4.0, and improve performance. The study results support the findings of Iyengar et al. (2015); Setia and Patel [11] that there is a direct relationship between ICT capabilities and absorptive capacity and is an important antecedent of absorptive capacity.

H3 is accepted; knowledge resource capability significantly affects absorptive capacity (β= 0.206, p ≤ 0.05). This finding suggests that the greater the capacity of organizational knowledge resources, the greater the absorptive capacity of the existing organization. H4 is accepted; knowledge resources significantly affect organizational performance (β= 0.141, p ≤ 0.05). This finding suggests that organizations with a high level of knowledge resources will increase their organizational absorptive capacity and performance. This study empirically investigates how to regularize the dissemination of knowledge stock, which has a high potential and realized absorptive capacity. Absorptive capacity is an ability or skill that enables an entity to recognize and evaluate the potential of knowledge and assimilate it within the organization to transform it for commercial purposes [11]. Absorptive capacity refers to the ability or power by which firms acquire, assimilate, transform, and exploit knowledge to produce dynamic organizational capacities [13]. It is made up of a series of routines and organizational developments that allow businesses to acquire, integrate, transform, and use knowledge to generate dynamic capabilities [13]. By increasing absorptive capacity, companies can recognize and evaluate the potential of knowledge and assimilate it into the organization

H5 is accepted; absorptive capacity affects organizational performance (β= 0.223, p ≤ 0.05). It implies that the greater the absorptive capacity, the better the organizational performance. According to the findings, to improve the performance of SMEs, it is

necessary to increase knowledge resources in the organization and good ICT skills through high absorption. The better the organization's absorptive capacity, the better the performance of SMEs.

7. Discussion

ICT plays a significant role in increasing the absorption capacity of SMEs. In the industrial era 4.0, which is based on digital technology such as artificial intelligence, internet of things, big data, robotics and 3-dimensional printing, it requires all companies and SMEs to adjust and reconfigure their resources to adapt to this changing environment. Industry 4.0 has an impact on activities carried out by individuals who are more creative and strategic. Thus, companies and SMEs in developing ICT depend on environmental conditions such as dynamic technology levels, market conditions as well as market growth opportunities and resource availability [27]. Based on the research results, ICT has a significant effect on increasing dynamic capabilities, especially SMEs. The results of the study support the study of [17] which found that the three ICTs affect the dimensions of dynamic capabilities, namely absorptive capabilities, adaptive capabilities. [22] found that ICT has a positive effect on organizational performance. The use of ICT has a direct effect on operational performance, but has no effect on strategic performance [23]. ICT internal efficiency is beneficial for improving SMEs in conducting analysis external information and take strategic steps based on existing knowledge. So far the implementation of ICT in SMEs is still limited due to various factors such as costs and human resources. The process of ICT adoption by SMEs into organizational processes depends on the size and competitive environment. The use of SME ICT will encourage SMEs' agility, especially in marketing and operations. Collaboration ICT is also beneficial for SMEs in the context of virtual collaboration that results in faster information and changes in market conditions. Collaboration with customers is useful in obtaining important information about customer tastes, trends pa sar and industry in the future. Companies that have information networks have a positive influence in responding to environmental changes [28]. SMEs will be superior in building new partners and maintaining existing partners and are able to strengthen absorption capabilities [17]. The role of ICT in communication is able to encourage companies to align the actions taken based on the information obtained. The results of the study also support the findings of [21] that ICT capability is very important in improving company performance.

Knowledge resources have a significant effect on the absorption capacity of companies and SMEs. In SMEs, the role of the owner as well as the manager plays an important role in acquiring knowledge to be disseminated within the organization, in order to be able to create creative and innovative ideas, both in terms of products, marketing and knowledge of its competitors. Knowledge of digital technology in the industrial era 4.0 needs to be done by SMEs to be able to have information and knowledge about customers, so that it will encourage the success of SMEs. Several phenomena in the industrial era 4.0 include the operating system will be dominated by physical cyber, decentralization in the decision-making process, automatic quality and maintenance, increased agility to integrate and manage it and work life and partner networks will get more flexibility and importance [29]. Thus, SMEs require external knowledge including knowledge of how customers perceive the company's products, company promotions and market segments. As well as having a lot of knowledge about the promotion of the company's competitors and the customers of the company's competitors. Knowledge resources owned by SMEs need to be continuously built through a knowledge management process supported by collaborative management with various parties and external sources will encourage the creation of absorption capacity and performance. Knowledge that creates ideas for product and process development and understanding customer needs will be carried out more quickly through mastery, absorption, acquisition and implementation of knowledge. Through the acquisition, development and implementation of knowledge will encourage the creation of superior SME performance. Management collaboration with various parties related to knowledge will also improve the performance of SMEs and competitive advantage.

SMEs play an important role in identifying, developing and launching new products and processes through their knowledge resources efficiently in order to be able to innovate. SMEs that have an internal interaction system can obtain knowledge resources in improving company performance. Building and promoting positive relationships with customers will include knowledge of how customers perceive the company's products, company promotions and market segments as well as knowledge of company competitors' promotions and company competitors' customers.

8. Conclusion

This study discusses the role of ICT capabilities and knowledge resources in enhancing SMEs' absorptive capacity and performance. The findings indicate that SMEs' high ICT

capability will increase absorption capacity. The greater SMEs' ICT capability, including ICT internal efficiency, ICT collaboration, and ICT communication, the easier it will be to absorb and innovate. Thus, given the limited internal resources and market conditions that SMEs have faced thus far, the role of SME owners and managers in mastering ICT is essential. The roles of knowledge resources, such as understanding how customers feel about products, promotions, and competitors, will make it easier for SMEs to enhance performance and achieve a competitive edge. ICT capability is a set of resources, skills, and knowledge that SMEs can use to coordinate all activities and achieve peak performance. The implication for SME owners and managers is that they must prioritize the development of ICT capabilities to encourage increased adaptability, absorptive, and innovation capabilities so that they can respond to environmental changes more efficiently due to limited internal resources, particularly human and financial resources.

This study on SME batik fashion used a quantitative approach and had an R square of 45.5%, which was still relatively low, indicating that the variables studied could not explain the absorptive capacity and SMEs performance. Future research could take a mixed approach, considering the size of SMEs and the broader type of SMEs.

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