

Lecture Notes in Networks and Systems 278

Leonard Barolli
Kangbin Yim
Tomoya Enokido *Editors*

Complex, Intelligent and Software Intensive Systems

Proceedings of the 15th International
Conference on Complex, Intelligent
and Software Intensive Systems
(CISIS-2021)

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Leonard Barolli · Kangbin Yim ·
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Complex, Intelligent and Software Intensive Systems

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and Software Intensive Systems (CISIS-2021)

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Welcome Message of CISIS-2021 International Conference Organizers

Welcome to the 15th International Conference on Complex, Intelligent and Software Intensive Systems (CISIS-2021), which will be held from July 1 to July 3, 2021, at Soon Chun Hyang (SCH) University, Asan, Korea, in conjunction with the 15th International Conference on Innovative Mobile and Internet Services in Ubiquitous Computing (IMIS-2021).

The aim of the conference is to deliver a platform of scientific interaction between the three interwoven challenging areas of research and development of future ICT-enabled applications: software intensive systems, complex systems and intelligent systems.

Software intensive systems are systems, which heavily interact with other systems, sensors, actuators, devices, other software systems and users. More and more domains are involved with software intensive systems, e.g., automotive, telecommunication systems, embedded systems in general, industrial automation systems and business applications. Moreover, the outcome of web services delivers a new platform for enabling software intensive systems. The conference is thus focused on tools, practically relevant and theoretical foundations for engineering software intensive systems.

Complex systems research is focused on the overall understanding of systems rather than its components. Complex systems are very much characterized by the changing environments in which they act by their multiple internal and external interactions. They evolve and adapt through internal and external dynamic interactions.

The development of intelligent systems and agents, which is each time more characterized by the use of ontologies and their logical foundations, builds a fruitful impulse for both software intensive systems and complex systems. Recent research in the field of intelligent systems, robotics, neuroscience, artificial intelligence and cognitive sciences is a very important factor for the future development and innovation of software intensive and complex systems.

The CISIS-2021 is aiming at delivering a forum for in-depth scientific discussions among the three communities. The papers included in the proceedings cover all aspects of theory, design and application of complex systems, intelligent systems and software intensive systems.

We are very proud and honored to have two distinguished keynote talks by Dr. Jayh (Hyunhee) Park, Myongji University, Korea, and Dr. Antonio Esposito, University of Campania “Luigi Vanvitelli”, Italy, who will present their recent work and will give new insights and ideas to the conference participants.

The organization of an international conference requires the support and help of many people. A lot of people have helped and worked hard to produce a successful CISIS-2021 technical program and conference proceedings. First, we would like to thank all the authors for submitting their papers, the program committee members and the reviewers who carried out the most difficult work by carefully evaluating the submitted papers. We are grateful to Honorary Co-Chairs Kyoil Suh, Soon Chun Hyang (SCH) University, Korea, and Prof. Makoto Takizawa, Hosei University, Japan, for their guidance and advices.

Finally, we would like to thank Web Administrator Co-Chairs for their excellent and timely work.

We hope you will enjoy the conference proceedings.

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CISIS-2021 Keynote Talks

Asking AI Why: Explainable Artificial Intelligence

Jayh (Hyunhee) Park

Myongji University, Yongin, Korea

Abstract. In the early phases of AI adoption, it was okay to not understand what the model predicts in a certain way, as long as it gives the correct outputs. Explaining how they work was not the first priority. Now, the focus is turning to build human interpretable models. In the invited talk, I will explain why explainable AI is important. Then, I will explain an AI model. Through this invited talk, I will discuss models such as ensembles and neural networks called black-box models. I will deal with the following questions.

- Why should we trust your model?
- Why did the model take a certain decision?
- What drives model predictions?

Coevolution of Semantic and Blockchain Technologies

Antonio Esposito

University of Campania “Luigi Vanvitelli”, Aversa, Italy

Abstract. Semantic technologies have demonstrated to have the capability to ease interoperability and portability issues in several application fields such as cloud computing and the Internet of things (IoT). Indeed, the increase in resource representation and the inference capabilities enabled by semantic technologies represent important components of current distributed software systems, which can rely on better information interoperability and decision autonomy. However, semantics alone cannot solve trust and reliability issues that, in many situations, can still arise within software systems. Blockchain solutions have shown to be effective in this area, creating data sharing infrastructure where information validation can be done without the necessity of third-party services. A coevolution and integration of semantic and blockchain technologies would at the same time enhance data interoperability and ensure data trust and provenance, creating undeniable benefits for distributed software systems. This talk will focus on the current state of the art regarding the integration of semantic and blockchain technologies, looking at the state of their coevolution, at the available and still needed solutions.

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Developing Innovation Capability to Improve Marketing Performance in Batik SMEs During the Covid-19 Pandemic

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Abstract. This paper aims to examine how the role of innovation capability in improving the marketing performance of Batik SMEs in Central Java, Indonesia during the Covid-19 Pandemic. The role of innovation capability (IC) is examined by analyzing its ability to mediate the influence of market orientation (MO), entrepreneurial orientation (EO), marketing capability (MC), and operational capability (OC) in improving marketing performance (MP). The relationship between these six concepts is something that has not received serious attention from academics in Indonesia. In this study, the 200 batik entrepreneurs were involved. The results showed that IC was proven to be an intervening variable in improving MP. Furthermore, this study expects that the development of IC can improve the MP of batik SMEs in Central Java during this pandemic, so that SMEs can continue to operate and develop.

Keywords: Market Orientation, Entrepreneurial Orientation, Marketing Capability, Operational Capability, Innovation Capability, and Marketing Performance

1. Introduction

SMEs in Indonesia grow as a support for the community's economy and have a very strategic role in the Indonesian economy. According to data from the Indonesian Ministry of Cooperatives and SMEs in 2018, it shows that the total number of SMEs is 99.9% of the total business units or 62.9 million units. The absorption capacity of SMEs is 96.99% of the total employment, while 89% of them are in the micro sector, and can contribute 62.58% to gross domestic product. The existence of SMEs is very important for the pace of the economy in Indonesia. Therefore, SMEs need special attention as they become the largest contributor to GDP and substitute for the mainstay of unemployment absorption, substitute for consumer goods products, and substitute for the production of consumer goods or semi-finished goods.

The Covid-19 pandemic has caused chaos in the economic sector. Not only in large industries, but the pandemic has made SME players in Indonesia anxious. SMEs are one of the sectors that have been severely affected by the Covid-19 pandemic in Indonesia. There are around 37,000 SME players that were affected by the covid-19 virus pandemic to their businesses as reported by the Ministry of Cooperatives and SMEs. From the data, 56% of SMEs reported a decrease in sales, 22% acknowledged capital difficulties, 15% had delayed distribution, and 4% reported difficulties in raw materials [1].

Batik is one of the superior products of SMEs in Central Java, Indonesia. Business continuity and survival are important factors in the struggle through today's difficult times. This pandemic condition is important to examine how creative industry players adapt and survive through difficult times and also for the next new normal period. The biggest challenge for batik SMEs during the pandemic is how these SMEs maintain their existence so that they are not getting worse and eroded by the intense competition in the batik industry and also not experiencing a decline in sales as a result of the Covid-19 pandemic. Marketing strategy is an important thing related to the survival of a business. To dominate a market, batik SMEs must have a special strategy to support the success of MP. MP is determined by the extent to which SMEs implement a MO. MO is a business perspective that focuses on the company's overall activities. MO is also a strategy in which companies or business actors must be oriented towards consumers and their market share [2]. [3] proved that MO contributes to improving MP. However, it is contrary to the results of research conducted by [4] that the MO factor does not determine MP. [5] stated that although several studies on the relationship between MO and performance still gave different results, research on the effect of MO on MP is still attractive for the benefit of corporate strategy. Companies that can apply MO have an advantage in customer knowledge, which can be a competitive advantage. The application of MO can provide a competitive advantage based on innovation.

Entrepreneurship-oriented businesses have the ability to seek and take advantage of market opportunities that have not been exploited and respond to challenges, and have the willingness to

take risks when faced with uncertain conditions. The results of research conducted by [6] show that EO has a positive and significant effect on MP. However, [7] shows that EO does not have a significant effect on MP. Likewise, research conducted by [8] shows that EO does not have a direct effect on MP. The existence of a gap between MO with MP and EO with MP has led to researchers' ideas to provide solutions by providing IC variable. IC is the company's ability to create new ideas, products, or processes. This study seeks to broaden the understanding of the relationship between MO, EO, MC, and OC in increasing IC. Thus, it is hoped that increased IC can improve the MP of batik SMEs in Central Java during this pandemic, so that SMEs can continue to operate and develop.

2. Literature Review

2.1. Market Orientation (MO)

MO is considered as the basis of the marketing concept and is important to contribute to improving business performance [9]. According to [10], MO is the process of finding and understanding the desires of existing and potential customers, as well as observing and overcoming the activities of existing competitors through processes and activities that develop the organization and management system. Therefore, MO can make the company better at responding to market demand and predicting market changes well to create sustainable competitive advantage. Meanwhile, according to [6], MO is related to the company's emphasis on creating and maintaining superior customer value. The requirement is to pay attention to the interests of stakeholders, in addition to providing norms for organizational development behavior and having an attitude of being responsive to market information. Along with increasing competitive advantage and changing customer needs, MO plays an important role because all companies realize that customers are assets that can improve company performance [11]. According to [2], MO is a process of company activities related to the creation of customer needs and satisfaction. The concept of MO was developed by [5]; they explain MO as an important factor for the company's success.

[5] described a MO as the most effective and efficient organizational culture creating the behaviors needed to create superior value for buyers and sustainable superior performance for businesses. Simultaneously, [12] created a MO as the generation of market intelligence throughout the organization relating to current and future customer needs, the dissemination of intelligence across departments, and the responsiveness of the entire organization to it. With MO, companies try to understand and take advantage of the exogenous factors in a company. A company can identify and respond to the needs of their customers and provide products and services according to their needs, thus making MO the main instrument in developing competitive advantage. Several studies on MO have emerged based on resource and literature-based views [13]. In this study, MO is considered as an intangible resource that emphasizes the company's ability to process market intelligence from customers and competitors [14].

2.2. Entrepreneurial Orientation (EO)

Entrepreneurial is a distinctive character that distinguishes entrepreneurs from managers or employees [15]. Entrepreneurs are known to seek out and take innovative, proactive, and risk-taking action. This differs from managers or workers who tend to avoid risk. Entrepreneurship is the hallmark of entrepreneurs who are constantly looking for and identifying business opportunities and creating new value for growth. According to [16], entrepreneurship is behavior that requires individuals to take risks and overcome challenges in creating new businesses that begin by identifying, evaluating, and seizing opportunities. The goal to be achieved is to earn income and make a profit. EO has emerged as an important factor in investigating the entrepreneurial spirit of companies and their influence on strategic processes [17]. The term EO refers to a series of dimensions consisting of decision-making processes, practices, and activities that lead to the re-creation of business ventures, including the tendency to act independently, the tendency to innovate and take risks, the tendency to competitive aggression in relation to competitors and the proactivity with new opportunities [18].

EO has a very vital role in obtaining and utilizing marketing information [19]. EO is the dissemination of entrepreneurial practices and associated shared values originating from top management companies so that it can be stated that EO starts at the highest organizational level and it aims to spread the practice of identifying and exploiting opportunities [20]. [21] argued that EO is related to the personal characteristics possessed by company owners in determining a clear vision, willingness to face challenges and risks, and the ability to create a good corporate image. Organizations with a strong EO will be more efficient in achieving a goal [22]. Entrepreneurship-

oriented businesses will have the ability to find and take advantage of market opportunities that have not been exploited and answer challenges and have the willingness to take risks when facing uncertain conditions [23]. According to [7], EO is the ability of processes, practices, and decision-making that is reflected in directing companies to engage in innovative, proactive, and risk-taking behavior to improve company performance.

2.3. Marketing Capability (MC)

Marketing capability refers to the company's ability to carry out marketing activities such as market research, advertising, promotion, customer relations, sales efforts, and so forth [24]. More specifically, marketing capability is a fundamental intangible asset that gives a company the ability to use available resources and perform marketing tasks according to the desired marketing performance [14]. Marketing capability also has the potential to make organizations aware of and act in response to changes in the market such as movements made by competitors, technological developments, and revolutions [25]. Marketing capability is also operated in a more precise organizational setting. The capacity of a company related to the collection, sharing, and dissemination of market information is part of its marketing capabilities [25]. Furthermore, as stipulated by [26], it includes launching new products successfully and maintaining good customer and supplier relationships. This all leads to the company's success. To reach this stage, companies will respond or take action based on their knowledge of the market.

2.4. Operational Capability (OC)

OC is a source of unity, integration, and can provide direction to existing resources through other operational practices. OC is defined as the ability by which a company can seek income in the short term [27]. The two main keys of OC are in marketing, namely the capabilities needed to meet customer needs and technology, and the capabilities needed to produce products and services. OC is a key component of a company's expertise to drive the achievement of production-related goals, for example, product quality, cost control and management, product flexibility, and delivery speed and reliability [28]. More specifically, OC refers to labor costs and operational costs. Labor costs include salaries, wages, and other benefits that the company pays to its employees and managers. The higher the employee and management benefits, the better the service the company can provide to its customers

2.5. Innovation Capability (IC)

IC is the skills and knowledge needed to effectively absorb, master, and improve existing technology to create new products [29]. IC according to [39], consists of 4 aspects, namely the capacity to develop new products that meet market needs, the capacity to apply the right process technology to produce new products, the capacity to develop and adopt new products, and process technology to meet future needs, and capacity. responding to unintentional technological activities as well as unexpected opportunities created by competitors [30]. IC is one of the most important dynamics that enable SMEs to achieve high competitiveness, both in the national and international markets. IC is the ability to continuously transform knowledge and ideas into new products, processes, and systems for the benefit of the company and its stakeholders. At this time, companies began to follow globalization and adopt innovation continuously, which highlighted the role of innovation capabilities [31]. The main reason that IC is defined as the ability to generate, accept, and implement new ideas, processes, products, and services [32] is to help a company maintain a competitive advantage for short-term survival and build its competitiveness and profits for long-term survival [33]. According to [34], IC can be described as the potential to produce innovative outputs.

MO is referred to as an organizational culture that focuses on how companies obtain and utilize market information [35]. Organizational capabilities have been identified to influence the transformation of market-oriented culture (such as market orientation) into specific activities [4], and IC has been presented as the main organizational capability [36]. Companies that implement a MO culture will be able to respect customer needs and the actions of competitors to focus more on IC to meet customer needs [36]. IC facilitates the creation of superior value for customers, and therefore companies that do not have that IC cannot fully utilize the market knowledge that has been generated through a MO [37]. In previous studies, [36]; [9] show that several variables can affect the relationship between MO and performance. The study conducted by [38] found a direct relationship between MO and IC. Thus, the hypothesis is proposed as follows:

H1: The more the market orientation increases, the more the innovation capability increases.

EO refers to entrepreneurial strategy-making practices, management philosophy, and company-level behavior [39]. Generally, companies that have a high EO will be more innovative, proactive, and dare to take risks [18]. Lack of EO often results in a low level of IC, especially at BUMN (State-owned enterprises) [18]. More specifically, innovation is a resource-intensive process, involving significant uncertainty and risk [40]. EO allows managers to take more risks while pursuing aggressive innovation [41]. Thus, the second hypothesis is proposed as follows:

H2: The better the Entrepreneurial Orientation, the better the innovation capability.

Companies will create a competitive advantage by thinking of new ways to do activities in the value chain, to provide superior customer value, which is an act of innovation [42]. This suggests that innovation will lead to competitive advantage and innovation can occur in any organizational value creation activity [43]. Marketing capability is very important at the product development stage, where the needs and competition of consumers must be assessed. Furthermore, information is shared to find comprehensive new product ideas to advance further to the development stage. Previous studies have shown that companies must have adequate resources and marketing capability to successfully develop new products with innovative capabilities [44]. The findings of [43] show that marketing capability plays a dual role in competitive strategy by influencing innovation and sustainable competitive advantage. Therefore, we believe that marketing capability affects all types of innovation made by a company. Thus, the relationship of marketing capability and IC is hypothesized as follows:

H3: The more marketing capability increases; the more innovation capability increases.

OC is defined as the integration of a series of complex tasks performed by a company to increase its output through the most efficient use of production capabilities, technology, and material flow [45]. OC arises from determinants such as resources and practices, as well as considerations such as skills, knowledge, and leadership [46]. The literature reveals many studies that establish a positive relationship between OC and innovation [47]. As in a study conducted by [48] who recommended that successful SMEs increase innovation by increasing OC. Thus, the fourth hypothesis is proposed as follows:

H4: The more the operational Capability increases, the more the innovation capability increase

2.6. Marketing Performance (MP)

The company has succeeded in meeting market demand by providing unique and inimitable products and services, which will increase superior performance. MP indicators are customer satisfaction, product or service quality, customer memory, customer loyalty, sales level, profit, and market share [36]; [49]. Furthermore, MP is a benchmark in assessing the success of value creation, which is a combination of strengthening IC and an in-depth understanding of MO. Various experts use different dimensions in measuring MP [50]. According to [23], MP is a factor that is often used to measure the impact of the strategy adopted by the company.

Recently, some marketing research studies have validated the positive effect of MO on MP [51]. One of the measures used to assess the success of the company's strategy is MP because every company has an interest in knowing the market achievement of the product sales. The success of MP is determined by how effective the company is in creating MO [52]. MO SMEs as part of the processes and activities related to the creation and fulfilment of customer needs and satisfaction will affect the improvement of MP [11]. [3] and [53] proved that MO contributes to improving MP. [65] found that MO and business performance are positively correlated. Furthermore, [54] found that there is a positive correlation between the business performance of SMEs and MO. Thus, the hypothesis is proposed as follows:

H5: The more the market orientation increases, the more the marketing performance increase

Research broadly shows that an EO tends to have positive business results for companies. [55] argue that an EO encourages a learning orientation in organizations. EO will encourage experimentation in introducing new products or services, new technology in developing new processes, and willingness to take cost risks. Taking risks and innovation as an effort to gain competitive advantage are reflected in efforts to improve MP [56]. The EO reflects the level of risk-taking, proactivity, and the company's aggressiveness towards innovation. Furthermore, EO will enhance organizational transformation and reform which can help build new competencies that drive improved MP [6].

Firms with high EO are more aggressive in entering new markets which are characterized by high risk and consequently require more intensive organizational learning [57]. A study conducted [58] revealed that EO has a positive effect on organizational learning which in turn has a positive

effect on MP. The results of research conducted by [6] indicate that EO has a positive and significant effect on MP. Furthermore, [59] revealed that the type of transformational leadership and EO contributed to the achievement of high MP. Likewise, in analyzing the agribusiness industry in Malaysia, [71] stated that EO has a positive effect on MP. Thus, the hypothesis is proposed as follows:

H6: The better the entrepreneurial orientation, the better the marketing performance

Market sensing and linkage with partners are some of the marketing capabilities that have been associated with positive organizational results. Others are customer, functional, and network capabilities [60] which can centrally be part of a marketing strategy that aims to improve superior MP. The company resource-based view proposes that intangible assets such as marketing capability have the potential to encourage competitive advantage, thereby increasing company performance in an industry. Marketing capability has been linked to business strategy, MO, and has become a complementary asset in driving MP. [61] investigated the effect of MC on firm performance. The results showed that MC had a positive effect on organizational performance. Research conducted by [25] found that MC has a positive and significant effect on MP. Therefore, the hypothesis is proposed as follows:

H7: The more the marketing capability increases, the more the marketing performance increases

Previous literature in the management and IT domain clearly shows that a strong OC can contribute positively to achieving and maintaining a competitive firm performance [62]. The strategic literature in manufacturing highlights the role of OC in performance. The positive effect of OC on firm performance has been documented in some ways, such as by increasing revenue, reducing costs associated with product development and delivery, and improving the quality of the company's existing processes and products [63]. Superior OC is recognized as a driver to achieve competitive advantage and improve work results [64]. Thus, the hypothesis is proposed as follows:

H8: The more the operational capability increases, the more the marketing performance increases

IC is very important to improve company performance. IC can improve performance by reducing production costs, thereby increasing profit margins [31]. SMEs can receive more benefits if they can develop, communicate, embrace, and exploit innovation. The innovation dimension consists of product innovation, process innovation, and market innovation which is thoroughly studied by [65]. SMEs can gain more profits or increase profitability if SMEs can develop, communicate, buy, and develop IC [66]. There have been many studies that show a positive relationship between IC and firm performance [67]. Research conducted by [32] concluded that innovation ability can significantly increase firm performance. This is in line with research conducted by [31], that IC has a direct effect on firm performance. Thus, the hypothesis is proposed as follows:

H9: The more the Innovation Capability increases, the more Marketing Performance increases

3. Research Methodology

3.1 Variable Measurement

MO is a strategy in which companies or business actors must be oriented towards consumers and their market share [2]. Measurement variables used 6 items, concerning the opinion of [5]. EO is the characteristics and values embraced by the entrepreneur itself, which are the nature of never giving up, taking risks, speed, and flexibility. Measurement of variables using 5 items, namely, business experience, proactive, courage to take risks, flexible, and antipathetic. MC refers to the company's ability to carry out marketing activities such as market research, advertising, promotion, customer relations, sales efforts, and so forth [13]. To measure MC, 4 items were used. OC measurement used 4 items, namely, service process management, service performance management, IT infrastructure, and utilizing the most recent technology available. The measurement of IC used 4 items, namely, developing new products, expanding the product range, improving the quality of existing products, and increasing production flexibility [32]. MP is used to measure the success of strategies in marketing products. MP measurement used 3 items, namely, sales growth, customer growth, and profitability.

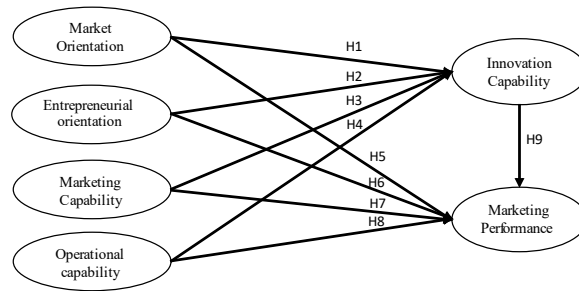


Figure 1: Research framework

3.2 Respondent

Respondents in this study were entrepreneurs or owners of batik SMEs in Central Java, Indonesia. The data was obtained by distributing questionnaires via google form and by meeting directly with batik entrepreneurs. The distributed questionnaire is then collected and only 200 questionnaires can be analyzed. Questionnaires were distributed from December 2020 to January 2021, at which Central Java faced the COVID-19 pandemic.

3.3 Data analysis technique

This research used the regression analysis technique with two stages. The first stage was a regression analysis to examine the effect of MO, EO, MC, and OC on IC. The second stage of regression was carried out to test the effect of MO, EO, MC, OC, and IC on MP. Regression analysis was performed by using SPSS 23. While to test whether IC could be a mediating variable or not, the Sobel test was used.

4. Results

Table 1 shows two regression models. The results of regression analysis of the first model and the second model produce good goodness of fit model because the Anova test produces the F-sign of 0.000. The coefficient of determination for the first model is shown by Adj. $R^2 = 0.501$, which means that IC variable can be well explained by MO, EO, MC, and OC of 50.1%. The remaining 49.9% is explained by other variables outside the model. The coefficient of determination for the second model shows Adj. $R^2 = 0.581$, which means that the MP variable can be well explained by the MO, EO, MC, OC, and IC of 58.1%. The remaining 41.9% is explained by other variables outside the model.

Table 1: Hierarchical Regression Analysis

Model	Hypothesis	Regression	Unstd β	std β	SE	p-value	VIF	Results
1	H1	MO \rightarrow IC	0.115	0.168	0.043	0.008**	1.557	Accepted
	H2	EO \rightarrow IC	0.165	0.233	0.046	0.000**	1.705	Accepted
	H3	MC \rightarrow IC	0.268	0.310	0.044	0.000**	1.041	Accepted
	H4	OC \rightarrow IC	0.316	0.371	0.048	0.000**	1.279	Accepted
2	H5	MO \rightarrow MP	0.074	0.060	0.072	0.307	1.635	Rejected
	H6	EO \rightarrow MP	0.084	0.066	0.078	0.287	1.816	Rejected
	H7	MC \rightarrow MP	0.162	0.105	0.079	0.042*	1.238	Accepted
	H8	OC \rightarrow MP	0.421	0.276	0.087	0.000**	1.562	Accepted
	H9	IC \rightarrow MP	0.841	0.469	0.118	0.000**	2.046	Accepted

Model 1: Adj $R^2 = 0.501$, F = 50.988, p-value = 0.000

Model 2 : Adj $R^2 = 0.581$, F = 56.120, p-value = 0.000

Notes: * p < 0.05; **p < 0.01

MO = Market orientation, EO= Entrepreneurial orientation, MC=Marketing Capability, OC=Operational capability, IC = innovation capability, MP= marketing performance

The results of the regression analysis in model 1 show that there are four variables used to test the increase in IC. The results of the regression analysis with SPSS show that the variables that can increase IC are MO (std $\beta = 0.168$), EO (std $\beta = 0.233$), MC (std $\beta = 0.310$), and OC (std $\beta = 0.371$), all of which have a p-value of less than 0.01. It can be concluded that the hypotheses H1, H2, H3, and H4 are accepted. Thus, MO, EO, MC, and OC have a positive and significant effect on IC.

For model 2 analysis, five variables, namely MO, EO, MC, OC and IC are used to test how they affect MP. The results of the regression analysis show that the effect of marketing MO on MP shows insignificant results (std $\beta = 0.060$, p-value 0.307). Thus, Hypothesis 5 is rejected. This means that the increase in MO is proven unable to improve MP. Similar results also occurred in an EO.

The effect of EO on MP is shown by $\text{std } \beta = 0.066$ and $p\text{-value} = 0.287$. This means that hypothesis 6 is rejected. Thus, the increase in EO proved unable to improve MP.

The results of the regression analysis show that the variables that can affect MP are MC ($\text{std } \beta = 0.105$, $p\text{-value} = 0.042$), OC ($\text{std } \beta = 0.276$; $p\text{-value} = 0.000$), and IC ($\text{std } \beta = 0.469$; $p\text{-value} = 0.000$). Therefore, H7, H8, H9 are accepted. This result implies that increasing MP can be done through increasing MC, OC, and IC. The mediation test procedure proposed by Sobel (1982) was adopted to test the mediating effect of Innovation Capability (Table 2).

Table 2. Parameter estimates for the path: indirect effects (Sobel test)

Path	Sobel test	p-value
MO →IC→ MP	2.504	0.0061*
EO →IC→ MP	3.204	0.0007*
MC →IC→ MP	4.630	0.0000*
OC →IC→ MP	4.836	0.0000*

Note: * $p < 0.01$

Table 2 shows that all the p-values in the Sobel test have a value less than 0.01. This implies that innovation capability variable mediates the relationship between variable market orientation and marketing performance. This shows that innovation capability can mediate the relationship between market orientation with marketing performance, entrepreneurial orientation with marketing performance, marketing capability with marketing performance, and operational capability with marketing performance.

5. Discussion

The results showed that IC can mediate the relationship between MO, EO, MC, and OC with MP. The increase in IC is marked by the company's ability to create products with the latest Batik designs and models, the ability to expand the Batik business area, and the ability to develop Batik production processes more effectively and efficiently. Meanwhile, the increase in MP is indicated by the increasing Batik business growth and reaching the target, increasing customers, profits, and Batik sales.

During a pandemic, the needs and desires of customers are important things that need to be understood by SME actors. SMEs must understand that many consumers limit their activities outside and prefer conducting all activities from home. Understanding the needs and desires of consumers is one manifestation of MO. MO is very important because it is proven to be able to increase the degree of IC. This is in line with research conducted by [48]. In this study, MO cannot directly affect MP but indirectly can affect MP through IC.

EO can be seen from the actors of Batik SMEs who have experience in business, are proactive in improving performance, are willing to take risks, are flexible, and are anticipatory to sales problems that will arise. Batik SMEs that have a high EO cause a high IC. On the other hand, SMEs that have less EO will result in low IC levels. This supports the research conducted by [24]. Meanwhile, in this study, EO cannot directly affect MP, but indirectly can affect MP through IC

MC of SME actors play an important role because it can increase IC and MP. Increasing MC can be done by increasing the ability of SME actors in setting prices according to the target market, rapidly developing new Batik products that are not yet in the market, and increasing the ability to communicate and market the Batik products.

Superior OC is proven to increase IC and MP. The increase of IC and MP is carried out by OC by improving service process management and service performance management of SMEs, increasing the ability to use IT infrastructure and the ability to utilize the latest technology.

6. Managerial Implications

In the Covid-19 pandemic, it turned out that IC was proven to be a variable that could be a solution to improving the marketing performance of SMEs in Central Java, Indonesia. Therefore, SMEs need to increase IC to survive and develop during this pandemic. To increase IC, SMEs can create products with the latest Batik designs and models. In addition, many customers limit their activities outside so that it is easy to find information about batik through the media. Therefore, companies need to create the Batik products with the latest batik designs and models according to customer desires and needs, so that consumers are interested and willing to buy.

SMEs also need to find new ideas to increase the ability to expand the Batik businesses area. This is because, during this pandemic, it is very easy for consumers to find the Batik products online, so that the Batik market area can expand and is not limited to one particular location... SMEs also need to improve their ability to develop the Batik production process more effectively and efficiently so that they can thrive in this pandemic. Therefore, it is expected that the marketing

performance of SMEs will be able to increase and rise from the decadency of business due to the pandemic.

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