Contents lists available at ScienceDirect

Journal of Open Innovation: Technology, Market, and Complexity

journal homepage: www.sciencedirect.com/journal/joitmc

Exploring the role of organizational creativity and open innovation in enhancing SMEs performance

Augustina Asih Rumanti, Afrin Fauzya Rizana*, Fandi Achmad

Department of Industrial Engineering, Telkom University, Bandung, Jawa Barat 40257, Indonesia

ARTICLE INFO

ABSTRACT

Keywords: Organizational creativity Organizational performance Open innovation SMEs Although the importance of fostering organizational creativity and open innovation is becoming more widely acknowledged, there are still few empirical evidence on the impact of creativity and innovation on enhancing SMEs performance. Moreover, previous study argued that the effect of creativity and innovation is still inconclusive, especially in SMEs. SMEs sometimes perceive that research and development is a costly activity and it doesn't view as the activity that can directly improve performance. This study aims to examine the effect of organizational creativity and open innovation on SMEs performance. Data used in this study was collected from 206 SMEs located in several regions of Indonesia. The collected data then being analysed using PLS-SEM and this study found that all the hypotheses constructed were accepted. The findings indicate that organizational creativity and open innovation are significantly and positively influence SMEs performance. On the other hand, this study also treats organizational creativity as a second order variable that is formed from a combination of individual creativity, group creativity, internal environment, and knowledge creation where most study only consider individual and group creativity as aspect that formed organizational creativity. The result of this study provide evidence that organizational creativity that is formed by those four aspects has the ability to directly improve SME performance. Theoretically, this study contribute to the debate on how organizational creativity and open innovation can directly improve SMEs performance. Practically, this study provides insight to SMEs manager regarding how organizational creativity and open innovation can contribute to SMEs performance.

1. Introduction

Every organization will try to obtain optimal performance to achieve organizational goals while being superior to its competitors (Pap et al., 2022). However, the performance of an organization is determined by its ability to innovate both in producing a product or service (Rumanti et al., 2021). Organizational performance is a concept that includes all activities within an organization or company, both those that produce products and services. Organizational performance refers to the implementation of the organization's vision, mission, goals, and activities (Pap et al., 2022) which are supported by the concept of innovation, one of which is open innovation (Lopes et al., 2022). Innovation is one of the drivers in the organization in an effort to accelerate optimal organizational performance while at the same time reflecting the main goals of the organization (Rumanti et al., 2021). Organizational performance is a key construct in management research and has received a lot of attention from interested parties in an organization (Scaliza et al., 2022; Rumanti et al., 2022; Singh et al., 2021). Organizational performance is also supported by the existence of an innovation related to the creation of new services and products, especially innovation that is open, namely open innovation. Organizational performance can be influenced by the organization's ability to innovate, especially from external parties (open innovation) (Rumanti et al., 2022).

Open innovation positively influences various organizational performance measures (Weinzimmer et al., 2011; Rumanti et al., 2021; Fetrati et al., 2022) The implementation or practice of open innovation is a strategic asset that drives long-term competitive advantage and improves organizational performance (Serrano-Bedia et al., 2016). The use of open innovation is increasingly necessary as the volume of globalization increases in innovation, new technologies, and research through new information technologies, communications, new organizational models and forms (Lopes et al., 2022). Open innovation is one of the factors supporting the performance of small and medium

* Corresponding author. E-mail address: afrinfauzya@telkomuniversity.ac.id (A.F. Rizana).

https://doi.org/10.1016/j.joitmc.2023.100045

Received 2 March 2023; Received in revised form 6 April 2023; Accepted 11 April 2023 Available online 24 April 2023





^{2199-8531/© 2023} The Author(s). Published by Elsevier Ltd on behalf of Prof JinHyo Joseph Yun. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

enterprise organizations (SMEs). In open innovation there are inbound and outbound open innovation (Popa et al., 2017; Rumanti et al., 2020). Inbound activities tend to increase the performance of radical innovations, while outbound practices have a greater effect on performance in terms of incremental innovation. This can especially be accommodated more in small and medium scale organizations (SMEs) (Scaliza et al., 2022).

Open innovation is a conceptual framework that enables SMEs to benefit from innovation, both process and product innovation, through leveraging the intentional flow of knowledge in and out for fast-track innovation (Singh et al., 2021). An open innovation approach will be very helpful in overcoming crisis conditions (crisis management) (Yuana et al., 2021). Collaborating with the global community, sharing issues on an open platform, managing intellectual property, and evaluating technology are some of the ways that can be done to help organizations overcome crisis conditions, especially those that occur globally (Rumanti et al., 2022; Singh et al., 2021; Yuana et al., 2021). Open innovation is a holistic approach to systematically managing innovation in organizations to encourage and explore various internal and external sources, consciously integrate this exploration with strong capabilities and resources, and make extensive use of these opportunities (Yun et al., 2020). The interaction between the organization and its employees is also important to be able to ensure that the innovation process can successfully achieve its goals and improve organizational performance (Pap et al., 2022; Nagwan et al., 2020). In the context of small and medium enterprises (SMEs), open innovation is a new strategy that allows organizational leaders or top management to have access to the external capabilities of the organization to develop its performance (Scaliza et al., 2022), where open innovation provides support for the performance of these SMEs (Valdez-Juárez et al., 2021; Rass et al., 2013). Through open innovation, organizations can innovate by interacting with external parties (Lee et al., 2010). Open innovation is believed to be a strategy to improve company performance (Valdez-Juárez et al., 2021), as well as economic performance and innovation (Lee et al., 2010). The concept of open innovation is one of the important things in achieving optimal organizational performance, especially at this time where digitalization is an opportunity for organizational development (Brodny et al., 2022). Currently, the development of the industry or business of an organization faces various challenges, including in digital transformation. Therefore, the stakeholders of an organization, especially organization's leader, need to adopt a policy to implement open innovation so that they are able to adapt to changes in new digital technology and collaborate globally (Tutak et al., 2022)

Several studies have shown the importance of open innovation in organizational performance (Lee et al., 2010; Ahn et al., 2016). The more intensive application of open innovation shows that higher organizational performance is supported by high implementation of open innovation (Liang et al., 2013). The effect of open innovation on organizational performance is not easy to investigate although in practice and theory the open innovation approach appears to be beneficial to organizations (Serrano-Bedia et al., 2016; Chun et al., 2014). Several studies have found positive effects of open innovation on organizational performance (Chun et al., 2014: BPS, 2020). In addition, open innovation is believed to have the ability to reduce the time needed to develop new products or processes, as well as increase the speed of entry into new markets (Lee et al., 2010). By opening up its boundaries, companies can leverage the complementary assets of their partners, maximize revenue by selling unused intellectual property (IP) assets, save time and costs on developing innovations, attract potential customers by involving them in the production process, and set new technology standards by form partnerships (Lawson and Samson, 2001). Performance in an organization, starting from small, medium to large scale organizations is influenced by its ability to be creative (Pap et al., 2022; Rumanti et al., 2017; Ghosh, 2015).

Organizational creativity is increasingly becoming the concern of many organizational stakeholders because creativity in business

organizations is a shared asset, both resulting from individual and group creativity (Borghini, 2005). Creativity is the ability to produce new work, considered as the starting point and root of innovation (Serrano-Bedia et al., 2016). Individual ability to innovate in the workplace is an important characteristic that helps organizations build competitive advantage, and individual innovation provides the foundation for generating high performance in organizations (Serrano-Bedia et al., 2016). Creativity is very important to support organizational performance and simultaneously solve problems quickly in conditions that are always connected and dynamic (Pap et al., 2022; Serrano-Bedia et al., 2016; Ghosh, 2015). The industry is currently facing a rapidly changing environment (Achmad et al., 2023), so organizations need creativity to survive in an increasingly dynamic environment. As globalization progresses, the need for creative responses increases exponentially, both in quantity and quality. Large multinational companies and start-ups can benefit from growing global flows, and increase business opportunities for small and medium enterprises (SMEs) as well as individuals (Woodman et al., 1993).

Creativity is very important in business because creativity is a differentiator between businesses or organizations (Landry, 2017). Creativity is a tool where the results obtained depend on those who use it, so building creativity will have a positive impact on organizational performance (Song et al., 2019). Organizational creativity is defined as the creation of valuable and useful new products, services, procedures or processes by individuals working together in complex social systems (Woodman et al., 1993). Organizational creativity is related to organizational performance therefore it is important to investigate the determinants of organizational creativity, not just employee creativity, and the circumstances that moderate how much it influences organizational creativity (Woodman et al., 1993; de Vasconcellos et al., 2019).

Organizational creativity is very important in problem solving, especially in uncertain conditions (de Vasconcellos et al., 2019; Jeong et al., 2019). Organizational creativity will have a positive effect on organizational performance and play a role in making organizations more effective in improving their performance (Mikalef and Gupta, 2021). Creativity makes an important contribution to the performance and impact of the generation of new ideas and the potential to be expressed together with innovation activities to achieve more optimal organizational performance (Ferreira et al., 2020). Organizational creativity plays a very important role in the process of organizational change, process effectiveness and ability to survive amid competition (Chun et al., 2014). A very creative climate contributes to high levels of organizational performance, for example in market share, sales volume, increased ability to implement complex work designs and others (Yström et al., 2015). The real results of organizational creativity are organizational changes such as improvements (changes from what has been done) and innovation (new activities for the company). Without creativity, organizations can fail to adapt to changes from within or outside the company (Choi and Lee, 2003). In general, corporate change objectives cover aspects of corporate performance such as improvement, survival, innovation, or organizational effectiveness.

Based on the explanation in the previous section, it has been explained the importance of creativity and innovation in an organization. Each plays a role in achieving more optimal organizational performance and supporting organizational goals. However, it has not been studied how the relationship between creativity and open innovation simultaneously supports the achievement of organizational performance, both in large, medium and small scale organizations. For this reason, this research will examine more deeply the role of organizational performance with the object of research on small and medium industries (SMEs). Through the research model produced in this study, the relationship and influence of organizational performance as well as the analysis and implications of both implications for relevant theory or science as well as implications for managerial activities within the



Fig. 1. Research Model (self-produced).

organization. The magnitude of the influence of organizational creativity and open innovation on organizational performance will become a reference in evaluating organizational creativity and open innovation processes that will support the performance of Indonesian SMEs.

2. Literature review

2.1. Organizational Performance

Organizational performance is essential to the survival and success of the modern business (Richard et al., 2009). Every company certainly strives to achieve good organizational performance to survive and compete with competitors. According to Popova and Sharpanskykh (2010), performance is assessed by estimating the values of qualitative and quantitative performance indicators (e.g., profit, number of clients, costs). Performance measurement and analysis is crucial for steering the organization to realizing its strategic and operational goals (Popova and Sharpanskykh, 2010; Xie et al., 2023). Organizational performance is information related to the level of financial and non-financial achievement of the organization towards its goals (Taouab, 2019). Study from Taouab (2019) shows a performance pyramid. Performance pyramid divides the company into a hierarchy of 4 levels. The top level of the firm's performance pyramid is where the general company vision is first defined. This is followed by the translation of this vision into specific business unit objectives. At the second level, the company will determine performance targets related to financial and market growth. In certain research, financial performance was assessed using metrics including profitability, return on investment, and share price. At the third level, companies will focus on performance measure related to daily operational actions such as customer satisfaction, flexibility, and productivity. At the last level, performance measures will focus on matters related to company operations such as product quality, process efficiency, delivery, and waste.

2.2. Organizational creativity

Organizational creativity can be defined as the development of innovative idea, products, services, methods, or processes that are valuable and advantageous for an organization (Crema et al., 2014; Borghini, 2005; Sutanto, 2017). For organizations, creativity is needed to survive and keep growing in a rapidly changing environment (Boso et al., 2017; Jeong and Shin, 2019). Studies show that creativity enable organization to provides creative solution to solve problem in rapid manners and help organization to adapt in uncertain condition (de Vasconcellos et al., 2019; Ferreira et al., 2020). Organizational creativity is built not only from employee's individual creativity but it is a collective process to which the employees are exposed. Organizational creativity must not consider simply as individual or group activity but should also consider the environment and knowledge creation.

2.3. Open innovation

Open innovation demonstrates how useful ideas can be obtained from the market, organizations' internal and external stakeholders, and other sources. The popularity of open innovation practice is driven by the rapid growth of technology (i.e. internet, smart gadgets, etc.) so that the volume and the speed of knowledge dissemination increase rapidly (Rumanti et al., 2021). Open innovation practices allow organization to utilize and exploit inward and outward transfer of knowledge and technologies with the aim of accelerating internal and external innovation, expanding markets (Parida et al., 2012; Rumanti et al., 2022). Literatures believed that engaging in open innovation practice is beneficial for organization since it can enable organization to increase its ability to accelerate access to new market, reduce time for new product development, and improving partnership to establish new technological standard. Open innovation practice is often decomposed into two dimensions i.e. inbound open innovation and outbound open innovation (Chesbrough, 2003; Popa et al., 2017). Inbound open innovation practice will allow organization to explore as well as absorb new technologies and knowledge from external sources, while outbound open innovation refer to the utilization of internal ideas or technological knowledge through licensing, patenting or legal partnership to obtain financial or non-financial benefit (Popa et al., 2017; Rumanti et al., 2021).

2.4. Formulation of hypotheses

Fig. 1 presents the research model developed in this study. The research model constructed in this study was elaborated from the study of Indriartiningtias et al. (2019) and Rumanti et al. (2022). This study constructs direct relationship between organizational creativity and performance (H1) and direct relationship between open innovation and performance (H2). In this study, organizational creativity and open innovation construct were treated as second-order construct with the consideration that both organizational creativity and open innovation is a complex concept that is composed by several constructs. In this study, organizational acts as a second order construct that is formed by individual creativity, group creativity, internal organizational environment, and knowledge creation. On the other hand, open innovation construct is composed by inbound open innovation and outbound open innovation practice.

2.4.1. Organizational creativity and performance

Literatures considered creativity as vital determinant of organization's performance and success (Boso et al., 2017). But, the relationship between organizational creativity and performance is still inconclusive and conflicting. Study stated that the relationship between organizational creativity and performance has long been suggested to depend on the environment in which creativity is exhibited (Boso et al., 2017). The study from Ferreira et al. (2020) argued that although creativity significantly contributes to performance, but the impact might be indirect. It is because the generation of new idea might be expressed in new and successful innovation, which can lead to performance improvement. In the study from Weinzimmer et al. (2011), creativity and performance were proposed to have a direct relationship. The implementation of creativity through the realization of idea and product development might increase cost at first, but over time, organizations that encourage creative behaviour often experience the increase of profit growth and lead to significant impact to organization financial performance (Weinzimmer et al., 2011). In line with that, creativity legitimizes creative behaviour among organizational members to improve organizational performance (Weinzimmer et al., 2011; Boso et al., 2017). The study from Riaz and Hassan (2019) also suggest a positive relationship between organizational creativity and performance. Organizational creativity that is reflected through various types of innovation such as innovation in processes, products, or technology will lead to improvements in organizational performance (Riaz and Hassan, 2019). Organizational creativity enable firm to obtain excellent market performance through the initiation the process of selling ideas, mobilizing sponsorship, collecting needed resources, creating innovation, and introducing the innovation to the marketplace (Boso et al., 2017; Sarooghi et al., 2015). Due to the conflicting effect of organizational creativity and organizational performance, this study tried to examine the effect of organizational creativity towards organization performance. Thus, in this study it is hypothesize:

H1: Organizational creativity positively and significantly influence organizational performance.

2.4.2. Open innovation and performance

The effect of open innovation to organization performance haven't yet reached a firm conclusion. Even though the majority studies concluded that engaging in open innovation had a favourable impact on performance, others discussed about inverted U-shaped relationship or even a negative impact on performance (Greco et al., 2015; Rumanti et al., 2021). In many literatures, the effect of open innovation to organization performance was captured on how open innovation can boost innovation performance in organization (Ebersberger et al., 2012; Inauen and Schenker-Wicki, 2011; Parida et al., 2012; Wang et al., 2012). Other than that, studies also showed that open innovation practice bring positive impact towards organization performance from its ability to improve organization's financial performance (Lee et al., 2015; Lu and Chesbrough, 2022). In an attempt to obtain clearer understanding regarding the role of open innovation practice and organization performance, this study tried to examine the effect of open innovation towards organization performance. Thus, in this study it is hypothesize:

H2: Open Innovation positively and significantly influence organizational performance.

3. Methodology

This research will examine the role of organizational creativity and open innovation in achieving organizational performance with the object of research on SMEs. The magnitude of the influence of organizational creativity and open innovation on organizational performance will be a reference in evaluating the process of organizational creativity and open innovation that will support the performance of SMEs. This empirical research was carried out by developing a research model, measuring and studying the factors that influence organizational performance improvement through open innovation and organizational creativity with a quantitative approach, with a non-experimental design and a cross-sectional, with causal hypothesis testing through the statistical technique of Partial Least Squares Structural Equations Modelling (PLS-SEM), using the statistical software SmartPLS statistical tools. There are two reasons for using this technique. First, because this study used a small sample, and secondly, because it works with parametric tests, thereby solving possible problems of data abnormality (Hair et al., 2014).

3.1. Sample and data collection

In this study, questionnaire was used as the instrument for data collection. The items in questionnaire was developed based on the three constructs used in this study as discussed in the Section 2. There are two stages of data collection employed in this study. At the first stage, data collection was performed for pilot test purpose. At the second stage, the data collection was performed for model evaluation. Before distributing the questionnaires, a preliminary study (pilot test) was carried out to increase the level of understanding of the respondents towards the questionnaire. This questionnaire was tested and validated with expert practitioners, academics, and 30 respondents/organizations randomly selected from all data of Batik SMEs in Lasem, Rembang Regency, Central Java Province, and Madura, East Java Province. Based on the feedback received from the pilot test stage, several improvements and changes were made to increase the clarity of the terms and wording of the questionnaire items. This improvement was made so that respondents could truly understand the questions' intent.

The population in this study were all Batik SMEs in Lasem, Rembang Regency, Central Java Province, Indonesia and Madura, East Java Province, Indonesia. The definition of micro-scale organizations (SMEs) is organizations with 1-19 employees, small-scale organizations as companies with 20-99 employees, medium-scale organizations as companies with 100-499 employees, and large-scale organizations as companies with more than 500 employees (Scaliza et al., 2022). The use of respondents in this study is the characteristics of small and medium-scale organizations, namely with a total of 20-499 employees. Questionnaires were distributed to respondents from July to October 2022 using a purposive sampling data collection technique, where the goal is to get a sample that can describe the population. The samples were distributed as follows, 100 respondents were obtained from Batik SMEs in Lasem, Rembang Regency, Central Java Province and 106 respondent were obtained from Batik SMEs in Madura, East Java Province. The number of usable and complete respondent was 206 out of a total of 221 respondents, or 93.21% of the valid respondent level for data processing. The number of samples taken from the population is ten times the number of research variables used in the analysis design, and the minimum is 80 samples (Hair et al., 2014). The number of questionnaires collected is a general response filled out by Batik SMEs owners who were respondents during this study. In filling out the questionnaire, guidance and assistance were provided to the respondents in order for the majority of the questionnaires to be fully completed. Respondents still have full authority and awareness to complete the questionnaire under the given circumstances, free from researcher interference. The characteristic of respondents is summarized in Table 1. Table 1 shows that the respondents who in this study

Tabel 1

Characteristic of Respondent.

Profile of Respondent		Category	Number of Respondent	(%)
Location		Sentra	66	32
		Non-Sentra	140	68
Age of SMEs		< 10 years	21	10
		11-20 years	58	28
		21-30 years	67	33
		31-40 years	37	18
		\geq 50 years	23	11
Respondent's Age		20-29 years	15	7
		30–39 years	51	25
		40-49 years	74	36
		50–59 years	46	22
		≥ 60 years	20	10
Gender		Male	178	86
		Female	28	14
Number of Workers		< 5 workers	17	8
		6 – 10 workers	24	12
		11 – 15 workers	52	25
		16 – 20 workers	64	31
		21 – 25 workers	31	15
		≥ 25 workers	18	9
Total Assets(Million Rupiah)		< 1000	146	71
		> 1000	60	29
Net Income/Year(Million Runiah)	Before pandemic	0 - 250	19	9
	Detore panaenne	251 - 500	36	18
		501 - 750	79	38
		751 - 1000	40	19
		> 1000	32	16
	During pandemic	0 - 250	37	18
	During paraetine	251 - 500	64	31
		501 - 750	59	29
		751 - 1000	31	15
		> 1000	15	7
Number of Partner/Stakeholders		1	5	, , ,
Number of Farmer/Stakeholders		2	45	2
		2	77	37
		3	//	
		4	+/ 22	23 16
		24	32	10

someone who have direct role of decision-making related to innovation management in an organization (e.g., managers, directors, business owners, and engineers).

3.2. Instrument development

The data used in this study was derived via the distribution and responses to qualitative questionnaires. The items included in the questionnaire were adapted from previous study related to organization creativity, open innovation, and performance. Measuring questionnaire items in this study used a 5-point Likert scale. Point 1 indicates that the respondent "strongly disagrees," and point 5 indicates that the respondent "strongly agrees" (Hair et al., 2014). The selection of the Likert scale was made with the thought that the Likert scale is more suitable for all types of respondents, especially when using an odd scale (Hair et al., 2014; Weijters et al., 2010). The construction description and related measurement indicators are given in Table 2.

3.3. Construct operationalization

This study organizes organizational creativity and open innovation construct as independent variables, while organizational performance is the dependent variable.

3.3.1. Independent variable

As previously mentioned, there are two independent variables in the research model i.e. organizational creativity and open innovation. There are four dimensions in this study that are used to reflect organizational creativity variable. These dimensions consist of individual creativity, inter-organizational environment, knowledge creation, and group creativity. Meanwhile, the open innovation variable reflects two dimensions, namely, outbound open innovation and inbound open innovation. Each dimension is measured using statement items described in the instrument development section.

3.3.2. Dependent variable

In this study, organizational performance act as dependent variable. Organizational performance can be achieved through two variables. Every time an organization is optimized, it is necessary to align organizational creativity and open innovation because these two variables affect organizational performance's achievement.

3.4. Data analysis

Today, there are numerous multivariate analysis is supported by sophisticated software. Since there are a number of unobserved variable used in this study, structural equation modelling (SEM) is considered as suitable technique. It is because SEM has the ability to capture unobserved concept as used in this study and estimate multiple dependence relationship simultaneously.

PLS-SEM was utilized in this study as a tools to test the collected data. There ere several reasons why PLS-SEM was used in this study (Hair et al., 2014; Henseler, 2020; Scaliza et al., 2022; Latan et al., 2017). First and foremost, PLS-SEM is an appropriate and useful technique to estimate complex models containing numerous of constructs and indicators. Second, PLS-PM suit to examine the relationship between variables for the research that still in the exploratory stage, advanced stage, or a combination of both. Lastly, PLS-PM enables researchers to assess models for various research purposes, which is essential to establishing theory and practice.

Tabel 2 .Measurement indicators for each	variable.			
Variable	Definition	Item		Reference
Organizational Performance	Organizational achievement is related to financial and non-financial	0P1	Organizations pay attention to net profit trends as a	(Indriartiningtias et al., 2019)
	organizations towards their goals	OP2	benchmark for performance The organization bays attention to the increase in revenue	
			as a benchmark for performance	
		OP3	The organization's net profit has increased consistently	
		OP4	over the past year The increase in revenue in the organization has occurred	
			consistently over the past year	
		OP5	Organizations compare the value of the investment to the	
		140	benefits derived from the investment	
		OP6	Customers are satisfied with the products and services of	
		CD7	ure organization The organization keens employee morale high ecnegially	
		110	the organization weeps emproyee morate men, espectany during the nandemic	
		OP8	Productivity targets set by the organization have always	
			been achieved over the past year	
		640	The quality of the products produced by workers is by the	
			standards set by the organization	
		OP10	Products and services are received on time by customers	
		0P11	Bookkeeping of the amount of stock is carried out	
		OP12	regularly The moducts moduced by the organization dominate the	
			market	
		OP13	Sales results have increased over the past year	
Organizational Creativity	The process of creating new and useful products, services, ideas, procedu	rres or proce	sses by individuals working together in complex social	(Indriartiningtias et al., 2019)
	systems.			
Individual Creativity	Creation of new ideas for organizations carried out by individuals	ICI	Worker creativity emerges when given the opportunity	(Indriartiningtias et al., 2019)
		IC2	Employees can develop appropriate plans and schedules	
			for the implementation of new ideas	
		IC3	Employees have innovative new ideas	
		IC4	Employees have high curiosity	
		IC5	Employees have high technical expertise in every field	
		106	Employees come up with creative solutions to problems in	
		<u>ل</u> ت	ure organization Employees how a new anneach to mobilem colving	
) <u>(</u>	Employees liave a new approach to problem-solving	
Group Creativity	Creation of new ideas that are useful for organizations that are carried out	91 100	Employees oner new ways to carry out work tasks Companies can produce innovative iobs and products	(Indriartiningtias et al., 2019)
	by several individuals who gather in a group	GC2	Every job requires workers to be creative	
		GC3	Everyone is encouraged to be creative within the	
			organization	
		GC4	Everyone is encouraged to take risks within the company	
		GC5	Overall, work in organizations supports individual creative	
		605	processes Organizations can discuss employee work related to the	
			development of work ideas	
		GC6	The information provided by the organization makes	
		10	employees more creative	
		GC7	Employees always discuss new things with each other in a	
		GCR	team about new ideas in a positive sense There is mutual trust hetween the team members of each	
		222	employee	

6

(continued on next page)

Tabel 2 (continued)				
Variable	Definition	Item		Reference
Internal Organizational Environment	The internal characteristics of the organization that affect the individual's creative process, both supporting and inhibiting the creative process.	10E1 10E2 10E3 10E4 10E5 10E5 10E6 10E7 10E8	The organization keeps employee morale high, especially during the pandemic Organizations do not ignore new ideas that are formed The organization values the work of every employee The organization accepts failure from the hard work that has been done in a job Organizations offer challenging jobs for their employees The budget to carry out the work is still insufficient The organization emphasizes healthy competition Top management is willing to take risks Organizational targets are very realistic in this	(Indriartiningtias et al., 2019)
Knowledge Creation	External Factors of Knowledge Creation are factors/interactions with external parties that can influence the process of generating new ideas (creativity process).	KC1 KC2 KC3 KC4 KC5	requent direct interaction with suppliers Frequent direct interaction with customers There is frequent direct interaction with customers There are activities around the organization to obtain new information There is a dialogue process with competitors There is interaction with experts from outside the company	(Indriartiningtias et al., 2019)
Open Innovation	The flow of knowledge within the organization, both incoming (inbound) used to accelerate internal innovation, expand markets and generate ext) and originat ernal innovat	ing from outside the organization (outbound) which is on for other organizations	(Rumanti et al., 2021; Rumanti et al., 2020; Popa et al., 2017)
Outbound Open Innovation	Innovation within the organization is carried out through the development of the organization's internal innovation capabilities and then the results can be provided to external organizations through licenses, patents or certain contracts to gain financial and non-financial benefits	0011 0012 0013 0014 0015	The organization seeks to gain other benefits from the internal innovations that have been carried out Organizations offer new methods used by internal organizations in other organizations The organization sells batik product licenses to other organizations The organization sells batik product patents to other organizations New batik motifs, new ways of batik, and new ways of processing waste, for the manufacture of batik tulis in other organizations	(Rumanti et al., 2021; Rumanti et al., 2020; Popa et al., 2017)
				(continued on next page)

7

Tabel 2 (continued)				
Variable	Definition	Item		Reference
Inbound Open Innovation	Innovation in organizations that is carried out by exploring sources of innovation such as new knowledge and technology from external sources such as customers, suppliers, competitors, government, consultants, universities, or research organizations	1011 1012 1014 1015 1015 1015 10110 10111 10111 10113	External parties are directly involved in innovation activities within the organization The government assists in innovation activities within the organization consumers assist in innovation activities within the organization competitors assist in innovation activities within the organization Netwestices or educational institutions contribute to Universities or educational institutions contribute to innovation activities within the organization Supplies contribute to innovation activities within the organization Supplies contribute to innovation activities within the organization Some consultants provide assistance in innovation activities within the organization Innovation activities carried out by organization activities within the organization finnovation activities carried out by organization finnovation activities carried out by organization activities within the organization finnovation activities carried out by organizations depend on external assistance The organization uses the latest tools to enhance internal innovation activities The organization purchases patents for internal innovation activities This organization purchases butents for internal innovation activities This organization purchases licenses to use for internal innovation activities	(Rumanti et al., 2021; Rumanti et al., 2020; Popa et al., 2017)

Data used in this study was collected from two region in Indonesia i.e. 100 data of respondents were obtained from Lasem, Rembang, Central Java and the remaining 106 data of respondents were obtained from Madura, East Java. These two location have similar regional characteristics in performing batik production process (Rumanti et al., 2022). Hair et al. (2012) state that the number of samples in this study, as many as 206 respondents, has been fulfilled because the sample ratio rule is 10:1. Small sample size is not much affected by PLS-SEM because this method uses multiple linear regression and iterative ordinary least squares ordering to investigate one component at a time (Hair et al., 2014; Gefen et al., 2000).

In this study, model was evaluated according to two aspects i.e. measurement model evaluation and structural model evaluation (Hair et al., 2014). The measurement model evaluation focused on examining the ability of the measured item in representing a smaller number of construct, so that the measurement model developed in this study can be considered valid and reliable, while Structural model evaluation was performed to examine the relationship between dependent and independent variables (Hair et al., 2014). The measurement model was evaluated through the convergent validity, composite reliability, and discriminant validity. Convergent validity is checked based on the outer loading value and also the average variance extracted (AVE). The outer loading value must be greater than 0.5 and ideally, outer loading has a value that is in the range 0.7-0.8. However, indicators with outer loading values in the range of 0.4-0.5 can still be maintained if other validity criteria are met. Moreover, the (Hair et al., 2012; Hair et al., 2014). The composite reliability examine the construct's internal consistency. The composite reliability value varies between 0 and 1, with the statement that the higher the value shown, the higher the reliability. In exploratory research, the composite reliability value between 0.6 and 0.7 is acceptable, while values 0.7-0.9 is satisfactory (Hair et al., 2012; Hair et al., 2014; Gefen et al., 2000). Discriminant validity measures the degree to which a construct differs from other constructs in a theoretical structural model. It is measured by how much it correlates with other constructs in the theoretical model, as opposed to how much indicators represent only one construct (Hair et al., 2012). To analyze discriminant validity, Fornell and Larcker (1981) criteria stated that the square root of the average variance extracted for each construct (diagonal element of the correlation matrix) must be greater than the absolute value of the inner construct correlation (element offdiagonal) was used (Hair et al., 2014). The presentation of the structural model relationship in PLS-SEM is shown in Fig. 2 by showing the positions of the dependent variables and independent variables in the research model that was built, including the variable dimensions.

4. Result

This section presents the results of a statistical investigation using the PLS-SEM technique. In PLS-SEM, the first stage is an analysis of the measurement model and then an analysis of the structural model.

4.1. Measurement model evaluation

Measurement model evaluation is aimed to check the fitness of collected data to the measurement theory developed in this study. Measurement model evaluation is performed by assessing the construct validity of the measurement items. To ensure the validity of the measurement model, this study examined the convergent validity, composite reliability, and discriminant validity. Convergent validity testing aims to check the degree to which measurement item are positively associated with alternative measurements of the same construct. In this study, convergent validity was examined through the outer loadings value and average variance extracted (AVE). The degree of similarity between the indicators is indicated by a high outer loading number. In addition, all numbers for outer loading must be significant. Although, as a rule of thumb, it's anticipated that the outer loading value will be at least in the range of 0.7–0.8, a range between 0.4 and 0.7 can be still included. The latter range can still be taken into account without being eliminated from the measurement, if the reliability of the composite or AVE is outside the threshold. Indicators with outer loading values lower than 0.4 can be eliminated from the measurement scale (Hair et al., 2014a). AVE is the average squared factor loading or average communality. AVE greater than 0.5 indicate adequate convergence (Hair et al., 2014a).

Composite reliability is a measure of internal consistency of item and was assessed through the value of Cronbach's alpha that is based on the intercorrelation between indicators with the assumption that all indicators have the same outer loading in their constructs. The composite reliability score ranges from 0 to 1, with a higher value indicating greater validity. In exploratory research, the composite reliability value of 0.6–0.7 is acceptable, while 0.7–0.9 is considered satisfactory (Hair et al., 2014a).

Discriminant validity was evaluated by following the criteria from Fornell-Larcker, while cross-loading and convergent validity was assessed through outer loading score and average variance extracted (AVE). Discriminant validity examines the extent to which a construct differs from other constructs by empirical standards. The criteria for measuring discriminant validity are the cross-loading value and the Fornell-Larcker score (Hair et al., 2014a). The cross-loading value projects the outer loading indicator to all constructs. The outer loading indicator value from the related construct must be greater than the outer loading indicator value from the other constructs (Weijters et al., 2010; Gefen et al., 2000). While the Fornell–Larcker value looks at the squared comparison of the AVE value to the latent variable correlation. The AVE squared value must be greater than the highest correlation with other constructs (Weijters et al., 2010). Table 3 presents the composite reliability and Average Variance Extracted (AVE) values.

The results of measurement model evaluation show that all outer loading values are more than 0.4; composite reliability and AVE for all constructs is greater than 0.5; and All cross-loading values for each indicator on each variable exceed the values of other variables. Thus, from the convergence and discriminant perspective, this measurement model can be considered as a reliable and valid model.

4.2. Structural model evaluation

The structural model evaluation is performed to test the hypotheses. The summary of the structural model evaluation is presented in Table 4. This study found that all hypotheses constructed in this study i.e. H1 and H2 are supported by the data used in this study, even though there's differences in significant level of acceptance. H1 were accepted at significant level of 0.001, while H2 was accepted at significant level of 0.05. The Pearson Coefficient Correlation is utilized to assess the relationship between the hypothesis' variables. The result of Pearson's correlation for H1 and H2 is 0.916 and 0.873, respectively.

The Pearson Coefficient Correlation is utilized to determine the relationship between the variables in the hypothesis. The result of Pearson's correlation for Hypothesis 1 (H1) and Hypothesis 2 (H2) is 0.916 and 0.873, respectively. The result of this study show that all the correlation values are above 0.8 which indicate a strong relationship between the hypothesized variables.

The R² value is shown in Table 5, which illustrates that all endogenous variable variances can be explained by their exogenous variables. This shows that the exogenous variables in this research model can explain the endogenous variables well because they have an R² value of more than 0.5 (Hair et al., 2014b). However, there are two variables that have the lowest value, namely knowledge creation, with an R² value of 0.584, and outbound open innovation, which has an R² value of 0.699.

Table 6 presents significant results for each dimension of the dependent variable organizational creativity. The individual creativity dimension significantly explains organizational creativity, group



Fig. 2. Relationship the structural model in PLS-SEM (self-produced).

creativity, as well as the inter-organizational environment, group creativity, and knowledge creation. Table 7 shows significant results for the open innovation variable. Each dimension of open innovation, namely inbound open innovation and outbound open innovation in Table 7, shows a significant relationship with the open innovation variable. Fig. 3 depicts the research model's structural relationships, showing all hypotheses that have a significant relationship with the dependent and independent variables.

Table 8 shows the fitness of model. The model fit value indicate that based on the relationship significance in the structural model, it meets the eligibility criteria of the model. This study used three different model fit criteria i.e. Standardized Root Mean Square Residual (SRMR), Normed fit index (NFI), and RMS theta value. According to literature, the SRMR value must be below 0.08, NFI value must greater than 0.9, and the RMS theta below 0.12 is acceptable. The model in this study has SRMR value of 0.0796, the NFI value of 0.898, and the RMS theta value 0.061. All the model fit produced in the model meet the criteria of the model fit.

Apart from looking at the value of model fit, a collinearity test between variables is also needed to ensure that there is no relationship between the independent variables (Hair et al., 2014). In PLSE-SEM, a measure of multicollinearity among independent model is provided by the Variance Inflation Factor (VIF). This test assesses the relationship between the two indicators in the model. Collinearity between indicators that construct a variable must be investigated using VIF to avoid the mistake in estimation process. High multicollinearity will lead to insignificant estimates (Hair et al., 2014). In Table 9, which is the result of the test, the VIF value is obtained according to the acceptance criteria. Based on the Table 9, there is no indication of a relationship between variables. Thus, it is safe to say that there's no multicollinearity in this research model.

In addition to examining the existence of a significant relationship between variables, it is also important for researchers to examine the magnitude of the influence between variables through effect sizes or f^2 values. An f^2 value of 0.02 indicates that the effect size value is low. Values between 0.02 and 0.15 have a moderate effect size, while a minimum of 0.35 has a high effect size. According to Hair et.al (2014b), the value of f^2 that is less than 0.02 can be disregarded or considered as having no impact. Table 10 shows that the f^2 value between organizational creativity and organizational performance is 0.211, which means that the effect size value is included in the medium category because the f^2 value is in the range of 0.15–0.35. In comparison, the f^2

Table 3

.Composite Reliability Value and Average Variances Extracted.

Measuring Instrument	AlfaCronbach	Composite Reliability	Average Variance Extracted (AVE)
Individual Creativity (IC)	0.724	0.801	0.843
Inter-Organizational Environment (IOE)	0.741	0.701	0.790
Group Creativity (GC))	0.893	0.829	0.827
Knowledge Creation (KC)	0.716	0.670	0.619
Organizational Creativity (OC)	0.722	0.770	0.792
Open Innovation (OI)	0.801	0.831	0.820
Inbound Open Innovation (IOI)	0.869	0.875	0.911
Outbound Open Innovation (OOI)	0.856	0.894	0.850
Organizational Performance (OP)	0.768	0.709	0.792

Table 4

.Significance of Structure Relationship.

Hypothesis		Path Coefficient	T-Statistic	P Value	Conclusion
H_1	$OC \rightarrow OP$	0.916	37.642	0.001	Accept *
H_2	$OI \rightarrow OP$	0.873	16.660	0.002	Accept **

Note(s): *significant at level 0.01; **significant at level 0.05;

Table 5

R² Value for SMEs.

	R Square	R Square Adjusted
Individual Creativity (IC)	0.937	0.931
Inter-Organizational Environment (IOE)	0.826	0.825
Group Creativity (GC))	0.900	0.899
Knowledge Creation (KC)	0.584	0.577
Organizational Creativity (OC)	0.710	0.706
Open Innovation (OI)	0.816	0.811
Inbound Open Innovation (IOI)	0.927	0.926
Outbound Open Innovation (OOI)	0.699	0.696
Organizational Performance (OP)	0.921	0.914

value for the relationship between open innovation and organizational performance is 0.179, which indicates that the effect size value is included in the moderate category.

The value of the model prediction indicator on the dependent construct (Q^2) can be used to assess the model's ability to predict. Q^2 values that are higher than 0 (zero) show that the model is predictive for specific dependent constructs. Meanwhile, if the Q^2 value is less than 0 (zero), the model's predictive ability for the dependent construct is relatively low. The measurement of this indicator is applied to the dependent construct with a reflective indicator (Hair et al., 2014a; Hair et al., 2014b). Table 11 present the Q^2 value produced in this study.

5. Discussion

The purpose of this study is to examine the effect of organizational creativity and open innovation practice towards organization performance. According to the results of testing the structural model, organizational performance and open innovation variable have a significant and positive relationship with organizational creativity. The findings in this study confirm the results of previous studies from Riaz and Hassan (2019), Ahn et al. (2015), and Crema et al. (2014). Hypothesis 1 was supported in this study, showing that organizational creativity has a positive relationship on organizational performance. The result is aligned with statement from Strojilova et al. (2013) where at the organizational level, creativity is a crucial component for achieving great performance. Thus, it is safe to say that organizational creativity was a positive driving factor for organization performance. Creativity plays central role in today's organization.

Moreover, in this study we also found that hypothesis 2 was also supported, where open innovation has a positive relationship on organizational performance This finding agreed with the finding of Crema et al. (2014) who proposed that open innovation implementation would lead to high organization performance. There are several reasons why currently open innovation is an important aspect in improving organizational performance, e.g. shorter product life cycle so that companies need to be able to innovate quickly to produce products or services that meet market needs, the increasing of global competition, the high cost costs for conducting research and development of a product or service, needs to react quickly to a rapid change of market, and/ or to develop new sales channel (Crema et al., 2014; Ahn et al., 2015).

6. Conclusion

6.1. Main result

This study was able to identify organizational performance through organizational creativity and open innovation. Each plays a role in achieving more optimal organizational performance and supporting organizational goals. Through the research model produced in this study, the relationship and influence of organizational creativity and open innovation will be identified on organizational performance as well as the analysis and implications of both implications for relevant theory or science as well as implications for managerial activities within the organization. The magnitude of the influence of organizational creativity and open innovation on organizational performance will become a reference in evaluating organizational creativity and open innovation processes that will support the performance of Indonesian SMEs. Where construction is studied in the context of SMEs, a sample of 206 SMEs is obtained using a purposive sampling technique. The results of this study provide empirical evidence showing a positive effect of organizational creativity and open innovation on organizational performance. Organizations that prioritize and actively cultivate a creative and innovative culture will likely see increased overall performance. These two main variables have been proven to improve the performance of an organization to reach optimal points in a more challenging business environment. This can be achieved through various means, such as encouraging employee participation in the innovation process, enhancing the individual creativity of employees, and promoting a learning-oriented culture.

SMEs have realized the importance of organizational performance and have started implementing several organizational innovations and creative actions to support it. However, organizations need to strike a balance between promoting creativity and maintaining efficiency and structure. Open innovation, in particular, can be a powerful tool for organizations to leverage external sources of knowledge and ideas, which can lead to significant performance improvements. In addition, open innovation can be a valuable strategy for SMEs looking to tap external sources of knowledge and ideas, which can lead to significant performance improvements. Organization should aware that, to realize organizational creativity there are several aspects that are needed, including individual creativity, inter-organizational environment, knowledge creation, and group creativity.

Table 6

Relationship Significance for Organizational Creativity with Its Dimension.

Relationship	Correlation Value	T- Statistic	P -Value	Conclusion
Individual Creativity (IC)→Organizational Creativity (OC)	0.891	19.845	0.001	Significant
Inter-Organizational Environment (IOE)→Organizational Creativity (OC)	0.929	24.870	0.000	Significant
Group Creativity (GC)→Organizational Creativity (OC)	0.949	29.681	0.000	Significant
Knowledge Creation (KC)→Organizational Creativity (OC)	0.833	16.322	0.001	Significant

Table 7

Relationship Significance for Open Innovation with Its Dimension.





Fig. 3. Relationship significance in the structural model (self-produced). Note(s): * significant level $\alpha = 0.01$; * significant level $\alpha = 0.05$.

Table 8	
.Model of Fit Value.	

Model of Fit	Criteria	Value	Conclusion
SMRS	< 0.08	0.0796	Indicating acceptable model fit
NFI	> 0.9	0.898	Indicating acceptable model fit
RMS Theta	< 0.12	0.061	Indicating acceptable model fit

6.2. Theoretical implication

Table 9

This research will examine the role of organizational creativity and open innovation in achieving organizational performance with the object of research on SMEs. This study addressed several theoretical implications. First, while past studies show conflicting findings about how organizational creativity and open innovation could improve organization performance, which may be indirect, this study emphasizes the direct effects of organizational creativity on organizational performance, especially financial and market-related performance. The result of this study highlighted the importance of a supportive organizational culture in encouraging creativity and innovation. Research shows that organizations that prioritize and actively develop a creative culture are more likely to experience the increased of overall performance. This is in accordance with previous research which emphasizes the importance of organizational culture in encouraging creativity and innovation.

Second, this study also contributes to the literature on open innovation by highlighting the potential benefits for organizations that

Table 10 f² Value.

Value.	
Construct	f^2
Organizational Creativity-Organizational Performance	0211
Open Innovation→Organizational Performance	0179

Та	bl	e	1	1
~	2	x 7	- 1	

.Q value.		
Construct	Q^2	
Organizational Performance	0344	
Organizational Creativity	-	
Open Innovation	-	

actively seeking external sources of knowledge and ideas. The findings show that open innovation can be a powerful tool for organizations to leverage external sources of knowledge and ideas, which can lead to significant performance improvements. This is consistent with previous research which has emphasized the potential benefits of open innovation for organizations.

Third, since this study is based on the sample of SMEs in several regions in Indonesia, this study enriches the literature on SMEs by underlining the importance of organizational creativity and open innovation for SMEs to enhance their performance. The findings show

VIF Value.		
Collinearity Between	Value	Decision
Individual Creativity (IC)→Organizational Creativity (OC)	1,540	No collinearity
Inter-Organizational Environment (IOE)→Organizational Creativity (OC)	1,222	No collinearity
Group Creativity (GC)→Organizational Creativity (OC)	1,167	No collinearity
Knowledge Creation (KC)→Organizational Creativity (OC)	1,680	No collinearity
Inbound Open Innovation (IOI)→Open Innovation (OI)	1,005	No collinearity
Outbound Open Innovation (OOI)→Open Innovation (OI)	1,000	No collinearity

that SMEs that actively promote and encourage a creative and innovative culture will lead to performance improvement. This research is important because it brings out the importance of creativity and innovation for SMEs, which have traditionally been seen as less innovative than larger organizations.

6.3. Practical implication

This study found that there are positive and significant relationship between organizational creativity and organization performance. In terms of practical implication, this finding offer insight to SMEs manager that it is important to ensure the organizational setting enable organizational creativity. To encourage creativity, jobs should be designed to provide a high degree of autonomy, skill variety, identity, significance, and feedback (Fetrati et al., 2022). It is also important to have team composition that come from different background and expertise. It would enable organization to gather several points of few from various knowledge to find new solutions of the problems. Other than that, to enable creativity, organization could involve employees to participate and to have influence in determining many aspects within organization, e.g. long-term plans, goal-setting, etc. (Axtell et al., 2000). More creative employee or team will make them to the more obtain and use creative method and techniques that will lead to improve in performance. Furthermore, past studies addressed five aspects that are believed as the characteristic of organizational culture that can encourage creativity (Martins and Terblanche, 2003; Puccio and Cabra, 2010). First, the organization has an innovation strategy derived from the vision and mission of the organization and focuses on developing new products and services. Second, there is an organizational structure that allows for flexibility, freedom, and time cooperation. Third, there is organizational support for creativity, such as award and recognition programs, as well as resources that can be in the form of time, technological support, or creative human resources. Fourth, organizations promote behaviors that encourage innovation such as the spirit of continuous learning, willing to take risks, support change, generate ideas, and manage conflict. Finally, an important factor for encouraging a creative culture that an organization should have been open communication.

Other than that, this study formulate hypothesis that state open innovation will positively and significantly affect organizational performance. The results of this study indicate that the formulated hypothesis is accepted. Practically it means that, SMEs Managers must be aware that open innovation is an important aspect in improving organizational performance. The adoption of open innovation requires companies to open their boundaries to allow valuable information and knowledge to flow into the company and flow out of the company so as to create opportunities for companies to be able to compete with partners, customers and suppliers (Crema et al., 2014). There are various forms of open innovation practices that organizations can implement. For example, SMEs can form a strategic alliance as an effort to exploit the expertise of other companies. Strategic alliances can be carried out through collaboration, partnerships, and alliances with other organizations. Moreover, one of the most frequent practice of strategic alliance in SMEs is from purchasing technology (Crema et al., 2014). Other than that, SME manager can also consider joint R&D, institutional collaboration, community collaboration, research collaboration, involving user in product or service development, obtaining supplier's advice, etc. As we can see that collaboration with partners is important aspect in open innovation practices, companies must carefully determine which parties will be chosen as partners in collaboration. Adoption of open innovation requires partners to simultaneously consider company policies, information sharing processes, alignment of company incentives, and appropriate performance measures for the collaborating parties.

6.4. Limitation and future lines of investigation

Despite this research effort contributing to both theory and practice, we recognize there are several limitations in this study that must be considered in future research. First, the exploratory nature of this research and the focus on one case of the SME industry, namely Batik SMEs. This study tries to talk about SMEs in general to limit our findings' generalizability. Thus, future research should involve more data from different types of SMEs to increase their generalizability and enrich the results. Second, the data collected in this study were obtained from several regions, however, because this research is still in its early research stage, it is assumed that these areas have the same characteristics. In order to obtain more representative results, in future studies, a multigroup analysis should be carried out to ensure whether or not there are differences in characteristics in different data groups which will certainly affect the results of the studies being conducted. Through multigroup analysis, it can be determined whether data processing from different regions can be combined or not.

There are several future opportunities for developing this research, namely regarding the role of digital technology in open innovation: Digital technologies such as social media, crowdsourcing, and opensource software can facilitate open innovation. A study can be conducted to investigate the role of digital technology in open innovation in the batik industry. This study can explore ways digital technology can be used to enhance knowledge sharing and collaboration between SMEs in the batik industry. In addition, Best practices in open innovation: Studies can be conducted to identify best practices in open innovation for SMEs in the batik industry. This study can explore the most effective strategies, processes, and organizational structures in implementing open innovation initiatives. The potential research opportunities in this area are vast, and researchers can explore these opportunities to help SMEs in the batik industry improve their organizational performance.

Conflicts of Interest

The author declare no conflict of interest.

Institutional review board statement

Not applicable.

Informed consent statement

Not applicable.

Funding

Not Applicable.

CRediT authorship contribution statement

Conceptualization, AAR; Data curation, AAR; Formal analysis, AAR, AFR, FA; Funding acquisition, AAR; Investigation, AAR, AFR, AF; Methodology, AF; Project administration, AF; Resources, AF; Software, AAR; Supervision, AAR; Validation, AAR, AFR, FA; Visualization, AFR, FA; Roles/Writing - original draft, AAR, AFR, FA; Writing - review & editing, AAR, AFR, FA. All authors have read and agreed to the published version of the manuscript.

Data Availability

The data presented in this study are available on request from the corresponding author.

References

- Achmad, F., Prambudia, Y., Rumanti, A.A., 2023. Improving tourism industry performance through support system facilities and stakeholders: the role of environmental dynamism. Sustainability 15 (5), 4103. https://doi.org/10.3390/su15054103
- Ahn, J.M., Minshall, T., Mortara, L., 2015. Open innovation: a new classification and its impact on firm performance in innovative SMEs. J. Innov. Manag. 3 (2). https://doi. org/10.24840/2183-0606_003.002_0006
- Ahn, J.M., Ju, Y., Moon, T.H., Minshall, T., Probert, D., Sohn, S.Y., Mortara, L., 2016. Beyond absorptive capacity in open innovation process: the relationships between openness, capacities and firm performance. Technol. Anal. Strateg. Manag. 28 (9), 1009–1028. https://doi.org/10.1080/09537325.2016.1181737
- Axtell, C.M., Holman, D.J., Unsworth, K.L., Wall, T.D., Waterson, P.E., Harrington, E., 2000. Shopfloor innovation: facilitating the suggestion and implementation of ideas. J. Occup. Organ. Psychol. 73 (3), 265–285. https://doi.org/10.1348/ 096317900167029
- Borghini, S., 2005. Organizational creativity: breaking equilibrium and order to innovate. J. Knowl. Manag. https://doi.org/10.1108/13673270510610305
- Boso, N., Donbesuur, F., Bendega, T., Annan, J., Adeola, O., 2017. Does organizational creativity always drive market performance? In Psychology and Marketing (Vol. 34, Issue 11). https://doi.org/10.1002/mar.21039.
- BPS. Micro and Small Industries during the COVID-19 Pandemic, 2020, Statistic Center Indonesia, Jakarta ISBN:978–602-438–429-6.
- Brodny, J., Tutak, M., 2022. Digitalization of Small and Medium-Sized Enterprises and Economic Growth: Evidence for the EU-27 Countries. J. Open Innov. Technol. Mark. Complex. 8(67). https://doi.org/10.3390/ joitmc8020067.

Chesbrough, H., 2003. Open Innovation: the New Imperative for Creating and Profiting from Technology. Harvard Business Press.

- Choi, B., Lee, H., 2003. An empirical investigation of KM styles and their effect on corporate performance. Inf. Manag. 40 (5), 403–417. https://doi.org/10.1016/S0378-7206(02)00060-5
- Chun, F., Samiha, B., Noureddine, D., 2014. Evolution of sustainable development strategies in Chinese SMEs. Int. J. Sci. Environ. Technol. 3 (2), 698–707.
- Crema, M., Verbano, C., Venturini, K., 2014. Linking strategy with open innovation and performance in SMEs. Meas. Bus. Excell. 18 (2), 14–27. https://doi.org/10.1108/ MBE-07-2013-0042
- Ebersberger, B., Bloch, C., Herstad, S.J., Van De Velde, E., 2012. Open innovation practices and their effect on innovation performance. Int. J. Innov. Technol. Manag. 9 (6). https://doi.org/10.1142/S021987701250040X
- Ferreira, J., Coelho, A., Moutinho, L. , 2020. Technovation Dynamic capabilities, creativity and innovation capability and their impact on competitive advantage and firm performance: The moderating role of entrepreneurial orientation. Technovation, 92–93(February 2017), 102061. https://doi.org/10.1016/j.technovation.2018.11. 004.
- Fetrati, M.A., Hansen, D., Akhavan, P., 2022. How to manage creativity in organizations: connecting the literature on organizational creativity through bibliometric research. Technovation 115 (January), 102473. https://doi.org/10.1016/j.technovation.2022. 102473
- Fornell, C., Larcker, D.F., 1981. Evaluating structural equation models with unobservable variables and measurement error. J. Mark. Res. 18 (1), 39–50.
- Gefen, D., Straub, D., Boudreau, M.C., 2000. Structural equation modeling and regression: Guidelines for research practice. Commun. Assoc. Inf. Syst. 4 (1), 7. https://doi.org/ 10.17705/1CAIS.00407
- Ghosh, K., 2015. Developing organizational creativity and innovation: toward a model of self-leadership, employee creativity, creativity climate and workplace innovative orientation. Manag. Res. Rev. https://doi.org/10.1108/MRR-01-2014-0017
- Greco, M., Grimaldi, M., Cricelli, L., 2015. Open innovation actions and innovation performance. Eur. J. Innov. Manag. 18 (2), 150–171. https://doi.org/10.1108/ejim-07-2013-0074
- Hair, J.F., Sarstedt, M., Ringle, C.M., Mena, J.A., 2012. An assessment of the use of partial least squares structural equation modeling in marketing research. J. Acad. Mark. Sci. 40 (3), 414–433. https://doi.org/10.1007/S11747-011-0261-6
- Hair, J.F., Sarstedt, M., Hopkins, L., Kuppelwieser, V.G., 2014. Partial least squares structural equation modeling (PLS-SEM): an emerging tool in business research. Eur. Bus. Rev. 26 (2), 106–121. https://doi.org/10.1108/EBR-10-2013-0128
- Hair Jr, J.F., Hult, G.T.M., Ringle, C.M., Sarstedt, M., 2014. A primer on partial least squares structural equation modeling (PLS-SEM. Sage publications, https://doi.org/ 10.1080/1743727X.2015.1005806
- Henseler, J., 2020. Composite-based Structural Equation Modeling: Analyzing Latent and Emergent Variables. Guilford Publications.
- Inauen, M., Schenker-Wicki, A., 2011. The impact of outside-in open innovation on innovation performance. Eur. J. Innov. Manag. 14 (4), 496–520. https://doi.org/10. 1108/14601061111174934
- Indriartiningtias, R., Subagyo, Hartono, B., 2019. Creativity of small firms in creative industry: Initial evidence from Indonesia. Int. J. Eng. Bus. Manag. 11 1847979019849135.
- Jeong, I., Shin, S.J., 2019. High-Performance work practices and organizational creativity during organizational change: a collective learning perspective. J. Manag. 45 (3), 909–925. https://doi.org/10.1177/0149206316685156

Landry, L., 2017. The importance of creativity in business. Northeastern University.

- Latan, H., Noonan, R., Matthews, L., 2017. Partial least squares path modeling. Partial least squares path modeling: basic concepts, methodological issues and applications. DOI: 10.1007/978–3-319–64069-3.
- Lawson, B., Samson, D., 2001. Developing innovation capability in organisations: a dynamic capabilities approach. Int. J. Innov. Manag. 5 (03), 377–400. https://doi.org/ 10.1142/S1363919601000427

- Lee, B., Cho, H.H., Shin, J., 2015. The relationship between inbound open innovation patents and financial performance: evidence from global information technology companies. Asian J. Technol. Innov. 23 (3), 289–303. https://doi.org/10.1080/ 19761597.2015.1120497
- Lee, S., Park, G., Yoon, B., Park, J., 2010. Open innovation in SMEs—An intermediated network model. Res. Policy 39 (2), 290–300. https://doi.org/10.1016/j.respol.2009. 12.009
- Liang, T.P., Chen, D.N., Pee, L.G., 2013. The impacts of open innovations on organizational performance: A perspective based on information technology and knowledge ecology.
- Lopes, J.M., Gomes, S., Oliveira, J., liveira, M., 2022. International Open Innovation Strategies of Firms in European Peripheral Regions. J. Open Innov. Technol. Mark. Complex. 8(7). https://doi.org/10.3390/ joitmc8010007.
- Lu, Q., Chesbrough, H., 2022. Measuring open innovation practices through topic modelling: Revisiting their impact on firm financial performance. Technovation, 114(November 2021), 102434. https://doi.org/10.1016/j.technovation.2021. 102434.
- Martins, E.C., Terblanche, F., 2003. Building organisational culture that stimulates creativity and innovation. Eur. J. Innov. Manag. 6 (1), 64–74.
- Mikalef, P., Gupta, M., 2021. Artificial intelligence capability: conceptualization, measurement calibration, and empirical study on its impact on organizational creativity and firm performance. Inf. Manag. 58 (3), 103434. https://doi.org/10.1016/j.im. 2021.103434
- Nagwan, A., Sany Sanuri, M., Zakaria, B. , 2020. Innovative CRM and Performance of SMEs: The Moderating Role of Relational Capital. Journal of Open Innovation, 2–14. 2020, 6(4), 155; https://doi.org/10.3390/joitmc6040155.
- Pap, J., Mako, C., Illessy, M., Kis, N., Mosavi, A., 2022. Modeling organizational performance with machine learning. J. Open Innov.: Technol. Mark. Complex. 8 (4), 177. https://doi.org/10.3390/joitmc8040177
- Parida, V., Westerberg, M., Frishammar, J., 2012. Inbound open innovation activities in High-Tech SMEs: the impact on innovation performance. J. Small Bus. Manag. 50 (2). https://doi.org/10.1111/j.1540-627X.2012.00354.x
- Popa, S., Soto-Acosta, P., Martinez-Conesa, I., 2017. Antecedents, moderators, and outcomes of innovation climate and open innovation: an empirical study in SMEs. Technol. Forecast. Soc. Change 118, 134–142. https://doi.org/10.1016/j.techfore. 2017 02 014
- Popova, V., Sharpanskykh, A., 2010. Modeling organizational performance indicators. Inf. Syst. 35 (4), 505–527.
- Puccio, G., Cabra, J., 2010. Organizational Creativity: A System Approach. In J. C. Kaufman, & R. J. Sternberg (Eds.), The Cambridge Handbook of Creativity (p. 145). New York: Cambridge University Press.
- Rass, M., Dumbach, M., Danzinger, F., Bullinger, A.C., Moeslein, K.M., 2013. Open innovation and firm performance: the mediating role of social capital. Creat. Innov. Manag. 22 (2), 177–194. https://doi.org/10.1111/caim.12028
- Riaz, H., Hassan, A., 2019. Mediating role of organizational creativity between employees' intention in knowledge management process and organizational performance: Empirical study on pharmaceutical employees. Pak. J. Commer. Soc. Sci. 13 (3), 635–655.
- Richard, P.J., Devinney, T.M., Yip, G.S., Johnson, G., 2009. Measuring organizational performance: towards methodological best practice. J. Manag. 35 (3), 718–804.
- Rumanti, A.A., Samadhi, T.M.A.A., Wiratmadja, I.I., Sunaryo, I. , 2017. Relationship among knowledge sharing, open innovation and green poduction: A multiple stakeholders perspective in batik tulis industries. In 2017 IEEE International Conference on Industrial Engineering and Engineering Management (IEEM) (pp. 176–180). IEEE. DOI: 10.1109/IEEM.2017.8289875.
- Rumanti, A.A., Sunaryo, I., Wiratmadja, I.I., Irianto, D., 2020. Cleaner production for small and medium enterprises: an open innovation perspective. IEEE Trans. Eng. Manag. 1–14. https://doi.org/10.1109/tem.2020.3015048
- Rumanti, A.A., Rizana, A.F., Ramadhan, F., Reynaldo, R., 2021. The impact of open innovation preparation on organizational performance: a systematic literature review. IEEE Access 9, 126952–126966. https://doi.org/10.1109/ACCESS.2021.3111091
- Rumanti, A.A., Rizana, A.F., Septiningrum, L., Reynaldo, R., Isnaini, M.M.R., 2022. Innovation capability and open innovation for Small and Medium Enterprises (SMEs) performance: response in dealing with the COVID-19 pandemic. Sustainability 14 (10), 5874. https://doi.org/10.3390/su14105874
- Sarooghi, H., Libaers, D., Burkemper, A., 2015. Examining the relationship between creativity and innovation: a meta-analysis of organizational, cultural, and environmental factors. J. Bus. Ventur. 30 (5), 714–731. https://doi.org/10.1016/j.jbusvent. 2014.12.003
- Scaliza, J.A.A., Jugend, D., Jabbour, C.J.C., Latan, H., Armellini, F., Twigg, D., Andrade, D.F., 2022. Relationships among organizational culture, open innovation, innovative ecosystems, and performance of firms: evidence from an emerging economy context. J. Bus. Res. 140, 264–279. https://doi.org/10.1016/j.jbusres.2021.10.065
- Serrano-Bedia, A.M., López-Fernández, M.C., Garcia-Piqueres, G., 2016. Analysis of the relationship between sources of knowledge and innovation performance in family firms. Innovation 18 (4), 489–512. https://doi.org/10.1080/14479338.2016. 1233826
- Singh, S.K., Gupta, S., Busso, D., Kamboj, S., 2021. Top management knowledge value, knowledge sharing practices, open innovation and organizational performance. J. Bus. Res. 128, 788–798. https://doi.org/10.1016/j.jbusres.2019.04.040
- Song, Z., Gu, Q., Wang, B., 2019. Creativity-oriented HRM and organizational creativity in China: a complementary perspective of innovativeness. Int. J. Manpow. https:// doi.org/10.1108/IJM-05-2016-0108
- Strojilova, P., Rafferty, P.D., Buts, C., Jegers, M., Henriques, P.L., Curado, C. (2013). BUSINESS-RELATED SCIENTIFIC.
- Sutanto, E.M., 2017. The influence of organizational learning capability and

Journal of Open Innovation: Technology, Market, and Complexity 9 (2023) 100045

organizational creativity on organizational innovation of Universities in East Java, Indonesia. Asia Pac. Manag. Rev. 22 (3), 128–135. https://doi.org/10.1016/j.apmrv. 2016.11.002

- Taouab, O. (2019). Firm Performance: Definition and Measurement Models. 15(1), 93–106. https://doi.org/10.19044/esj.2019.v15n1p93.
- Tutak, M., Brodny, J., 2022. Business digital maturity in Europe and its implication for open innovation. J. Open Innov.: Technol. Mark. Complex. 8 (1), 27. https://doi.org/ 10.3390/joitmc8010027
- Valdez-Juárez, L.E., Castillo-Vergara, M., 2021. Technological capabilities, open innovation, and eco-innovation: Dynamic capabilities to increase corporate performance of SMEs. J. Open Innov.: Technol., Mark., Complex. 7 (1), 8. https://doi.org/ 10.3390/joitmc7010008
- de Vasconcellos, S.L., Garrido, I.L., Parente, R.C., 2019. Organizational creativity as a crucial resource for building international business competence. Int. Bus. Rev. 28 (3), 438–449. https://doi.org/10.1016/j.ibusrev.2018.11.003
- Wang, Y., Roijakkers, N., Vanhaverbeke, W., Chen, J., 2012. How Chinese firms employ open innovation to strengthen their innovative performance. Int. J. Technol. Manag. 59 (3–4). https://doi.org/10.1504/IJTM.2012.047245

Weijters, B., Cabooter, E., Schillewaert, N., 2010. The effect of rating scale format on

response styles: The number of response categories and response category labels. Int. J. Res. Mark. 27 (3), 236–247. https://doi.org/10.1016/j.ijresmar.2010.02.004 Weinzimmer, L.G., Michel, E.J., Franczak, J.L., 2011. Creativity and firm-level perfor-

- Weinzinnier, L.G., Michel, E.J., Franczak, J.L., 2011. Creativity and infinitever performance: the mediating effects of action orientation. J. Manag. Issues 23 (1), 62–82.Woodman, R.W., Sawyer, J.E., Griffin, R.W., 1993. Toward a theory of organizational
- creativity. Acad. Manag. Rev. 18 (2), 293–321. https://doi.org/10.5465/amr.1993. 3997517 Xie, Q., Gao, Y., Xia, N., Zhang, S., Tao, G., 2023. Coopetition and organizational per-
- Xie, Q., Gao, Y., Xia, N., Zhang, S., 1ao, G., 2023. Coopetition and organizational performance outcomes: a meta-analysis of the main and moderator effects. J. Bus. Res. 154, 113363.
- Yström, A., Aspenberg, H., Kumlin, A., 2015. Exploring the creative climate in an open innovation arena: Identifying challenges and possibilities. Eur. J. Innov. Manag. https://doi.org/10.1108/EJIM-08-2013-0085
- Yuana, R., Prasetio, E.A., Syarief, R., Arkeman, Y., Suroso, A.I., 2021. System dynamic and simulation of business model innovation in digital companies: an open innovation approach. J. Open Innov.: Technol. Mark, Complex. 7 (4), 219. https://doi.org/ 10.3390/joitmc7040219
- Yun, J.J., Zhao, X., Jung, K., Yigitcanlar, T., 2020. The culture for open innovation dynamics. Sustainability 2020, 12(12), 5076; https://doi.org/10.3390/su12125076.