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BUSINESS INTELLIGENCE CAPABILITIES AND ECONOMIC PERFORMANCE: SERIAL MEDIATION OF KNOWLEDGE ABSORPTIVE CAPACITY AND INNOVATION

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ABSTRACT
Numerous studies have delved into the performance of SMEs. In contrast, the intricate interplay between Business Intelligence Capabilities, Knowledge Absorptive Capacity, Innovation, and the Economic Performance of SMEs in Indonesia's creative economy remains unexplored, making this research a unique and significant contribution to the field. This research not only uncovers the serial mediating role of Knowledge Absorptive Capacity and Innovation in the relationship between Business Intelligence Capabilities and Economic Performance, but also provides practical insights for the 210 creative-economy-based SMEs in East Java, Indonesia. The findings suggest that enhancing Business Intelligence Capabilities can lead to increased knowledge absorptive capacity, innovation and economic performance, highlighting the potential for these SMEs to improve their business strategies. The theoretical implications of this research open the boundaries of Resource-based and Knowledge-based theory of the firm in the context of creative economy-based SMEs in developing countries that SMEs can already carry out simple business intelligence with existing resources. Future research needs to investigate qualitatively to what extent SMEs in the Society 5.0 era carry out Business Intelligence practices and how deep the absorption of knowledge is so that it can produce innovation that is out of the box.

Keywords: Business Intelligence Capabilities, Economic Performance, Knowledge Absorptive Capacity, Innovation, Creative Economy

INTRODUCTION

The creative economy sector is at the forefront of the revival of the national economy in the post-Covid-19 pandemic era (Anjaningrum & Moko, 2023) and is recognized as driving Indonesia's economic growth, especially East Java, a province that significantly contributes to the national GDP (Anjaningrum, Yogatama, et al., 2024). However, there are many challenges in the development of creative economy-based SMEs in East Java since the Covid-19 pandemic, including declining performance, lack of innovation, and the pace of digital transformation that is not balanced by the quality of qualified human resources (Anjaningrum, Azizah, et al., 2024) so that every SME must determine its strategic direction to face these challenges, especially in the current business environment which is rapidly changing and triggering terrible competition (Benyahya & Matošková, 2021).

Several recent studies show that the economic performance of SMEs can be improved through Business Intelligence (i.e. Huang, Dan-yi, et al., 2022; Menaouer et al., 2022; and Chen & Lin, 2021). Business Intelligence is a series of processes of turning raw data into something meaningful (Huang, Zhong-jie, et al., 2022). However, contradictory research results of Huang, Zhong-jie, et al. (2022) revealed that Business Intelligence

had no effect on financial performance. The empirical gap is also visible in research results of Anjaningrum, Azizah, et al. (2024) which confirm that the influence of business intelligence on SME performance is insignificant. Meanwhile, according to Agusdin et al. (2023), economic performance can be viewed in terms of marketing and financial performance, but the findings of Huang, Dan-yi, et al. (2022) state that business intelligence has yet to be proven to improve marketing performance. These inconsistent results underscore the need for further investigation. It suggests that the impact of business intelligence on economic performance may not be direct, but rather, it may need to go through mediation. This opens up a fascinating area for future research and exploration.

Regarding business intelligence and SME performance, several studies have emerged on innovation as a mediation (i.e. Olszak, 2022; Yang et al., 2022; Caseiro & Coelho, 2019; and Božič & Dimovski, 2019)). However, research (Anjaningrum, Azizah, et al., 2024) refutes these results because Business Intelligence cannot necessarily be used directly to produce innovation. This happens apart from the lack of resources, which is why Business Intelligence Capabilities are not optimal. Not all SMEs can carry out business intelligence, especially technology-based ones. The inconsistencies in the results of this research also give rise to a research gap where perhaps business intelligence does not directly affect innovation but must go through mediation.

Several previous studies reveal that Business Intelligence has a positive effect on Knowledge Absorptive capacity (KAC) (i.e. Božič & Dimovski, 2019a; Božič & Dimovski, 2019b; and Bag et al., 2023). KAC is a company's ability to identify, assimilate, and apply external knowledge to achieve organizational goals (Fulgence et al., 2023). Meanwhile, several other studies prove that KAC also influences innovation (i.e. Khan, 2022; Dabić et al., 2023, Weidner et al., 2023, and Aslam et al., 2024).

However, whether Business Intelligence Capabilities, Knowledge Absorptive Capacity, and Innovation are interrelated to form a framework that can improve Economic Performance still needs to be tested, thus raising the research question: (RQ1) Can Economic Performance be significantly increased by Business Intelligence Capabilities? (RQ2) Can Innovation be significantly enhanced by Business Intelligence Capabilities? (RQ3) Can Business Intelligence Capability significantly increase Knowledge Absorptive Capacity? (RQ4) Can Innovation be significantly increased by Knowledge Absorptive Capacity? (RQ5) Can Economic Performance be significantly increased by Innovation? (RQ6) Can Economic Performance be significantly increased by Business Intelligence Capability through Innovation as a mediation? (RQ7) Can Innovation be significantly increased by Business Intelligence Capability through Knowledge Absorptive Capacity as a mediation? (RQ8) Can Economic Performance be significantly increased by Business Intelligence Capability through the serial mediation of the Knowledge Absorptive Capacity and Innovation?

The novelty of this research lies in the conceptual framework that offers serial mediation of Knowledge Absorptive capacity and Innovation as a solution to the inconsistency in the influence of Business Intelligence Capabilities on Economic Performance as proven empirically by creative economy-based SMEs in East Java, Indonesia.

The research contribution is the development and limitations of the Resource-Based View (RBV) and Knowledge-Based View (KBV) theory. In this context, the RBV-KBV theory suggests that creative economy-based SMEs in developing countries have business intelligence capabilities but still need to use their resources directly to carry out business intelligence to improve economic performance. SMEs must first expand their capacity to absorb knowledge to create innovations that meet consumer expectations and impact economic performance.

LITERATURE REVIEW

Resource-based and Knowledge-based theory of the firm

Resource-based Theory of the Firm (RBT), often the Resource-based View (RBV), is the most influential management strategy. RBT continues to experience rapid development in searching for company resources to achieve competitive advantage. The focus of RBV through the VRIO (Value, Scarcity, Imitability, and Organization) framework is the relationship between company strategy and internal resources (Truong et al., 2023). RBV developed into KBV (Knowledge-based View), emphasizing knowledge as the most crucial resource for driving innovation (Cuthbertson & Furseth, 2022). One way to seek knowledge is through Business Intelligence practices, but how this can be practiced also depends on the company's level of knowledge absorption (Cuevas-vargas, 2022).

Business Intelligence Capabilities and Economic Performance

Business intelligence is a valuable and irreplaceable internal company resource in a process that transforms raw data into something meaningful (Huang, Zhong-jie, et al., 2022). The research of Huang, Dan-yi, et al. (2022) has validated the strong influence of Business Intelligence practices on economic performance, where the sharper the business intelligence results, the greater the economic performance, especially financial performance. This finding is strengthened by research of Yang et al. (2022) on different objects. However, controversial research results occurred in research of Huang, Zhong-jie, et al., (2022), revealing that Business Intelligence had no effect on financial performance. The empirical gap is also visible in research results of Anjaningrum, Azizah, et al. (2024), which confirm that the influence of business intelligence on SME performance is not significant. Meanwhile, economic performance, according to Agusdin et al. (2023), can be viewed in terms of marketing and financial performance, but the findings of Huang, Dan-yi, et al. (2022) state that business intelligence is not proven can improve marketing performance. The many inconsistencies in the research results indicate that more extensive empirical evidence is still needed. Moreover, not all SMEs can use technology-based business intelligence, such as SMEs in developing countries that still use simple methods to conduct business intelligence (Anjaningrum, Azizah, et al., 2024).

Business Intelligence Capabilities and Innovation

Innovation is the primary driver of SME performance, but not all SMEs are successful in their efforts (Shaik et al., 2023). So, something is needed that can encourage the success of innovation carried out by SMEs. Previous research has proven the significant impact of Business Intelligence on startup company innovation (Caseiro & Coelho, 2019). In addition, the research of Božič & Dimovski (2019b) supports the idea that business intelligence is positively related to the success of balancing between explorative and exploitative innovation activities. Olszak (2022) and Yang et al. (2022) also prove the success of innovation as a result of business intelligence practices. However, an empirical gap occurs, as in research results (Anjaningrum, Azizah, et al., 2024), which reveal that business intelligence has no significant effect on innovation. Not all SMEs have optimal capabilities in carrying out business intelligence and utilizing data obtained from business intelligence practices as a fundamental resource for innovation.

Business Intelligence Capabilities and Knowledge Absorptive Capacity

Knowledge Absorptive Capacity (KAC) is a company's ability to identify, assimilate, and apply external knowledge to achieve organizational goals (Fulgence et al., 2023). Previous research proves that Business Intelligence can significantly increase KAC (Božič & Dimovski, 2019a; and Božič & Dimovski, 2019b). This is confirmed by research (Bag et al., 2023), which explains that the greater the information data obtained by a company, the greater the KAC required. Absorptive capacity must be developed from strong analytical business competencies (Li et al., 2022). So, adopting technology in conducting Business Intelligence in the digital era is needed to strengthen absorptive

capacity (Cuevas-vargas, 2022). In this case, SMEs can use social media as the most familiar technology in this era to help carry out business intelligence, which helps develop absorptive capacity (Tian et al., 2024).

Knowledge Absorptive Capacity and Innovation

Several previous studies have confirmed the relationship between Knowledge Absorptive Capacity and Innovation. How innovation can develop can be known through a more inclusive absorptive capacity approach (Khan, 2022). Open innovation, inbound and outbound, is closely related to the company's knowledge absorption capacity (Dabić et al., 2023). Companies are also characterized by heterogeneous patterns of absorptive capacity, according to the innovation produced (Weidner et al., 2023). Knowledge absorptive capacity dramatically influences the speed and quality of innovation (Aslam et al., 2024). Innovation is enhanced indirectly through interaction with the firm's absorptive capacity (Božič & Dimovski, 2019b). Companies with an adequate technological environment can better facilitate their ability to absorb information and knowledge from various digital channels to increase innovation (Li et al., 2022). This is reinforced by the findings of (Cuevas-Vargas et al., 2022), which explain that the impact of absorptive capacity on innovation is more substantial in companies that adopt technology in their processes.

Innovation and Economic Performance

Many studies prove the extraordinary positive impact of innovation on economic performance. Research (Anjaningrum, Azizah, et al., 2024) measures SME financial and marketing performance, proving that innovation is critical in developing countries to improve SME performance. Previous research also showed the same results, where the more extraordinary the innovation produced, the higher the economic performance of SMEs (Singh et al., 2022). Similar findings occurred in research (Larios-Francia & Ferasso, 2023), although they were more specific to product innovation. Likewise, research (Tsai et al., 2022) that emphasizes open innovation in its framework also proves its positive impact on SME performance.

The literature review above shows that there is a relationship between Business Intelligence Capabilities (BIC), Knowledge Absorptive Capacity (KAC), Innovation (INN) and Economic Performance (EP). The relational of these four variables forms the conceptual model of this research as presented in Figure 1.

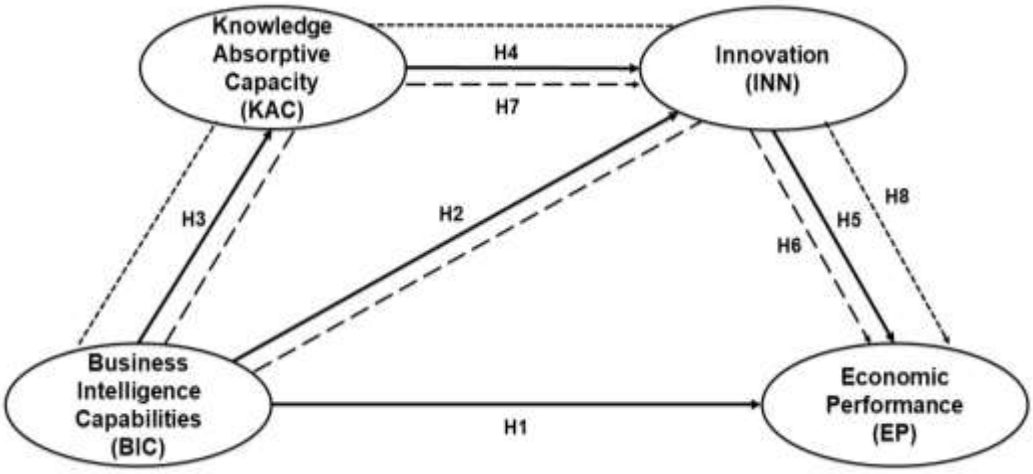

Figure 1. Conceptual Framework
Source: Authors Own (2024)

HYPOTHESES

The hypotheses of this research include:

H1: Economic Performance can significantly increase when supported by powerful Business Intelligence Capabilities.
H2: Innovation can be enhanced significantly when supported by powerful business intelligence capabilities.
H3: Knowledge Absorptive Capacity can significantly increase when buttressed by powerful Business Intelligence Capability.
H4: Innovation can significantly increase if they have an extensive knowledge absorption capacity.
H5: Economic Performance can significantly increase if buttressed by extraordinary innovation.
H6: Economic Performance can significantly increase if reinforced indirectly by Business Intelligence Capability through Innovation mediation.
H7: Innovation can significantly increase if reinforced indirectly by Business Intelligence Capability through the mediation of Knowledge Absorptive Capacity.
H8: Economic Performance can significantly increase if reinforced indirectly by Business Intelligence Capability through the serial mediation of the Knowledge Absorptive Capacity and Innovation.

METHODS

A quantitative approach was used to conduct this research. An online questionnaire survey collected data from 210 respondents representing creative economy-based SMEs in East JavaThe number of respondents is calculated from Hair et al. (2020) criteria, in which the number of samples = 10 x total items measuring latent constructs = 21 x 10 = 210 respondents. The sampling technique chosen was Accidental-Purposive Sampling. Online questionnaires are distributed via WhatsApp groups of creative economy communities in East Java with the condition that respondents are company owners or personnel who are directly involved in formulating the company's strategic direction, who are experienced or have a minimum of 3 years of service, and the SMEs being handled are already operational. For a minimum of 5 years to demonstrate the existence of the UKM, especially when facing challenges during the COVID-19 pandemic). The data collection and processing process lasted three months (April – June 2024). PLS analysis was used using SmartPLS software version 4.1.0.6 to validate the model and test the hypothesis. Each latent construct is measured through several indicators referring to previous research adapted to the research subject. The construct measuring indicators are presented in Table 1.

Table 1. Latent Construct Measuring Items

Latent Constructs	Items	
Business Intelligence Capabilities (BIC) adapted from (Xu et al., 2022) (Wang et al., 2022)	BIC1:	Access information from many sources to find out who our competitors are and their strengths and weaknesses.
	BIC2:	Sort the information content that we obtain from various sources so that the information is in line with our business needs.
	BIC3:	Integrate data systematically from myriad information sources, ensuring the reliability and accuracy of our insights.
	BIC4:	Apply data analysis to make the various information we obtain easier to conclude.
	BIC5:	Use correct information to determine the direction of the business strategy.
	BIC6:	Get used to making analytical decisions.
Knowledge Absorptive	KAC1:	Absorb and apply external knowledge for innovation purposes.

Latent Constructs		Items
Capacity (KAC) Adapted from (Shahzad et al., 2020) (Fulgence et al., 2023)	KAC2:	Collect industry information formally and informally.
	KAC3:	Utilize innovative knowledge.
	KAC4:	Invest in appropriate new technology to generate efficiencies.
	KAC5:	Suggests the impact of changing market demand on new products and services.
	KAC6:	Utilize innovative and creative ideas.
Innovation (INN) adapted from (Anjaningrum et al., 2021) (Anjaningrum, Azizah, et al., 2024)	INN1:	Innovate to face competition.
	INN2:	Develop new products/services.
	INN3:	Use new methods to speed up operational activities.
	INN4:	Choose innovations that take customer experience into account.
	INN5:	Explore ideas constantly for new product/service development.
Economic Performance (EP) adapted from (Xu et al., 2022) (Singh et al., 2022)	EP1:	The profit capacity of the new product is higher than that of competitors.
	EP2:	New product sales rates are higher across all volume sales than those of competitors.
	EP3:	Profits have increased more than competitors.
	EP4:	Market share has increased compared to competitors.

Source: Authors Own (2024)

RESULTS

Respondent Demographics

A questionnaire was conducted on 210 respondents representing creative-economy-based SMEs in East Java, Indonesia. Respondents came from 17 creative economy subsectors: 34 people (16.19%) from the culinary subsector, 25 people (11.90%) from the Crafting subsector, 21 people (10.00%) from the fashion subsector, 17 people (8.10%) %) from the application subsector, 16 people (7.62%) from the game development subsector, 13 people (6.19%) from the Visual Communication Design subsector, 12 people (5.71%) from the film, animation, and video subsector, 11 people (5.24%) from the performing arts subsector, 10 people (4.76%) from the architecture subsector, 9 people (4.29%) from the photography subsector, 8 people (3.81%) from the music subsector, 8 people (3.81%) from the advertising subsector, 7 people (3.33%) from the product design subsector, 6 people (2.86%) from the fine arts subsector, 5 people (2.38%) from the publishing subsector, 5 people (2.38%) from the interior design subsector, and 3 people (1.43%) from the television and radio subsector.

Our research was inclusive, with a balanced representation of gender among the respondents. 51% (107 people) were women, and 49% (103 people) were men. This balance ensures a comprehensive understanding of the creative economy landscape in East Java, Indonesia. Meanwhile, for the length of time SMEs have been operating, 36% (76 SMEs) have been operating for 5 – 10 years, 33% (69 SMEs) have been operating for 11 – 15 years, 27% (57 SMEs) have been operating for 16 – 20 years, and 4 % (8 SMEs) have been operating for more than 20 years.

PLS External-Model Measurement

Loading factor is a tool for assessing the convergent validity of each manifest construct measuring the latent construct. Manifest constructs with loading factor values must be more than 0.70 to be considered valid (Hair et al., 2014; and Garson, 2016). The loading factor values are the numbers on the line between the manifest construct and the latent construct in Figure 2. For example, the KAC.1 loading factor value is 0.822 and the KAC.2 loading factor value is 0.786. It can be seen in Figure 1. that the PLS Graphical

output has proven the validity of the research instrument because each item has a loading factor value of more than 0.70.

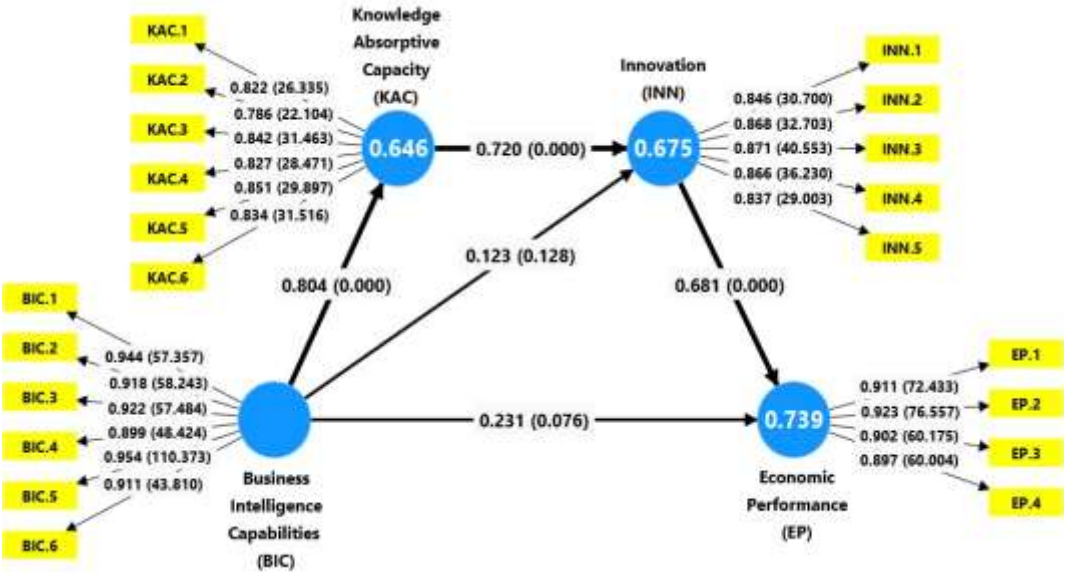

Figure 1. PLS Graphical Output
Source: SmartPLS-vr.4.1.0.6 Output – Outhors Own (2024)

Another way to test convergent validity is through each latent construct's Average Variance Extracted (AVE) value, which must be > 0.5. Table 3, the AVE value section, shows that the research instrument measuring the latent construct is valid.

Table 3. Validity and Reliability Test Result

Latent Constructs	Validity		Reliability			
	AVE		CA	RC (rho a)	CR (rho c)	
BIC	0.855	Valid	0.966	0.967	0.973	Reliable
EP	0.825	Valid	0.929	0.930	0.950	Reliable
INN	0.736	Valid	0.910	0.912	0.933	Reliable
KAC	0.684	Valid	0.908	0.908	0.929	Reliable

Source: SmartPLS-vr.4.1.0.6 Output – Authors Own (2024)

Meanwhile, for testing discriminant validity, the Fornell-Larcker criteria were used at the latent construct level and cross-loading at the manifest construct level. To determine the validity of using the Fornell-Larcker criteria, you must compare the Fornell-Larcker value (square root of the AVE value) with the correlation value between the latent constructs. The research instrument is considered valid if the Fornell-Larcker value for each latent construct is greater than the correlation between the latent constructs.

Table 4. Fornell-Larcker Criterion

	BIC	EP	INN	KAC
BIC	**0.925**	0.231	0.123	0.804
EP		**0.908**		
INN		0.681	**0.858**	
KAC			0.720	**0.827**

Source: SmartPLS-vr.4.1.0.6 Output – Authors Own (2024)

The data in Table 4 shows that the Fornell-Larcker BIC value of 0.925 is greater than the correlation between BIC and EP, which is 0.231, also more remarkable than the correlation between BIC and INN, which is 0.123, and also more incredible than the correlation between BIC and KAC which is 0.804. The Fornell-Larcker EP value of 0.908

is greater than the EP correlation with BIC of 0.231 and the EP correlation with INN of 0.681. The Fornell-Larcker INN value of 0.858 is greater than the correlation between INN and EP, which is 0.681. The Fornell-Larcker KAC value of 0.827 is greater than the correlation between KAC and INN, which is 0.720. In such a way, the research instrument that measures each latent construct is discriminant valid.

Discriminant validity testing through cross-loading values is carried out by comparing the loading values for each manifest construct, where the loading value for the targeted latent construct must be greater than the other latent constructs. Based on the data in Table 5, it is shown that each manifest construct is discriminant valid and can measure the latent construct.

Meanwhile, the research instrument is considered reliable if the Cronbach's-Alpha (CA) value is more than 0.6 and the required Composite-Reliability (CR) value is more than 0.8. Look again at the data in Table 3. It is known that the CA value for each latent construct is > 0.6 with a CR value > 0.8, which shows the instrument's reliability.

Table 5. Cross-Loading

	(BIC)	(EP)	(INN)	(KAC)		(BIC)	(EP)	(INN)	(KAC)
BIC.1	**0.944**	0.659	0.642	0.753	**INN.1**	0.643	0.668	**0.846**	0.678
BIC.2	**0.918**	0.588	0.629	0.720	**INN.2**	0.654	0.662	**0.868**	0.701
BIC.3	**0.922**	0.730	0.670	0.759	**INN.3**	0.598	0.822	**0.871**	0.734
BIC.4	**0.899**	0.696	0.664	0.747	**INN.4**	0.577	0.769	**0.866**	0.716
BIC.5	**0.954**	0.681	0.666	0.764	**INN.5**	0.540	0.680	**0.837**	0.677
BIC.6	**0.911**	0.566	0.616	0.712	**KAC.1**	0.724	0.654	0.694	**0.822**
EP.1	0.649	**0.911**	0.799	0.815	**KAC.2**	0.715	0.582	0.670	**0.786**
EP.2	0.646	**0.923**	0.750	0.766	**KAC.3**	0.654	0.814	0.684	**0.842**
EP.3	0.648	**0.902**	0.775	0.795	**KAC.4**	0.613	0.790	0.660	**0.827**
EP.4	0.633	**0.897**	0.739	0.782	**KAC.5**	0.618	0.745	0.708	**0.851**
					KAC.6	0.655	0.740	0.640	**0.834**

Source: SmartPLS-vr.4.1.0.6 Output – Authors Own (2024)

PLS Internal-Model Measurement

The feasibility of the PLS model formed was reviewed through PLS Internal-Model Measurement. In this study, three measures were considered: (1) Determination Test (R-square), Effect Size Test (f-square), and (3) Goodness of Fit (GoF). The R-Square value is presented in Figure 2. PLS Graphical Output, the number in the blue circle symbol. Chin's criteria explains that the strength of influence of exogenous latent constructs on endogenous latent constructs is categorized into three based on the R-Square value: (1) strong influence if R-Square is at least 67, (2) moderate influence if R -Square is at least 0.33, and (3) weak influence if the R-Square value is 0.19 (Hair et al., 2014). The R-Square value for KAC is 0.646, meaning that around 64.6% of KAC is explained by BIC (medium influence). The R-Square value for INN is 0.675, meaning that 67.5% of INN is explained by BIC and KAC (strong influence). The R-Square value for EP is 0.739, meaning that around 73.9% of EP is explained by BIC, KAC, and INN (strong influence).

Meanwhile, Effect Size (f-square) shows the influence of each exogenous latent construct on the partial endogenous latent construct. An f-square value of 0.35 is considered a considerable influence, 0.15 a medium influence, 0.02 a minor influence (Hair et al., 2014).

Tabel 6. f-square

	EP	INN	KAC
BIC	0,104	0,016	**1,826**
INN	**0,904**		
KAC		**0,564**	

Source: SmartPLS-vr.4.1.0.6 Output – Authors Own (2024)

The data in Table 6 are f-square values, where the relational latent constructs in the strong category are BIC-KAC, KAC-INN, and INN-EP. Meanwhile, BIC-INN and BIC-EP are in the medium influence category.

Meanwhile, the GoF (Goodness of Fit) value is calculated using the Tenenhaus formula (Hair et al., 2017), i.e., GoF = $\sqrt{(AVE \times R^2)}$. GoF is categorized as large if it is at least 0.38 (Tenenhaus & Lauro, 2005 in Hair et al., 2014), indicating the structural model's feasibility.

The calculation results obtained:

$$\text{GoF KAC} = \sqrt{0.684 \times 0.646} = 0.665 \quad (1)$$

$$\text{GoF INN} = \sqrt{0.736 \times 0.675} = 0.702 \quad (2)$$

$$\text{GoF EP} = \sqrt{0.825 \times 0.739} = 0.781 \quad (3)$$

All GoF values greater than 0.38 mean the structural model is feasible. In other words, the model formed is based on actual conditions in the field.

Hypothesis Test

Hypothesis testing was carried out using the t-test, where the expected t-statistical value was more significant than 1.96 (normal z-score value at α = 5%) with a p-value of less than 0.05 is significant influence (Garson, 2016). The original sample value (O) is nothing other than the path coefficient value (see Figure 2 and Table 7). If the path coefficient value is positive, it indicates a positive influence, whereas if it is negative, it indicates a negative influence.

Table 7. t-test Results

Latent Construct Relationships	*ρ*	t-stat	p-val	Inference
Direct Effects				
BIC -> EP	0,231	1,773	0,076	(+) Not Significant → H1 Rejected
BIC -> INN	0,123	1,522	0,128	(+) Not Significant → H2 Rejected
BIC -> KAC	0,804	18,361	0,000	(+) Significant → H3 Supported
KAC -> INN	0,720	7,800	0,000	(+) Significant → H4 Supported
INN -> EP	0,681	5,181	0,000	(+) Significant → H5 Supported
Indirect Effects				
BIC -> INN -> EP	0,084	1,429	0,153	Not Mediation → H6 Rejected
BIC -> KAC -> INN	0,578	7,040	0,000	Complete Mediation → H7 Supported
BIC -> KAC -> INN -> EP	0,394	3,515	0,000	Serial Mediation → H8 Supported

Source: SmartPLS-vr.4.1.0.6 Output – Authors Own (2024)

Based on the conceptual framework and the path coefficient (*ρ*) in Table 7 or Figure 2, the PLS main structural model, including:

Path 1: KAC = 0.804 BIC + ε_1 (4)

Path 2: INN = 0.123 BIC + 0.720 KAC + ε_2 (5)

Path 3: EP = 0.231 BIC + 0.681 INN + ε_3 (6)

Where BIC is Business Intelligence Capabilities, KAC is Knowledge Absorptive Capacity, INN is Innovation, EP is Economic Performance, and ε is the error terms.

PLS analysis shows that BIC has no significant effect on EP, although the effect is positive (ρ = 0.231), with a T-statistic value of 1.773 (<1.96) and a p-value of 0.076 (>0.05). This result rejects H1, which states that "Economic Performance can significantly increase when supported by powerful Business Intelligence Capabilities." Likewise, the influence of BIC on INN was revealed to be not significant even though the influence was

positive (ρ = 0.123), with a T-statistic value of 1.522 (<1.96) and a p-value of 0.128 (>0.05). This result rejects H2, which states, "Innovation can be enhanced significantly when supported by powerful business intelligence capabilities."

Meanwhile, BIC was proven to have a positive and significant effect on KAC (ρ = 0.804), with a T-statistic of 18.361 (>1.96) and a p-value of 0.000 (<0.05). These results support H3, which states, "Knowledge Absorptive Capacity can significantly increase when stressed by strong Business Intelligence Capability." Likewise, the effect of KAC on INN was proven to be positive and significant (ρ = 0.720), with a T-statistic of 7.800 (>1.96) and a p-value of 0.000 (<0.05). These results support H4, which states, "Innovation can significantly increase if they have an extensive knowledge absorption capacity." It was also revealed that the effect of INN on EP was positive and significant (ρ = 0.681), with T-statistics of 5.181 (>1.96) and p-value of 0.000 (<0.05). These results support H5, which states, "Economic Performance can significantly increase if stressed by extraordinary innovation".

Furthermore, regarding indirect effects, it was found that INN was unable to mediate the indirect effect of BIC on EP, even though the indirect effect was positive (ρ = 0.084), with T-statistics of 1.429 (<1.96), with a p-value of 0.153 (>0.05). This result rejects H6, which states, "Economic Performance can significantly increase if reinforced indirectly by Business Intelligence Capability through Innovation mediation." Meanwhile, KAC was proven to be able to mediate the influence of BIC on INN with a path coefficient value that was quite large in the positive direction (ρ = 0.578), a T-statistic of 7.040 > (1.96), and a p-value of 0.000 (<0.05). These results support H7, which states, "Innovation can significantly increase if reinforced indirectly by Business Intelligence Capability through the mediation of Knowledge Absorptive Capacity." Finally, it is also proven that KAC and INN act as serial mediation, which can mediate the influence of BIC on EP, with a relatively sizeable indirect influence coefficient (ρ = 0.394), a T-statistic of 3.515 (>1.96), and a p-value of 0.000 (<.0.05). These results support H8, which states, "Economic Performance can significantly increase if reinforced indirectly by Business Intelligence Capability through the serial mediation of the Knowledge Absorptive Capacity and Innovation."

Discussion

The results of this study provide strong evidence for the need for partial mediation that can bridge BIC and EP. The direct influence of BIC on EP is insignificant, showing that SMEs need to utilize their resources optimally when implementing BI to achieve high economic performance. SMEs have quite good capabilities in conducting business intelligence, but SMEs require a sizeable absorptive capacity to accommodate the knowledge obtained from BI. If the capacity to absorb knowledge is large, SMEs can manage knowledge to get out-of-the-box ideas for innovation. Superior innovation will significantly impact improving economic performance, both from a financial and marketing perspective.

EP in this research is generally reviewed from a marketing and financial perspective, so the insignificant influence of BIC on EP in this research is in line with the research of Huang, Zhong-jie, et al. (2022), which explained earlier that Business Intelligence does not exist. Its effect on financial performance. These findings also strongly support the research of Anjaningrum, Azizah, et al. (2024), which has confirmed that the influence of business intelligence on SME performance is not significant. Apart from that, the results of this research also support the statement of Huang, Dan-yi, et al. (2022) about the results of business intelligence needing to be proven to improve marketing performance. However, the results of this research indeed contain fossil findings of Huang, Zhong-jie, et al. (2022) that show the significant influence of BI on marketing performance. This finding also contradicts the results of research of Yang et al. (2022), which confirms that the role of BI is vast in improving startup financial performance.

This research proves that the serial mediation role of KAC and INN on the influence of BIC on EP is vital, considering that BIC cannot have a significant direct effect on innovation. The insignificant influence of BIC on INN fully supports the findings of Anjaningrum, Azizah, et al. (2024), which reveal that business intelligence has no significant effect on innovation. This happens because only some SMEs have optimal capabilities in carrying out business intelligence due to limited technological and qualified human resources in their fields, and they still need to be optimal in utilizing data obtained from business intelligence practices as fundamental resources for innovation.

BIC, which has no significant effect on INN, automatically contradicts previous research that provides evidence to the contrary, such as the findings of Caseiro & Coelho (2019), Olszak (2022), and Yang et al. (2022). The results of this research also dispute the research of Božič & Dimovski, 2019b, which believes that using business intelligence is positively related to the success of balancing explorative and exploitative innovation activities.

Evidence of the role of perfect serial mediation is the main finding in this study that previous studies have not revealed. BIC is proven to have a significant effect on KAC-supporting research of Božič & Dimovski (2019a) and Božič & Dimovski (2019b). It is also in line with the findings of Bag et al. (2023), which state that the greater the information data obtained by a company, the greater the KAC required. This condition makes it imperative for SMEs to develop absorptive capacity by adopting technology (Li et al., 2022). Technology adoption is beneficial in carrying out Business Intelligence in the digital era and strengthening absorptive capacity (Cuevas-Vargas et al., 2022). Technology that is very familiar and easy for SMEs to use today is social media (Tian et al., 2024). SMEs can also use several Business Intelligence platforms such as Tableau, QlikView, and IBM Cognos Analytics (Anjaningrum, Azizah, et al., 2024).

The results of this study prove the significant influence of KAC on INN, which supports the research of Khan (2022) and Dabić et al. (2023) on how the pattern of KAC of each heterogeneous SME will align with the innovation produced (Weidner et al., 2023), including the speed and quality of innovation (Aslam et al., 2024). The influence of KAC on INN will be more decisive if SMEs adopt technology in their processes (L. Li et al., 2022; and Cuevas-Vargas et al., 2022). Finally, the results of this study also prove the significant influence of INN on EP as in previous studies (i.e. Anjaningrum, Azizah, et al., 2024; Singh et al., 2022; Larios-Francia & Ferasso, 2023; and Tsai et al., 2022).

Theoretical and Practical Implications

The theoretical implications of the results of this research are the development and limitations of the RBV-KBV theory, where creative economy-based SMEs in developing countries like Indonesia have Business Intelligence Capabilities but still need to be able to improve Economic Performance directly. SMEs must expand their capacity to absorb knowledge first to create out-of-the-box innovation. Innovation that is superior and meets consumer expectations impacts economic performance.

Meanwhile, the practical implication is that to achieve high performance, both from a financial and marketing perspective, SMEs must be willing to empower their resources to carry out Business Intelligence. SMEs should seek access to information from many sources to find out their competitors, as well as their competitors' strengths and weaknesses. Then, SMEs should sort the information content to suit their business needs, integrate the data periodically, and analyze it to conclude easily. Furthermore, SMEs should use the correct information to determine the direction of business strategy and get used to making analytical decisions.

By doing all this, SMEs should absorb and apply external knowledge for innovation purposes, continue to be willing to collect information formally and informally and utilize innovative knowledge. In addition, SMEs should be willing to invest in new technology to generate efficiency. So that SMEs can innovate to face competition, develop new

products/services, use new methods to speed up operational activities, and choose innovations that consider customer experience. In addition, SMEs should continue to explore ideas for developing new products/services. In such a way that the profit capacity of SMEs can be higher than competitors, sales of new products are higher throughout the sales volume increases, market share and profits obtained also increase.

CONCLUSION

This research investigates the role of the serial mediation of Knowledge Absorptive Capabilities and Innovation on the influence of Business Intelligence Capabilities on the Economic Performance of creative-economy-based SMEs in East Java, Indonesia. The findings show that Business Intelligence Capabilities do not significantly affect Economic Performance or Innovation. Business Intelligence Capabilities have a significant effect on Knowledge Absorptive Capacity. Knowledge Absorptive Capacity has a significant effect on Innovation. Innovation has a significant effect on Economic Performance. Innovation is not able to mediate Business Intelligence Capabilities on Economic Performance. However, Knowledge Absorptive Capacity perfectly mediates the influence of business intelligence capabilities on Innovation. So, Knowledge Absorptive Capacity and Innovation mediates serially and perfectly the influence of Business Intelligence Capabilities on Economic Performance.

The limitation of this research is the use of grand theory, which still uses RBV-KBV; further research is recommended to use Dynamic Capacity theory and Absorptive Capacity theory, which may give different results. This research is also limited to SMEs in East Java, which will give different results if carried out in other regions, so further research is recommended to test the model on objects in other regions or in developed countries. Future research needs to investigate qualitatively to what extent SMEs in the Society 5.0 era carry out Business Intelligence practices and how deep the absorption of knowledge is so that it can produce innovation that is out of the box.

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