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Article

Students' business innovation capabilities: The moderating role of university support and entrepreneurial resilience

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Abstract: The high unemployment rate among university graduates is prompting universities to enhance the business skills of their students. This research aims to holistically explain the role of university support and entrepreneurial resilience in increasing students' business innovation capabilities. To analyze phenomena and relationships between variables, a quantitative approach using partial least square structural equation modeling (PLS-SEM) was used. This research sample involved 165 student entrepreneurs who are members of the student entrepreneur community in Indonesia. Knowledge management does not significantly impact increasing business innovation capabilities. However, perceived university support and entrepreneurial resilience have been shown to significantly impact business innovation capabilities and strengthen the influence of knowledge management activities on increasing business innovation capabilities. Universities must create policies supporting extracurricular entrepreneurship programs, focusing on building entrepreneurial resilience. This can be achieved through workshops and business incubator initiatives involving partnerships with industry and the entrepreneurial community. This research provides a new perspective in analyzing higher education entrepreneurship education through a more in-depth explanation of the extracurricular activities of the student business community to build business innovation capabilities based on knowledge, institutional, and trait theory perspectives.

Keywords: entrepreneurial resilience; knowledge management; perceived university support; business innovation capability

1. Introduction

Over the past two decades, global attention has been increasing on entrepreneurship education research (Hammoda, 2023; Hill et al., 2023). This is because the government realizes the critical role of entrepreneurship in economic growth and development (Fayolle, 2018; Hammoda, 2023). Consequently, entrepreneurship education has become a priority in higher education (Bell and Bell, 2016). This condition also exists in developing countries such as Indonesia. In this country, the government facilitates entrepreneurship education in universities, including intracurricular and extracurricular activities to improve students' capabilities, skills, attitudes, and responsibilities and foster teamwork, independence, and business development through creative activities to encourage innovation (Susilaningsih, 2015). Tam et al. (2024) indicate that entrepreneurship education should equip individuals with the knowledge, skills, and attitudes necessary to develop adaptive strategies, maintain motivation, and strengthen an innovative and proactive mindset, which are essential for surviving and thriving in a dynamic and often uncertain business environment. However, the learning outcomes from

entrepreneurship courses (intracurricular) often do not have a significant impact on students in developing their business innovations. Intracurricular entrepreneurship education frequently faces limitations in terms of classroom space and learning time, and it often emphasizes theoretical aspects over practical business activities in the field (Barbini et al., 2020; Hammoda, 2023; Marchand et al., 2016).

In line with Miço and Cungu (2023), entrepreneurship education requires experience in solving business problems in the real world to encourage students to develop optimal business innovation capabilities. Utilizing an entrepreneurial extracurricular activity platform can overcome academic rigor, which may not align with the complexity of the entrepreneurial process (Harrison and Leitch, 2005; Johannisson, 2016). In line with this, Yürekli-Kaynardağ (2019) highlights the importance of the pedagogical competence of educators in higher education. However, most research in entrepreneurship education tends to focus on pedagogical approaches or general educational theories (Fayolle, 2018; Lackeus et al., 2016; Neck and Corbett, 2018). This tends to ignore essential aspects of entrepreneurship, such as knowledge management, entrepreneurial orientation, and business capabilities, which overcome dynamic business challenges. The urgency of student entrepreneurial activities in extracurricular activities is essential to develop them into entrepreneurs who are strong and able to adapt to a volatile business environment, as well as encourage the creation of innovation to face intense business competition (Bacigalupo et al., 2016; Leher and Corbett, 2018; Miço and Cungu, 2023; Rae et al., 2012).

Entrepreneurship extracurriculars are critical for developing students' knowledge, skills, resilience, and business networks (Hammoda, 2023; Miço and Cungu, 2023; Rae et al., 2012). This approach follows the pedagogical approach, emphasizing autonomous learning, leadership behavior, and adaptability in uncertain and ambiguous business environments (Bacigalupo et al., 2016; Neck and Corbett, 2018). From the output of this approach, business innovation capability is essential for creating sustainable competitive advantage in a dynamic market (Eisenhardt and Martin, 2017). Business innovation capabilities are reconfiguring resources and capabilities to suit changing circumstances (Eisenhardt and Martin, 2017; Kirkley, 2017; Teece, 2012). This research examines and explores the determinants of business innovation capability in the context of student entrepreneurship in higher education. This research introduces a new perspective by examining the critical role of knowledge management, entrepreneurial resilience, and university policy support on students' business innovation capabilities within the scope of entrepreneurial extracurricular activities with the subject of the student business community.

2. Literature review and hypotheses development

2.1. Business innovation capability

Current literature shows the importance of innovation capabilities in the entrepreneurial learning process. This emphasizes that continuous learning contributes to developing innovation capabilities (Birchall and Tovstiga, 2005; Narcizo et al., 2017). Entrepreneurs always identify market opportunities and transform knowledge and ideas into new systems, processes, and products, driving innovation even within a limited scope (Frishammar et al., 2012). Innovation capability is considered the most

critical skill an entrepreneur must possess, enabling them to be a significant source of innovation. From a theoretical point of view, three critical theories explain the determinants of business innovation capability: the knowledge-based view, the institutional-based view, and the trait theory. The Knowledge-Based View (KBV) emphasizes knowledge as the primary resource for competitive advantage. KBV plays a crucial role in building business innovation capabilities by effectively managing, disseminating, and utilizing knowledge, enabling companies to innovate and adapt in a dynamic business environment (Sveiby, 2001). The Institutional-Based View explains how institutional support, such as government policies or industry structures, helps companies enhance their business innovation capabilities by creating a supportive environment, reducing barriers, and encouraging innovative practices (Peng et al., 2008; Peng et al., 2009). Trait theory explains that entrepreneurial resilience, as one of the main traits, boosts business innovation capabilities by helping entrepreneurs tackle challenges and remain focused on developing new ideas (Hedner et al., 2017; Yusof et al., 2023). Based on the three theories, it can be concluded that knowledge management, perceived organizational support, and entrepreneurship are key drivers of enhancing business innovation capabilities.

2.2. Knowledge management and business innovation capabilities

According to the Knowledge-Based View theory (Lin, 2007; Lin et al., 2012), knowledge and ideas are important factors that contribute significantly to company success and long-term business growth. This theory emphasizes the importance of practical knowledge management because it allows businesses to develop innovation capabilities essential to achieving their goals. Kusumawijaya and Astuti (2023) further explain that knowledge management involves a planned approach to creating, sharing, utilizing, and maximizing knowledge as a valuable organizational asset. By doing this, companies can increase capability, speed, and efficiency in producing innovative products or services that align with their business strategy. When entrepreneurs capture, acquire, manage, and disseminate knowledge, they create new insights, developing innovative capacities to produce unique products and services (Ara and Das, 2021). For entrepreneurial students, knowledge management is vital in building business innovation capabilities and designing strategies to improve products, services, and marketing techniques (Gao and Clarke, 2008). As a result, optimizing innovation capabilities is essential for achieving superior business performance and increasing customer value (Ara and Das, 2021; Hossein et al., 2022). Therefore, the hypothesis has been constructed as follows:

H1: Knowledge management has a significant impact on business innovation capabilities.

2.3. Perceived university support, knowledge management, and business innovation capability

Institutional-based theory shows that perceived university support is considered an aspect of the institutional perspective, encouraging dynamic interactions that increase innovation capabilities in products and processes, ultimately impacting business performance (Peng et al., 2008; Peng et al., 2009). University support for

student entrepreneurship programs includes providing funding, entrepreneurship training, access to mentors, and internship programs (Amalia and Von Korflesch, 2021). Additionally, universities facilitate knowledge transfer and offer platforms to commercialize innovations. This support helps students develop skills, start businesses, and enhance their innovation capabilities in facing business challenges (Maritz et al., 2022).

Perceived university support is categorized into three dimensions: perceptions of business development support, perceptions of educational support, and perceptions of concept development, as described by Kraaijenbrink et al. (2010). This dimension includes students' comprehensive understanding of the support they receive from the university, facilitating the promotion of innovation in their entrepreneurial ventures (Pradana and Kartawinata, 2020). Additionally, universities are essential in identifying and nurturing students' entrepreneurial innovation capabilities when launching new ventures. Research conducted by Huang and Yang (2023) shows that nurturing an entrepreneurial ecosystem and providing a platform for knowledge management among fellow entrepreneurial students or with established professionals effectively grows students' entrepreneurial innovation capacity. The university prioritizes its role as a center for starting new business ventures. University support, such as offering entrepreneurial internship opportunities, allows students to participate in knowledge management activities that foster general skills and business innovation capabilities so that they can accelerate the commercialization of the products they develop (Kraaijenbrink et al., 2010). Therefore, the hypothesis is built as follows:

H2: Perceived university support has a positive effect on business innovation capability.

H3: Perceived university support moderates the influence of knowledge management on business innovation capability.

2.4. Entrepreneurial resilience, knowledge management, and business innovation capability

Awotoye and Singh (2017) define entrepreneurial resilience as the capability to overcome entrepreneurial challenges and persevere when facing adverse situations and unexpected outcomes. Resilience is essential for entrepreneurs, allowing them to face uncertainty, maintain optimism, foster creativity, and uphold a positive outlook (Ayala and Manzano, 2014). According to trait theory, entrepreneurial resilience is associated with certain personality traits, such as effective organizational management, persistence, creativity, innovation skills, and a tendency to take risks (Hedner et al., 2017). Ayala and Manzano (2014) identify three dimensions of successful entrepreneurial resilience: optimism, resourcefulness, and resilience. By engaging in knowledge management practices, entrepreneurs can continue to improve their entrepreneurial resilience. Resilience is crucial in empowering organizations to increase innovation capabilities by anticipating and adapting to environmental challenges (Fandiño et al., 2019; Yusof et al., 2023). Resilient entrepreneurs will diligently pursue their goals, adapt to change, excel in new situations, and learn from mistakes. Resilience encourages the development of solid innovation capabilities, which leads to competitive advantage in a dynamic business environment (Tehrani et

al., 2022). Therefore, the hypothesis has been constructed as follows:

H4: Entrepreneurial resilience positively impact business innovation capability.

H5: Entrepreneurial resilience moderates the impact of knowledge management on business innovation capability.

The relationship among entrepreneurial resilience, knowledge management, perceived university support, and business innovation capability is described as follows, see **Figure 1** below.

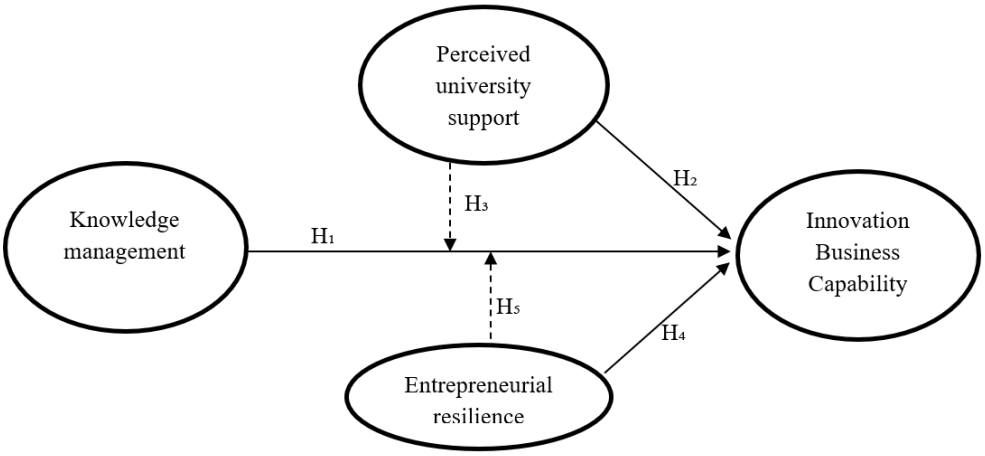

Figure 1. Research model.

3. Materials and methods

3.1. Research approach and data collection

This research used a quantitative approach with a cross-section survey design. Research data was obtained through distributing questionnaires using the purposive sampling method. The research sample is entrepreneurial students who have had a business running for at least six months and are active members of the Association of Young Indonesian Higher Education Entrepreneurs in state and private universities across Indonesia. The locus of Indonesia was chosen because the country is currently experiencing a significant increase in unemployment among higher education graduates, despite the fact that 20% of the national budget is allocated to entrepreneurship education. (Amalia and Von Korflesch, 2021; Maritz et al., 2022). The sample was chosen because the community members are students who are active in entrepreneurship. The sample was chosen from those actively engaged in entrepreneurship because they align with the characteristics of the existing variables. Students who are not involved in entrepreneurship tend to be biased, as they may not have experienced or engaged with all the contexts related to the variables of entrepreneurial resilience, knowledge management, perceived university support, and business innovation capability (Pradana and Kartawinata, 2020). The sample size in this study refers to the recommendations put forward by Kock and Hadaya (2016) using the inverse root square method of a minimum of 160 analysis units to obtain a power level of 80%. The research instrument was provided in a self-administered questionnaire distributed via Google Forms and distributed to respondents via email and WhatsApp from March to November 2023. In addition, the Institutional Review

Board approved all ethical issues at Universitas Negeri Semarang, Indonesia. Approximately 200 respondents took part in this survey, and we found 165 respondents, or a questionnaire rate of 82.5%, which could be analyzed further. In contrast, 17.5% of questionnaires were not returned, were damaged, and could not be analyzed. The specifications of the sample are as follows, see **Table 1**.

Table 1. Sample specification (%).

Characteristics	Information	Frequency	%
Gender	Female	76	46.07
	Male	89	53.93
Age	19–22 years old	88	53.33
	23–25 years old	77	46.67
Year class	2020	78	47.27
	2021	77	46.67
	2022	10	6.06
Parents' occupation	Entrepreneur	58	35.15
	Educator	42	25.45
	Farmer	36	21.81
	Civil servant	12	7.21
	Private sector	17	10.3
University Status	State University	86	52.12
	Private University	79	47.88

Source: own study.

3.2. Measurement indicators

All variables in this study used a measurement scale based on Likert 1–5 agree/disagree. Each item was given a range of extreme angles on the scale "strongly agree and strongly disagree"; the scale was adapted based on experts' proxies. Business innovation capability was measured through five dimensions of capability, namely product innovation, process innovation, strategic innovation, behavioral innovation, and marketing innovation, with a scale comprising 15 items adapted from Hogan et al. (2011) and Omar et al. (2016) for more detailed items, see **Table 2**. Knowledge management with dimensions including internalization, externalization, combination, and socialization, was measured from a measurement scale, assessed with 12 items adapted from Becerra-Fernandez and Sabherwal (2001) for more detailed items, see **Table 2**. Perceived University Support was measured using three dimensions, namely business development support, educational support, and concept development support, using an 11-item scale adapted from Kraaijenbrink et al. (2010) for more detailed items, see **Table 2**. The entrepreneurial resilience variable was measured in the self-dimension (internal strength) and business situational cognitive capability (cognitive competence) with a scale consisting of 23 items adapted from Buang (2012) for more detailed items, see **Table 2** below.

Table 2. Measurement of the variables.

Construct	Item		Reference
Knowledge management	KM 1	I regularly study and apply new knowledge from training and experience in my business strategies.	Becerra, I., Sabherwal, R. (2001)
	KM 2	I often reflect on my experiences to find lessons that can be applied in business decision-making.	
	KM 3	I use the results of evaluations and feedback from business experiences to improve my understanding and skills.	
	KM 4	I share knowledge and new ideas with my team to create innovative solutions together.	
	KM 5	I document my experiences and business insights so they can be reused by the team.	
	KM 6	I actively contribute to group discussions by sharing relevant information to achieve common goals.	
	KM 7	I combine various information from different sources to create more effective business strategies.	
	KM 8	I often integrate knowledge obtained from various fields to enrich product and service innovations.	
	KM 9	I use data and information from multiple sources to make more accurate and measured decisions.	
	KM 10	I frequently collaborate with peers to exchange knowledge and business experiences.	
	KM 11	I participate in communities or forums that allow me to learn from the experiences of others.	
	KM 12	I actively engage in networking activities to expand my knowledge and gain new insights from other entrepreneurs.	
Perceived University Support	PUS 1	The university provides business incubation facilities that help me in growing my business.	Kraaijenbrink, J., et al. (2010)
	PUS 2	I have access to business mentors through programs offered by the university.	
	PUS 3	The university provides access to financial resources, such as funding or grants, to develop my business.	
	PUS 4	The university actively assists me in building strong business networks with entrepreneurs and investors.	
	PUS 5	The university offers entrepreneurship courses that enrich my knowledge of business management.	
	PUS 6	I receive practical training from the university that helps me understand the operational aspects of business.	
	PUS 7	The university provides seminars and workshops on innovation and entrepreneurship that are beneficial for the development of my business.	
	PUS 8	The university grants access to educational materials and resources relevant to my business needs.	
	PUS 9	The university helps me refine my business ideas through structured guidance and consultation.	
	PUS 10	I receive support from the university in developing product prototypes that align with my business concept.	
	PUS 11	The university offers programs that encourage the development of creative and innovative ideas to be implemented in my business.	

Table 2. (*Continued*).

Construct	Item		Reference
Entrepreneurial Resilience	ER 1	Overall, the performance of my business is getting better each year.	Buang, N. A. (2012)
	ER 2	The returns of my business are increasing each year.	
	ER 3	The cost of running my business is still reasonable.	
	ER 4	The turnover growth of my business is better each year.	
	ER 5	The number of personnel in my business is still manageable.	
	ER 6	The financial risks of my business are still within my control.	
	ER 7	There is a possibility of earning more income from new opportunities that my business has identified.	
	ER 8	I can see that my business is thriving very well.	
	ER 9	The number of clients is adding up from time to time due to the quality of my business product(s).	
	ER 10	The speed of development of my business is suitable with the effort that I have put in.	
	ER 11	My business has good potential to grow and sustain in the future.	
	ER 12	I am comfortable with the time span that I have used to bring my business to a more stable stage.	
	ER 13	I accept the fact that there is a cost to any decision that I take in my business activities.	
	ER 14	I am able to ignore my fear of failure and future results to continue working hard for my business.	
	ER 15	I can always figure out how to solve problems that arise at my business place.	
	ER 16	I don’t let myself neglect the daily running of business even though I am preoccupied with many problems.	
	ER 17	I can take advantage of the changing environment to my benefit.	
	ER 18	I respond to adverse situations in my business with a positive attitude.	
	ER 19	I am able to handle many conflicting decisions in my business with patience.	
	ER 20	I don’t act impulsively whenever I face stressful moments with my clients and staff.	
	ER 21	I react constructively to stressful situations in my daily running of business.	
	ER 22	I manage to see and capitalize on the opportunity that comes with change in my business environment.	
	ER 23	I courageously face potentially disruptive changes by turning adversity into advantageous opportunities.	

Table 2. (*Continued*).

Construct	Item		Reference
Business Innovation Capability	BIC 1	I regularly develop and introduce new products to meet the ever-changing market needs.	Hogan, S. J., et al. (2011); Omar, N. A., et al. (2016)
	BIC 2	The products I create have unique features that distinguish them from similar products on the market.	
	BIC 3	I always strive to improve the quality of existing products through continuous innovation and research.	
	BIC 4	I am constantly looking for ways to improve production process efficiency to reduce costs and production time.	
	BIC 5	I apply new technologies in the production process to enhance product quality and quantity.	
	BIC 6	I frequently change work methods or operational processes to boost productivity and reduce errors.	
	BIC 7	I periodically review and modify business strategies to align with the dynamic market conditions.	
	BIC 8	I am willing to take risks in changing business direction to seize new opportunities.	
	BIC 9	I always develop long-term strategies focused on business growth and sustainability.	
	BIC 10	I am always open to new ideas and changes that can enhance my business.	
	BIC 11	I motivate myself and my team to continually seek new ways to solve business problems.	
	BIC 12	I quickly adapt to changes in situations and challenges in running the business.	
	BIC 13	I use various innovative marketing channels to reach new customers.	
	BIC 14	I often develop creative marketing campaigns to boost brand awareness and sales.	
	BIC 15	I consistently evaluate and adjust marketing strategies based on customer feedback and the latest market trends.	

3.3. Data analysis

Data analysis in this research was carried out using Partial Least Square-Structural Equation Modelling (PLS-SEM) with Warp PLS. The reason for adopting this approach, rather than covariance-based SEM (CB-SEM), is that it allowed us to explore complex relationships while ensuring the required sample accuracy (Kock, 2019). In addition, PLS-SEM has more advantages in terms of high parameter estimation efficiency than covariance-based Structural Equation Modeling (CB-SEM) (Hair et al., 2017; Lowry and Gaskin, 2014). The procedure consisted of several steps: (1) creating a conceptual model; (2) assessing and estimating the external model, this step was carried out to test the validity and reliability of the construct; (3) evaluating and estimating the inner model (model fit and quality indices) through reflective mode and resampling to ensure t-statistical values, and (4) conducting hypothesis testing and mediation analysis (Kock, 2010).

4. Results

4.1. Measurement model analysis

This research examines the validity and reliability of the constructs to test the external/measurement model. The convergent validity test examines whether the Average Variance Extracted (AVE) for each composite exceeds a threshold of 0.50, indicating the validity of the composite's conceptual properties (Henseler et al., 2017). Additionally, the square root of the AVE for each composite is compared with its correlation with other composites to establish convergent validity. Discriminant validity tests use several techniques, including ensuring that all latent variable correlations are lower than the square root of the AVE of their respective constructs and confirming differences in correlations between each pair of constructs using the standard bias method (Anderson and Gerbing, 1988; Fornell and Larcker, 1981). To assess the reliability of the construct, the researchers tested Cronbach's alpha coefficient and composite reliability, which should exceed the threshold of 0.80 (Henseler et al., 2017). The external model analysis is presented in the table provided.

Table 3 shows that knowledge management and perceived university support need three items to be eliminated. However, the entrepreneurial resilience and business innovation capability variables meet the convergent validity criteria without being eliminated. The four variables meet the construct reliability criteria because their combined reliability value exceeds 0.7.

Table 3. Analysis of convergent validity and reliability.

Variable (Indicator)	λ	AVE	C.R	(α)
Knowledge management (12 items)	0.561–0.784	0.632 (3 item dropped)	0.928	0.909
Perceived university support (12 items)	0.611–0.813	0.504 (2 item dropped)	0.888	0.892
Entrepreneurial resilience (16 items)	0.667–0.744	0.628	0.974	0.972
Business innovation capability (15 items)	0.561–0.784	0.761	0.978	0.975

Abbreviations: λ: loading factor; AVE: Average Variance Extracted; CR: Composite Reliability; (α): Cronbach alpha, source: warp pls output.

The discriminant validity analysis shown in **Table 4** fulfils construct validity because the ratio of the square roots of the AVE of each variable is greater than the correlation between latent variables diagonally.

Table 4. Correlations among latent variables vs with square rooted of AVEs.

	Knowledge Management	Perceived University Support	Entrepreneurial Resilience	Business Innovation Capability
Knowledge Management	0.681	0.504	0.538	0.558
Perceived University Support	0.504	0.726	0.458	0.339
Entrepreneurial Resilience	0.538	0.458	0.792	0.499
Business Innovation Capability	0.558	0.339	0.499	0.872

Source: warp pls output.

Table 4 shows that the root average of the variance extracted (AVE) of each latent variable is higher than the correlation between the latent variables, thus indicating that the instrument meets the criteria for discriminant validity. After eliminating certain variables, all remaining variables still meet the criteria for discriminant validity. In addition, discriminant validity is further confirmed through the standard bias method with full collinearity Variance Inflation Factors (VIFs), where all variables meet the discriminant validity criteria because their full collinearity VIF scores are below 5.5, as shown in **Table 5** below.

Table 5. Full collinearity VIFs.

Knowledge Management	Perceived University Support	Entrepreneurial Resilience	Business Innovation Capability
1.922	1.266	3.023	3.036

Source: warp pls output.

4.2. Structural model analysis

After fulfilling all construct validity criteria (convergent and discriminant validity) and construct reliability in the measurement/router model, the next step is to analyze the structural model in two stages: the goodness of fit/fit model stage and the significance test for hypothesis testing. In the model feasibility test stage, 15 indices are tested. For the model to be considered a fit model, all indices must score above the cut-off value. If these criteria are met, hypothesis testing continues. The following sections present the results of the goodness of fit model and quality indices.

Table 6 shows that all types of suitability tests, including Average path coefficient (APC) to Standardized threshold difference sum ratio (STDSR) tests, indicate that the structural model of this research is fit and can be continued for hypothesis testing. The details of hypothesis testing and path coefficients are shown in the table below.

Table 7 shows the results of hypotheses (H2) and (H4), which state that perceived university support and entrepreneurial resilience influence business innovation capability, are accepted statistically, with a *p*-value of less than 0.05. In addition, hypotheses (H3) and (H5), which state that perceived university support and entrepreneurial resilience moderate the influence of knowledge management on business innovation capability, are also statistically accepted, with a *p*-value below

0.05. However, the statistical results do not support the hypothesis (H1) because the *p*-value is 0.311, exceeding the cut-off value of 0.05. This shows that knowledge management does not significantly affect business innovation capability in the context of student entrepreneurship in Indonesia.

Table 6. Model fit and quality indices (extended set).

Criteria	Cut-off Value	Results	Information
Average path coefficient (APC)	$P > 0.05$	0.359; $P < 0.001$	Acceptable
Average R-squared (ARS)	$P > 0.05$	0.552; $P < 0.001$	Acceptable
Average adjusted R-squared (AARS)	$P > 0.05$	0.541; $P < 0.001$	Large
Average block VIF (AVIF)	acceptable if ≤ 5. ideally ≤ 3.3	3.499	Acceptable
Average full collinearity VIF (AFVIF)	acceptable if ≤ 5. ideally ≤ 3.3	2.894	Acceptable
Tenenhaus's Goodness of Fit (GoF)	small ≥ 0.1. medium ≥ 0.25. large ≥ 0.36	0.594	Acceptable
Simpson's Paradox Ratio (SPR)	acceptable if ≥ 0.7. ideally = 1	0.900	Acceptable
R-squared contribution ratio (RSCR)	acceptable if ≥ 0.9. ideally = 1	0.968	Acceptable
Statistical suppression ratio (SSR)	acceptable if ≥ 0.7	1.000	Acceptable
Nonlinear bivariate causality direction ratio (NLBCDR)	acceptable if ≥ 0.7	0.900	Large
Additional indices (indicator correlation. matrix fit)			
Standardized root mean squared residual (SRMR)	acceptable if ≤ 0.1	0.064	Acceptable
Standardized mean absolute residual (SMAR)	acceptable if ≤ 0.1	0.026	Acceptable
Standardized chi-squared with 1890 degrees of freedom (SChS)	$P > 0.05$	103.754; $P < 0.001$	Fit
Standardized threshold difference count ratio (STDCR)	acceptable if ≥ 0.7, ideally = 1	0.993	Acceptable
Standardized threshold difference sum ratio (STDSR)	acceptable if ≥ 0.7, ideally = 1	0.917	Acceptable

Source: warp pls output.

Table 7. Hypothesis test results.

Hypotheses and Regression Paths	Path Coefficient	Cut-off Value	*P*-value	Information
H_1: Knowledge Management → Business Innovation Capability	0.036	$P > 0.05$	0.311	Not supported
H_2: Perceived University Support → Business Innovation Capability	0.19	$P > 0.05$	0.004	Supported
H_4: Entrepreneurial Resilience → Business Innovation Capability	0.911	$P > 0.05$	< 0.001	Supported
The Moderating Effect of Regression Paths	**Path Coefficient**	**Cut-off Value**	***P*-value**	**Information**
H_3: Knowledge Management * Perceived University Support → Business Innovation Capability	0.309	$P > 0.05$	< 0.001	Supported
H_5: Knowledge Management * Entrepreneurial Resilience → Business Innovation Capability	0.498	$P > 0.05$	< 0.001	Supported

Source: warp pls output.

5. Discussion

The results of testing hypothesis 1 contradict previous research that supports the idea of a positive relationship between knowledge management and business innovation (Cader et al., 2013; Taherparvar et al., 2014). Moreover, these findings do not align with the knowledge-based view theory, which states that effective knowledge management contributes to sustainable competitive advantage and higher profitability in the industry (Chen et al., 2012). Knowledge management among student

entrepreneurs is not optimal due to limited access and resources, lack of practical experience, and inadequate institutional support. Additionally, a focus on theory rather than practice, lack of understanding of best practices, and time constraints also hinder the effective application of knowledge management in enhancing their business innovation capabilities. This shows that inappropriate knowledge-creation activities are normal because students are still learning. Astuti and Martdianty (2012) show that students' reflections on applying entrepreneurial or business science and knowledge in learning often do not get optimal results. Therefore, university support is needed to provide a network of professional entrepreneurs as a place to gain knowledge and skills in business. In line with this, Patricia and Silangen (2016) show that higher education as a strong pillar of education and research must provide tangible benefits to the entrepreneurship education process. The learning should be based on classroom learning and business implementation outside the classroom.

Cader et al. (2013) state that stored knowledge becomes a more reliable and practical resource for innovation adoption. However, the main problem is that the knowledge built and shared can be misleading in its discussion and interpretation in networks and partnerships if the quality of business knowledge is less than optimal. Furthermore, Kusumawijaya and Astuti (2023) emphasize that entrepreneurs need to pay attention to the quality and relevance of information, validate sources, and thereby gain crucial knowledge for developing market-accepted business innovations. Therefore, firms that produce innovations rely on a combination of new and existing knowledge, whereas firms that adopt other innovations rely heavily on existing knowledge.

The results of this study indicate that the second hypothesis is statistically significant. It supports the second hypothesis that the higher the perceived university support, the higher the business innovation capability of entrepreneurial students. In addition, perceived university support is statistically significant in moderating the influence of knowledge management on students' entrepreneurial business innovation capabilities. These results support the third hypothesis, but there is an interesting context. For this third hypothesis, although there is a significant influence on the interaction variables of knowledge management and perceived university support on business innovation capability, knowledge management does not significantly affect business innovation capability. It proves that good perceived university support can increase the impact of knowledge management on innovation capability. It again shows that extracurricular entrepreneurship programs for students outside the classroom show that the role of universities is significant in developing students' entrepreneurial competencies. This result aligns with the findings of Huang and Yang (2023), who demonstrate the critical role of universities in identifying and developing students' entrepreneurial character and capabilities to encourage students to start their businesses.

This research underlines the vital role of universities in promoting student entrepreneurship and encouraging the creation of start-up businesses. Entrepreneurship programs, creating an entrepreneurial atmosphere, and diverse and supportive policies significantly impact students' innovation capabilities in the business world (Walter et al., 2009). University support related to entrepreneurship development, such as entrepreneurship funding programs, entrepreneurship training

programs, and recognition of entrepreneurial achievements, significantly affects students' entrepreneurial capacity (Kraaijenbrink et al., 2010). University support, such as entrepreneurship internships and knowledge transfer programs, also significantly influences students' tendencies to start their businesses. Furthermore, continued support from universities to commercialize innovative products, processes, marketing, strategies, and entrepreneurial behavior has also proven effective. Thus, supporting the student entrepreneurial community in building their businesses contributes to developing business concepts and ideas. This finding aligns with the perspective proposed by Pradana and Kartawinata (2020) and Shane and Venkataraman (2000), which show that university entrepreneurship policy support fosters awareness, motivation, business ideas, and understanding of student entrepreneurial opportunities. Additionally, university support provided during the business development phase significantly impacts students' business innovation capabilities.

Entrepreneurial resilience has been proven to positively and significantly affect students' business innovation capabilities. This shows that the more students have high entrepreneurial resilience, the more their business innovation capabilities will be stimulated. These findings show that resilience in entrepreneurship is a good driver in forming business innovation. Emrizal and Primadona (2023) argue that the resilience of novice entrepreneurs is an absolute price. Furthermore, they also state that through good resilience, entrepreneurs will always be motivated to be development-oriented, dare to take risks, always be innovative, and have good self-control. Therefore, these findings confirm that entrepreneurial students can take advantage of existing business opportunities and quickly take necessary steps by considering the company's resources when entrepreneurial students have good entrepreneurial resilience. In line with Ayala and Manzano (2014), it shows that entrepreneurs with good entrepreneurial resilience will not have difficulty achieving success. Entrepreneurs will recombine their resources and be able to take steps against uncertainty in business (Yusof et al., 2023).

The research results show that entrepreneurial resilience is proven to strengthen the influence of knowledge management on business innovation capability. These results indicate that the dimensions of business situational cognitive capabilities and social relations skills get higher scores than internal strengths. This means that the entrepreneurial capability to adapt dynamically to changing and challenging market conditions is very important to encourage business innovation. Resilient entrepreneurs demonstrate a high tolerance for ambiguity in an ever-changing business environment, as noted by Manzano and Ayala (2013) and Morisse and Ingram (2016). Entrepreneurs with high resilience tend to view mistakes as learning opportunities, quickly bounce back from setbacks, and adjust business management methods when necessary (Awotoye and Singh, 2017; Yusof et al., 2023). Entrepreneurial resilience is the result of interactions between entrepreneurs and their environment. Ayala and Manzano (2014) also emphasize that resilience is a strategic growth factor for entrepreneurs, enabling continuous improvement in innovation capabilities in line with challenges and changes in the business environment. In this context, resilience can be fostered through student entrepreneurship extracurricular activities to equip them to face business uncertainty.

6. Conclusion

The knowledge management activities related to the businesses run by entrepreneurial students do not significantly enhance their business innovation capabilities, primarily due to limited resources, practical experience, and institutional support. However, strong university support has been shown to strengthen the impact of knowledge management on business innovation. University entrepreneurship programs, including funding, training, and internships, are crucial in developing students' innovative capacities and encouraging the creation of new businesses. Additionally, students' entrepreneurial resilience significantly improves business innovation capabilities, with more resilient students demonstrating better adaptability to market changes and uncertainty. This resilience encourages students to view mistakes as learning opportunities, recover from failures, and adjust their business strategies. Continuous university support and strong entrepreneurial resilience have been proven to be critical factors in shaping students' business innovation capabilities.

6.1. Theoretical contribution

This research confirms three main theoretical perspectives as references in shaping an empirical model to determine the business innovation capabilities of entrepreneurial students: the knowledge-based view (KBV) (Sveiby, 2001), the institutional-based view (Peng et al., 2008; Peng et al., 2009), and trait theory (Hedner et al., 2017). The knowledge-based view (KBV) emphasizes the importance of knowledge resources in ensuring sustainable competitive advantage, where resources that are difficult to imitate become the foundation for sustainable differentiation. In this context, entrepreneurial students must develop and leverage unique knowledge that competitors cannot easily replicate to create sustainable business innovations. Additionally, the institutional-based view indicates that the institutional environment, such as support policy from universities, plays a crucial role in shaping students' innovation capabilities. Strong institutional support can facilitate access to the resources and networks necessary to develop business innovation capabilities. Trait theory highlights the importance of individual characteristics, such as resilience and creativity, which serve as drivers in overcoming challenges and seizing opportunities in the business world. The combination of these three perspectives provides a strong foundation for understanding how entrepreneurial students can build competitive business innovation capabilities.

6.2. Practical implications

However, entrepreneurial students must carefully consider certain aspects in building knowledge within the students’s entrepreneur organization: (1) limited knowledge assets owned by members of the entrepreneurial extracurricular community, thereby allowing the knowledge management process to be ineffective in developing innovation capabilities; (2) asymmetry of knowledge (competencies and capabilities) in business, which may not be shared honestly to protect the knowledge assets of each entrepreneur, resulting in less than optimal knowledge sharing among organizational members. Institutional support from universities, such as policies, programs, financial support, technical assistance, and other forms of support

implemented, has proven effective in encouraging effective knowledge management processes among students, supporting their entrepreneurial resilience through workshops and similar activities in business incubators. In addition, university support can also provide a platform that involves partnerships with external stakeholders, including industry and the entrepreneurial community, to assist students in developing and testing business ideas and accessing markets. Universities can offer entrepreneurship grant programs through business competitions to enhance students' business innovation capabilities, enabling them to sustain their ventures successfully, as strong human capital serves as a key catalyst for generating ideas and driving innovation for business continuity.

6.3. Limitations and future research

This study has several issues that need to be addressed. Future research should take these limitations into account. First, the empirical evidence for this study was gathered from the context of student entrepreneurs in a developing country like Indonesia, so the findings may not be generalizable or applicable to other countries. Entrepreneurship education policies at universities vary from country to country, depending on their constitutions and legal frameworks. Therefore, researchers should consider expanding the geographical scope to achieve better generalization in future studies, particularly through multinational studies. Second this research has limitations in developing and selecting indicators for combining knowledge management variables. The adaptation of Becerra-Fernandez and Sabherwal (2001) indicators for entrepreneurship does not produce an optimal measurement model, so it is necessary to develop measurements suitable for novice entrepreneurs in the context of entrepreneurship learning outside the classroom. Therefore, future research needs to elaborate on the case of student entrepreneurship because the context is different compared to professional entrepreneurship. In addition, expanding the scope of research to include more countries would be beneficial.

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