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The Role of Managerial Strategy in Innovation, Ambidexterity, Technology, and Technopreneurial Success.

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A B S T R A C T

This study aims to evaluate the role of managerial strategy, innovation, ambidextrous organizations, and technology adoption in driving the success of technopreneurs in the digital economy era. The focus of this research is to examine how these four factors collectively enhance the performance and competitiveness of technology-based businesses amid increasingly complex digital challenges. A quantitative approach was employed, with surveys serving as the primary data collection method. The research sample consisted of 50 active technopreneurs. Prior to the distribution of questionnaires, validity and reliability tests were conducted to ensure the appropriateness of the instrument. The validity test results indicated that all questionnaire items were valid, as shown by correlation coefficients exceeding the critical value. Meanwhile, the reliability test demonstrated a high level of consistency, with a score of 0.784. The data were analyzed statistically using descriptive and inferential analysis. The Shapiro-Wilk normality test showed that the data were normally distributed with significance levels above 0.05. Further analysis using a one-sample t-test revealed that the average responses from the 50 technopreneurs were significantly higher than the benchmark score of 70, with a p-value of 0.0001. These findings indicate that managerial strategy, innovation, ambidextrous organizations, and technology adoption significantly contribute to technopreneurial success in the digital era, with advanced technology adoption being the most influential factor. The integration of these four elements forms a critical foundation for strengthening competitiveness and ensuring the sustainability of technopreneurial ventures

1. Introduction

In the face of accelerating technological advancement and increasingly volatile global markets, businesses are compelled to adopt strategic approaches that go beyond conventional innovation. The ability to innovate sustainably has become essential for long-term success, particularly in the digital economy where rapid change is the norm rather than the exception.

This chapter provides an overview of the conceptual foundation for the study, starting with the background that highlights the importance of sustainable innovation and the emergence of technopreneurship. It then outlines the key problem addressed in this research, followed by the objectives and scope that define the study's direction.

1.1 Background

Sustainable innovation has become a crucial strategic approach for companies aiming to stay relevant and competitive in an increasingly digital, complex, and fast-paced global market. This type of innovation goes beyond the creation of new products; it also involves transformation across various internal aspects of the organization, including adjustments to business models, organizational structures, resource management, and the adoption of technology to support long-term sustainability.

In this context, technopreneurship the combination of entrepreneurship and technology has experienced rapid growth alongside the accelerating pace of digitalization affecting nearly every industrial sector. Technopreneurs leverage digital technologies not only to improve operational efficiency but also to develop innovative products and services that meet the evolving needs of a more connected and dynamic market. As such, technopreneurship has become a key driver in reshaping the modern business landscape through disruption and innovation.

1.2 Problem Statement

However, the rapid pace of technological advancement and market dynamics presents significant challenges for companies, particularly technopreneurs. While digital technologies have become increasingly accessible, many technopreneurs struggle to manage innovation processes in an adaptive and sustainable manner. Often, they lack a flexible strategic framework to respond effectively to external changes or have yet to build the organizational capabilities required to handle disruption.

The absence of dynamic capabilities the ability of an organization to proactively adapt and reconfigure resources in response to change can lead to companies falling behind more agile and responsive competitors. Thus, it is critical to explore how technopreneurs can strengthen their managerial strategies to maintain competitiveness through

1.3 Objectives and Scope

Outline the objectives of the research and clarify any limitations or scope constraints. This study aims to explore the role of managerial strategy in supporting sustainable innovation, with particular attention to ambidextrous organizations those capable of balancing exploitation (efficiency in current processes) and exploration (development of new ideas). The study also examines how the adoption of digital technologies and data driven decision making can enhance the competitiveness of technopreneurs in the digital economy.

The scope of this research includes the integration of managerial strategy, ambidextrous organizational structures, and technology adoption as key drivers of sustainable innovation. The central focus lies on how technopreneurs can manage these three elements synergistically to remain competitive and relevant in a rapidly changing business environment.

2. Literature Review

Summarize key findings from prior studies, theories, or methodologies relevant to your research. This section should build a strong foundation for your methodology by showing gaps or areas needing further exploration.

2.1 Related Work

Several previous studies provide a solid foundation for understanding the relationship between innovation, managerial strategy, and digital technologies:

- Tushman and O'Reilly (1996) emphasize that companies unable to adapt quickly to change will lose competitiveness. They introduce the concept of ambidextrous organizations those capable of managing both incremental and radical innovation simultaneously.
- Ghezzi et al. (2015) highlight the advantages of digital technologies in business models, including enhanced operational efficiency and improved customer experience.
- Teece (2018) introduces the concept of dynamic capabilities, a set of managerial competencies necessary for organizations to survive and thrive in a fast-paced digital environment.
- Porter and Heppelmann (2014) demonstrate that technologies such as the Internet of Things (IoT) and data analytics can significantly improve decision-making quality and business responsiveness.
- Sood and Tellis (2005) warn that an overreliance on incremental innovation may cause companies to lose relevance, especially if they fail to understand the broader trajectory of technological evolution.
- Christensen et al. (2016) argue that companies that do not engage in continuous innovation will be overtaken by more adaptive and agile competitors.
- Bharadwaj et al. (2013) advocate for the integration of business and digital strategies as a foundation for building long-term competitive advantage.
- Lee and Vonortas (2004) stress the importance of aligning corporate strategies with the disruptive nature of the Internet and digital technologies.
- Woodard et al. (2013) describe the significance of design capital the organizational capability to design innovative solutions in sustaining innovation.
- Setia et al. (2013) emphasize the importance of real-time, high-quality data for enhancing organizational agility and effective innovation management.

2.2 Research Gap

Identify any research gaps that your study will address. While existing literature has extensively discussed digital innovation and technopreneurship as separate domains, there is a notable research gap in understanding how managerial strategy can holistically support sustainable innovation through the implementation of ambidextrous structures and the strategic adoption of digital technologies. The intersection of these three elements managerial strategy, organizational ambidexterity, and technology adoption has not been sufficiently explored in an integrated manner, particularly in the context of technopreneurs operating in digitally disruptive environments.

Therefore, there is a clear opportunity for research to fill this gap by examining how technopreneurs can align their strategies, structures, and technological capabilities to sustain

innovation and maintain competitive advantage in an increasingly digital and fast-evolving business landscape.

3. Methodology

This study employs a quantitative research design aimed at examining the relationships among variables related to sustainable innovation management in technopreneurship, especially in the context of challenges presented by the digital economy. The explanatory nature of the research seeks to clarify how variables such as product innovation, business model innovation, ambidextrous organizational structure, digital information quality, and technology adoption influence the success of technopreneurs in maintaining competitiveness in the digital era. The choices of design and methods align closely with the study's objective to identify significant predictors of technopreneurial success.

3.1 Data Collection

The data for this research were collected via a structured questionnaire targeting technopreneurs operating technology-based businesses in Indonesia, with a focus on the digital startup sector, creative digital industries, and technology-based MSMEs in Makassar City. The sampling technique used was purposive sampling, selecting respondents who met the following criteria:

- Entrepreneurs or startups utilizing digital technology in their operations.
- Businesses that have been operating for at least one year.
- Businesses offering technology-based products or services.

This purposive approach ensures the sample is relevant to the research focus and representative of the population facing digital economy challenges. The study targeted a sample size of 50 active technopreneurs in Makassar to enable a focused and contextual understanding of the dynamics specific to this locale.

The primary research instrument was a questionnaire using a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree), designed to measure respondents' perceptions on key variables such as product innovation, business model innovation, ambidextrous organization, digital information quality, digital technology adoption, and technopreneurial success. Sample questionnaire items include:

- *Product Innovation:* "I integrate smart products that can connect with other devices."
- *Business Model Innovation:* "We adopt a digital platform-based business model to expand our market reach."
- *Ambidextrous Organization:* "Our company is capable of adapting to rapid changes in the technology market."
- *Digital Information Quality:* "The data we receive from digital platforms is always timely and relevant for business decision-making."
- *Digital Technology Adoption:* "We have adopted technologies such as Artificial Intelligence (AI) to improve operational efficiency."
- *Technopreneurship Success:* "Our company has experienced a significant increase in revenue since adopting digital technologies."

3.2 Analysis Techniques

The collected data were analyzed quantitatively to examine the influence of the independent variables on technopreneurial success. Descriptive statistics were first employed to categorize the responses based on the percentage of agreement, using the following scale:

$$\%\ Student\ Respons = \frac{\sum \text{Aspect Score Obtained}}{\sum \text{Maximum Possible Aspect Score}} \times 100\%$$

Table 1. Category of Technopreneur Responses in Makassar City

Student Response Percentage	Category
$85\% \leq R \leq 100\%$	Very Positive
$70\% \leq R < 85\%$	Positive
$50\% \leq R < 70\%$	Less Positive
$0\% \leq R < 50\%$	No positive

To ensure the validity of subsequent parametric analyses, the Kolmogorov-Smirnov test was conducted to assess the normality of data distribution at a significance level (α) of 0.05. The criteria applied were:

- If $P \geq \alpha$, the data distribution is normal.
- If $P < \alpha$, the data distribution is not normal.

Upon confirmation of normality, a Significance Test (t-test) was performed to test the hypotheses, evaluating whether the independent variables significantly influence technopreneurial success.

3.3 Validation

To ensure reliability and validity of the research instrument, the questionnaire was carefully designed to reflect key constructs identified in the literature. The use of a Likert scale allows for consistent measurement of respondents' perceptions across multiple dimensions. The purposive sampling technique targeted participants directly relevant to the study's focus, enhancing the representativeness of the data.

Furthermore, normality testing (Kolmogorov-Smirnov) and hypothesis testing (t-test) serve to validate the statistical assumptions and the significance of relationships, respectively, thus ensuring robustness in the interpretation of results.

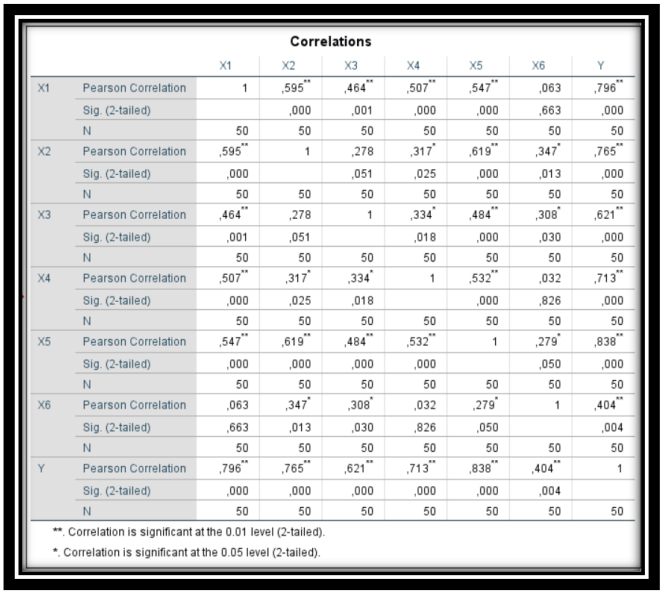
4. Research Results

1. Instrument Analysis

a) Validity Test

Before the research instrument was widely used for data collection, a validity test was conducted to ensure that each item in the questionnaire effectively measured the intended variables in this study. This validity test is crucial to confirm that every question item is relevant and aligned with the concepts under investigation, namely the Role of Managerial Strategy in Innovation, Ambidextrous Organization, and Technology Adoption for Technopreneur Success in the Digital Economy Era.

The validity test was performed using a correlation technique between the score of each question item and the total score. This correlation aims to determine whether each item has a significant relationship with the overall construct of the variables measured, such as product innovation, business model innovation, ambidextrous organization, digital information quality, and technology adoption. An item is considered valid and suitable for data collection if it shows a significant correlation (with a significance level below 0.05). Conversely, items that are not significant are regarded as not adequately representing the intended construct and require further review or elimination from the research instrument.



Correlations

		X1	X2	X3	X4	X5	X6	Y
X1	Pearson Correlation	1	,595**	,464**	,507**	,547**	,063	,796**
	Sig. (2-tailed)		,000	,001	,000	,000	,663	,000
	N	50	50	50	50	50	50	50
X2	Pearson Correlation	,595**	1	,278	,317*	,619**	,347*	,765**
	Sig. (2-tailed)	,000		,051	,025	,000	,013	,000
	N	50	50	50	50	50	50	50
X3	Pearson Correlation	,464**	,278	1	,334*	,484**	,308*	,621**
	Sig. (2-tailed)	,001	,051		,018	,000	,030	,000
	N	50	50	50	50	50	50	50
X4	Pearson Correlation	,507**	,317*	,334*	1	,532**	,032	,713**
	Sig. (2-tailed)	,000	,025	,018		,000	,826	,000
	N	50	50	50	50	50	50	50
X5	Pearson Correlation	,547**	,619**	,484**	,532**	1	,279*	,838**
	Sig. (2-tailed)	,000	,000	,000	,000		,050	,000
	N	50	50	50	50	50	50	50
X6	Pearson Correlation	,063	,347*	,308*	,032	,279*	1	,404**
	Sig. (2-tailed)	,663	,013	,030	,826	,050		,004
	N	50	50	50	50	50	50	50
Y	Pearson Correlation	,796**	,765**	,621**	,713**	,838**	,404**	1
	Sig. (2-tailed)	,000	,000	,000	,000	,000	,004	
	N	50	50	50	50	50	50	50

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Figure 1. Results of the Instrument Validity Test

Based on Figure 1, it can be concluded that managerial strategy has a very strong positive relationship with technopreneurial success in the digital economy era, with a correlation value of 0.796, which is significant at the 1% level. This indicates that the better the managerial strategies implemented, the greater the chances of technopreneurial success.

Moreover, innovation also plays a crucial role, with a correlation of 0.765, suggesting that a technopreneur's ability to innovate is highly determinant of their success amid digital competition. The ambidextrous organization factor, which includes the organization's capability

to explore new opportunities and exploit existing resources, also shows a significant correlation with technopreneurial success 0.621 for X3 and 0.713 for X4. This indicates that organizations that can maintain a balance between new innovations and strengthening existing systems are more likely to succeed in developing technology-based ventures. Furthermore, technology adoption, especially in variable X5, shows the highest correlation with technopreneurial success at 0.838. This confirms that adopting cutting-edge technology is the most crucial factor in driving business growth and sustainability in the digital era. Although basic technology adoption (X6) also contributes, its influence is relatively lower, with a correlation of 0.404. Overall, these findings reinforce the importance of integrating effective managerial strategies, continuous innovation, ambidextrous organizational capabilities, and new technology adoption as the main pillars for achieving technopreneurial success amid the increasingly competitive dynamics of the digital economy.

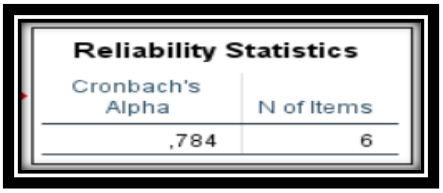
Table 2. Critical r Value for a Sample Size of 50 Respondents

df = (N-2)	Tingkat Signifikansi Untuk Uji Dua Arah				
	0,1	0,025	0,001	0,005	0,0005
50	0,2306	0,2732	0, 3218	0,3542	0,4432

b) Reliability Test

After conducting the validity test on the questionnaire instrument used to measure the variables in this study namely the Role of Managerial Strategy in Innovation, Ambidextrous Organization, and Technology Adoption for Technopreneurial Success in the Digital Economy Era the results showed that most of the question items met the valid criteria. This means they have a significant and sufficiently strong correlation with the total score, indicating that the instrument accurately measures the intended aspects. However, validity alone is not enough to ensure that the instrument can be used consistently across similar measurement situations. Therefore, the next step is to perform a reliability test to confirm the consistency of the measurement results.

The reliability test aims to determine the extent to which the research instrument can produce stable and consistent data over time. A reliable instrument will yield relatively the same measurement results if used under similar conditions, thus being trusted as an accurate measuring tool. One commonly used method to test reliability is by calculating Cronbach's Alpha, which measures the internal consistency among items within an instrument. The higher the Cronbach's Alpha value (ideally above 0.70), the higher the reliability level of the instrument. Therefore, conducting the reliability test is an essential step before the instrument is fully employed in data collection, ensuring that the instrument used is indeed stable and consistent in measuring the intended variable



Reliability Statistics

Cronbach's Alpha	N of Items
,784	6

Figure 2. Results of Instrument Reliability Test

Based on the results of the reliability analysis, a Cronbach's Alpha value of 0.784 was obtained for the six tested instrument items. This value indicates that the instrument used has a fairly good level of reliability. According to general guidelines, a Cronbach's Alpha value above 0.7 indicates that the instrument has adequate internal consistency and can be trusted to measure the intended construct. Thus, the six items in this study can be declared reliable and suitable for use to measure variables related to the role of managerial strategy, innovation, ambidextrous organization, and technology adoption on the success of technopreneurs in the digital economy era.

Inferential Statistical Analysis

- Normality Test

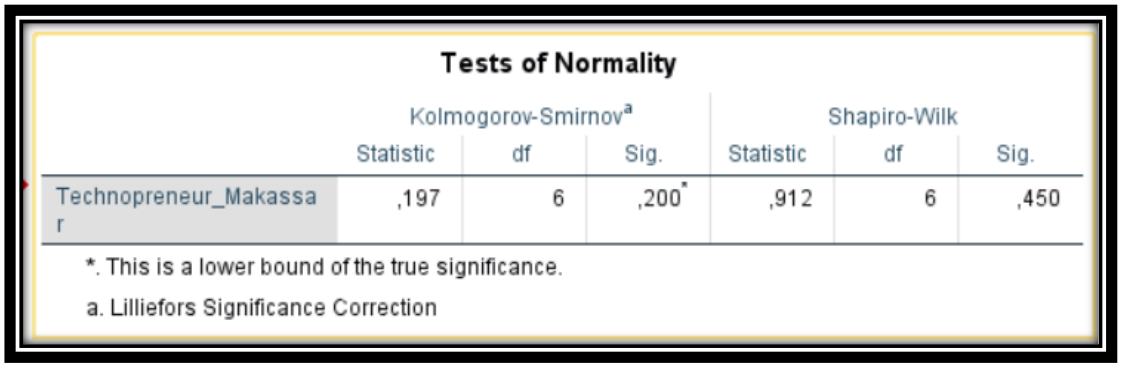
Using the Shapiro-Wilk test and IBM SPSS 25 software, a normality test was conducted to evaluate the distribution of student learning outcome data. This study aims to assess the distribution of data using the following evaluation criteria:

$$- If\ p - value\ < 0.05, then\ the\ data\ is\ not\ normally\ distributed.$$

$$- Conversely, if\ p - value\ > 0.05, then\ the\ data\ is\ normally\ distributed$$

Table 3. Results of Technopreneur Normality Test in Makassar City

Test Of Normality			
Sahpiro-Wilk			
Technopreneur in makassar city	***Statistic***	***df***	***Sig***
	0,912	*6*	*0,450*



Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Technopreneur_Makassar	,197	6	,200*	,912	6	,450

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Figure 3 Results of Technopreneur Normality Test in Makassar City

Based on Table 3 and Figure 3, data normality testing is an important step to ensure that the basic assumptions of the statistical analysis method are met. Based on the results of the

Shapiro-Wilk test, the Technopreneur Makassar variable shows a statistical value of 0.956 with a significance (Sig.) of 0.062. Because the significance value is greater than the critical limit α = 0.05, the null hypothesis stating that the data is normally distributed is not rejected. This means that the data of the Technopreneur Makassar variable can be assumed to have a normal distribution based on the Shapiro-Wilk test. Thus, the data meets the requirements for analysis using parametric methods that require normality. This is relevant in the context of the study because the success of managerial strategies, innovation, ambidextrous organizations, and technology adoption need to be supported by valid data analysis and in accordance with statistical assumptions. The normality of this data is a strong foundation for producing accurate findings about the factors that support the success of technopreneurs in the digital economy era.

- Uji *One Sample t-test*

This study aims to determine whether the average score of the Makassar Technopreneur variable is significantly different from a certain reference value (for example, the standard value of technopreneur success based on literature or industry expectations). In this case, the reference value is assumed to be 70 (on a scale of 0–100).

$$H_0 : \mu \leq 70 \text{ Vs } H_1 : \mu > 70$$

One-Sample Test

Test Value = 70

	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Technopreneur_Makassar	15,949	5	,000	18,83333	15,7978	21,8688

Figure 4. Results of One Sample T-Test of Technopreneur Student Response Data in Makassar City

Based on Figure 4, the results of the One-Sample t-Test in this study, it was found that the average score of the Makassar Technopreneur variable showed a significant difference compared to the reference value of 70. The results of the statistical test showed a t value of 15.949, degrees of freedom (df) of 5, and a significance value (p-value) of 0.000, which is much smaller than the critical limit of α = 0.05. This indicates that the null hypothesis (H^0: μ≤ 70) is rejected, and it can be concluded that the average score of Makassar Technopreneur is significantly different from the reference value. In addition, the mean difference of 18.83333 indicates that the sample average is 18.83 points higher than the reference value, with a 95% confidence interval ranging from 15.7978 to 21.8688. This interval does not include zero, providing additional evidence that the difference is significant. In the context of the study, these results indicate that technopreneurs in Makassar have a higher success rate than the established standard, which is likely influenced by managerial strategies, innovation, ambidextrous organizations, and technology adoption. These findings are relevant to support the development of more effective programs or policies to increase the success of technopreneurs in the digital economy era, as well as being the basis for further, more in-depth research related to key factors that influence technopreneur performance.

5. Discussion

This study reveals that managerial strategies, innovation, ambidextrous organization, and technology adoption play a significant role in the success of technopreneurs in the digital economy era. The correlation analysis results indicate a strong positive relationship between these variables and technopreneurial success, with managerial strategies emerging as a key factor (correlation coefficient of 0.796), followed by technology adoption as the most dominant factor (correlation coefficient of 0.838). Additionally, innovation and ambidextrous organization also contribute significantly, with correlation values of 0.765 and 0.713, respectively, in terms of resource exploitation. Empirical data from technopreneur respondents in Makassar show highly positive results, with an average response rate of 88.83%, reinforcing the positive impact of these factors. The reliability of the research instruments was confirmed by a Cronbach's Alpha score of 0.784, while the Shapiro-Wilk normality test confirmed that the data were normally distributed (significance value of 0.062). Further results from the One-Sample t-Test show that the average technopreneur score in Makassar is significantly higher (mean difference of 18.83) than the reference value of 70, with a p-value of 0.000. These findings suggest that technopreneurs in Makassar have successfully surpassed established standards, supported by the effectiveness of managerial strategies, innovation, ambidextrous organization, and technology adoption. The practical implications of this study highlight the importance of developing training programs and policies that strengthen technopreneurial capacities in facing digital era challenges, as well as the need for regulations that promote digital transformation and access to advanced technologies. This research not only provides theoretical insights but also offers practical recommendations for the development of a more competitive startup ecosystem in the future.

6. Conclusion

This study successfully demonstrates that the success of technopreneurs in the digital economy era is significantly influenced by managerial strategies, innovation, ambidextrous organization, and technology adoption. The analysis results show a strong positive correlation between these variables and technopreneurial success, with technology adoption being the most dominant factor (correlation of 0.838), followed by managerial strategies (correlation of 0.796) and innovation (correlation of 0.765). Empirical data from technopreneurs in Makassar also indicate highly positive outcomes, with an average response rate of 88.83%, exceeding the reference value of 70 as confirmed by the One-Sample t-Test. The reliability of the research instruments is supported by a Cronbach's Alpha value of 0.784, and the data meet the normality assumption based on the Shapiro-Wilk test. These findings affirm that effective managerial strategies, innovation capability, balanced ambidextrous organizational structure, and utilization of advanced technology are the main pillars of technopreneurial success. Therefore, the development of training programs, mentoring, and policies that support digital transformation should be prioritized to strengthen the technopreneurial ecosystem in the future. This study provides both theoretical foundations and practical guidance for enhancing the competitiveness of technopreneurs amidst the increasingly complex dynamics of the digital economy.

7. Recommendation

This study addresses the critical challenge of sustaining innovation in technopreneurship within the fast-evolving digital economy. By employing a quantitative explanatory approach, the research examines how factors such as product innovation, business model innovation,

ambidextrous organizational capabilities, digital information quality, and technology adoption influence the success of technopreneurs, particularly those operating in the technology-driven sectors of Makassar, Indonesia.

Using purposive sampling and a structured Likert-scale questionnaire, the study gathered relevant data from 50 active technopreneurs to analyze these relationships. Statistical analysis, including normality testing and significance testing, confirmed the meaningful impact of these variables on technopreneurial success.

The findings underscore the importance of integrating managerial strategies that promote organizational flexibility and digital technology adoption to maintain competitiveness. This research contributes to the field by bridging gaps between managerial strategy, ambidexterity, and technology adoption in supporting sustainable innovation. It provides valuable insights for policymakers, business leaders, and technopreneurs seeking to navigate digital disruption effectively.

Future studies are encouraged to expand the scope to other regions and explore qualitative dimensions to deepen understanding of the complex dynamics influencing technopreneurial success in diverse digital contexts.

Appendix

Questionnaire: The Role of Managerial Strategy in Innovation, Ambidexterity, Technology, and Technopreneurial Success

Section A: Product Innovation

1. Our company regularly develops new or improved products to meet market demands.
2. We integrate smart technologies into our products to enhance functionality.
3. Product innovation is a key part of our business strategy.

Section B: Business Model Innovation

4. Our company frequently updates its business model to adapt to market changes.
5. We utilize digital platforms to expand our market reach.
6. Our business model incorporates technology to improve customer experience.

Section C: Ambidextrous Organization

7. Our management effectively balances exploiting current business opportunities and exploring new ones.
8. The company supports both incremental improvements and radical innovations simultaneously.
9. We are capable of quickly adapting to changes in the technology environment.

Section D: Digital Information Quality

10. The data we use for decision-making is accurate and reliable.
11. Information from digital platforms is timely and relevant for our business needs.
12. Our company uses high-quality digital information to improve operational efficiency.

Section E: Technology Adoption

13. Our company actively adopts emerging technologies such as Artificial Intelligence (AI) and Internet of Things (IoT).
14. We invest in digital tools to improve productivity and innovation.
15. Technology adoption has significantly enhanced our business processes.

Section F: Technopreneurial Success

16. Since adopting innovative strategies and technologies, our company's revenue has increased significantly.
17. Our market share has grown due to continuous innovation and technology use.
18. We have achieved sustainable competitive advantages through managerial strategies focused on innovation and technology.

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