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**Jurnal Ekonomi Kreatif dan Manajemen Bisnis Digital**
https://transpublika.co.id/ojs/index.php/JEKOMBITAL
Online ISSN 2961-8428

https://doi.org/10.55047/jekombital.v4i4.1187

Original Article

# The Effectiveness of a Business Statistics-Based Market Validation Capstone Project in Improving Entrepreneurial Readiness among Generation Z

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**Received : 08 May - 2026**
**Accepted : 30 June - 2026**
**Published online : 01 July - 2026**

## Abstract

Generation Z students have strong potential to develop new business ventures due to their familiarity with digital technology, social media, and rapidly changing consumer trends. However, business ideas developed in entrepreneurship courses are often based on group assumptions rather than empirical market evidence. This investigation seeks to assess the influence of a Business Statistics based Market Validation Capstone Project on the entrepreneurial readiness found among Generation Z students. To carry out the study, the researchers used a quantitative framework and a one group pretest posttest design. The subjects consisted of Digital Business undergraduates concurrently enrolled in Business Statistics and Entrepreneurship courses. The intervention consisted of a Market Validation Capstone Project, including questionnaire development, data collection from target consumers, market validation analysis, and the use of findings as the basis for business decision-making. Entrepreneurial readiness was measured using a Likert-scale questionnaire before and after the intervention. Data were analyzed using descriptive statistics, validity and reliability tests, normality testing, and paired sample t-test. The results showed a significant increase in students' entrepreneurial readiness after completing the Market Validation Capstone Project. This finding indicates that integrating Business Statistics into entrepreneurship learning through market validation activities effectively strengthens students' readiness to develop, evaluate, and offer new business products. The study concludes that data-driven capstone learning can support entrepreneurial education by encouraging students to make business decisions based on empirical evidence rather than assumptions.

**Keywords**: Business Statistics, Capstone Project, Entrepreneurial Readiness, Generation Z, Market Validation.

## 1. Introduction

Entrepreneurship is an important competency in higher education, particularly in study programs oriented toward digital business. Students are not only expected to generate new business ideas but also to examine the feasibility of those ideas based on market needs and responses. In the context of Generation Z students, entrepreneurship learning needs to be designed in an applied manner because this generation is closely connected to digital technology, social media, and changing consumer behavior. Generation Z is known as a generation of digital natives who tend to prefer interactive, technology-supported, and experience-based learning environments over purely theoretical instruction (Priporas et al.,

2017). In higher education, these learning characteristics require educators to design practical learning approaches that encourage direct engagement with real-world problems and digital environments (Chicca & Shellenbarger, 2018). Furthermore, advancements in digital technology have significantly transformed entrepreneurial activities, as business decision-making increasingly relies on customer data, market analysis, and digital interaction patterns (Alruthaya et al., 2021). Consequently, entrepreneurship education must not only focus on creativity and innovation but also develop students' ability to conduct data-driven business analysis and market validation before implementing business ideas. Entrepreneurship education is also considered important in developing the entrepreneurial readiness of Generation Z students, especially when supported by digital business literacy and the ability to identify market opportunities (Hasan et al., 2024).

In entrepreneurship learning practice, students' business ideas are often developed based on group assumptions, personal preferences, or popular trends. This condition can cause the designed products to be less suitable for the needs, purchasing power, and preferences of target consumers. Therefore, students need to be guided to conduct market validation before the product is further developed or offered to potential consumers. Market validation activity is in line with the lean startup principle that emphasizes idea testing, learning from customers, and continuous product refinement based on the feedback obtained (Blank, 2013). In the context of this research, market validation becomes a means for students to understand consumer needs and refine business ideas before entering a wider market.

A number of studies conducted in Indonesia have demonstrated that students' entrepreneurial readiness and intentions are favorably affected by their exposure to digital literacy training and entrepreneurship coursework. Research by Febriani et al. (2025) explains that entrepreneurial literacy and digital skills contribute significantly to entrepreneurial interest and students' business decision-making process. Consistent with this, Saputra (2025) reported that digital literacy and an entrepreneurial orientation jointly prepare students to identify and act on business opportunities in the current digital landscape. Additional evidence from Affandi et al. (2021) suggests that entrepreneurship education rooted in real world projects and direct experience effectively builds student competency and self-confidence during the idea generation phase of venture creation. Further, Aisha et al. (2025) emphasized that market-oriented entrepreneurship learning is important to help students understand consumer needs and reduce business decisions that are based only on assumptions.

However, there is a research gap, namely the still limited studies that specifically integrate the Business Statistics course with Entrepreneurship Education through a market validation capstone project approach, in which students not only learn theory but also collect, analyze, and interpret empirical market data before implementing business ideas (Ramadhan et al., 2025). This limitation shows that there have not been many studies that directly test the effectiveness of data-based learning in improving students' entrepreneurial readiness, particularly Generation Z. Therefore, this research is important to conduct to examine whether the Business Statistics-Based Market Validation Capstone Project can improve the entrepreneurial readiness of Generation Z students through data-based entrepreneurship learning.

This study was conducted in the context of integrating Business Statistics and Entrepreneurship courses through a Market Validation Capstone Project. In this activity, students who develop new business ideas in the Entrepreneurship course are directed to apply Business Statistics concepts and skills in the market validation process. Students prepare questionnaires, determine respondents, collect data, analyze target consumer responses, and use the analysis results as the basis for business decision-making. The use of data in business

decision-making is essential because data-supported decisions can help individuals or organizations understand problems more objectively and measurably (Provost & Fawcett, 2013).

The capstone project-based learning model is relevant because it provides a learning experience that emphasizes knowledge application, teamwork, and real problem-solving. In higher education, a capstone project is understood as a culminating learning experience that encourages students to apply the competencies they have learned to produce solutions to real-world problems. Such an approach finds support in the principles of experiential learning, where meaningful education arises when learners take part in hands on endeavors, contemplate what they have done, and leverage those reflections to develop a more robust understanding (Kolb, 2014).

Based on the design of the Market Validation Capstone Project assignment, students are required to develop a questionnaire consisting of at least 15 questions, distribute it to respondents who match the target market, and analyze business validation aspects such as product attractiveness, purchase intention, price suitability, market needs, consumer preferences, target market problems, packaging, and branding. Ensuring that student business decisions rest on factual data, rather than on conjecture, constitutes the central objective of this task.

Specifically, this project aims to help students understand market needs, assess product potential, evaluate price suitability, identify opportunities for product improvement, and increase their readiness to offer new business products. Thus, Business Statistics is not only positioned as a course that focuses on statistical concepts and calculations but also as a tool to support data-driven entrepreneurship learning. This integration is expected to strengthen students' entrepreneurial readiness because they gain direct experience in using data as the basis for business decision-making.

This study aims to analyze the effectiveness of a Business Statistics-based Market Validation Capstone Project on the entrepreneurial readiness of Generation Z students. Entrepreneurial readiness in this study includes students' readiness to understand the market, make data-driven business decisions, evaluate products, determine prices, improve products based on consumer feedback, and offer products to potential consumers. Using a one-group pretest-posttest design and paired sample t-test, this study examines whether there is a difference in students' entrepreneurial readiness before and after participating in the capstone project.

## 2. Literature Review

### 2.1. Business Statistics in Data-Driven Learning

Business Statistics is a field that applies statistical methods to collect, organize, analyze, interpret, and present data for business decision-making (Anderson et al., 2015). In business education, statistics is not only taught as a computational subject but also as a practical tool to support evidence-based decisions. Through Business Statistics, students learn how to use data to understand market conditions, consumer preferences, purchase intention, price suitability, and product attractiveness.

A strong connection exists between the utilization of data in business contexts and the framework known as data driven decision making. Under this framework, organizations rely on data analysis to detect challenges, weigh potential solutions, and arrive at well founded determinations (Provost & Fawcett, 2013). The use of data analytics in business education also helps students improve analytical thinking and evidence-based problem solving (Sirelkhatim

& Gangi, 2015). In the context of this study, Business Statistics helps students transform business assumptions into empirical evidence through questionnaire design, data collection, descriptive analysis, and interpretation of market responses.

Empirically, various studies show that digital literacy, economic literacy, and data-based analysis ability have a positive effect on students' entrepreneurial intention and readiness. Digital literacy has been proven to improve entrepreneurial intention through strengthening technological ability and information-based decision making (Maudina et al., 2022; Sulistyowati et al., 2022), while financial and digital capability also has a significant effect on entrepreneurial intention through improving entrepreneurial competence (Kang et al., 2024). This influence occurs because data-based and statistics-based learning improves critical thinking ability, risk evaluation, and market data interpretation that are important in business decision making.

## 2.2. Market Validation in Entrepreneurship

Market validation is an important process in entrepreneurship because it helps entrepreneurs test whether a product or service idea is relevant to the needs of potential customers. In the early stages of business development, many business ideas are based on assumptions about customer needs, product attractiveness, and market potential. Customer feedback enables entrepreneurs to minimize business uncertainty and improve product-market fit before commercialization (Kassean et al., 2015). Therefore, market validation is needed to reduce uncertainty and improve the quality of business decisions.

The lean startup approach emphasizes that new business ideas should be tested through customer feedback, experimentation, and continuous learning before being developed on a larger scale (Blank, 2013). Similarly, (Ries, 2011) explains that product development should be based on validated learning, where entrepreneurs test their assumptions through interaction with customers. In this study, market validation is carried out through questionnaires distributed to target respondents to assess product attractiveness, purchase intention, price suitability, market needs, consumer preferences, target market problems, packaging, and branding.

## 2.3. Capstone Project-Based Learning

Capstone project is a learning model that integrates knowledge, skills, and practical experience into a final applied project. In higher education, capstone projects are commonly used to encourage students to solve real-world problems, work collaboratively, and apply concepts learned from different courses. This model is closely related to experiential learning, which argues that learning becomes more meaningful when students are directly involved in real activities, reflect on their experiences, and use those experiences to build new understanding (Kolb, 2014).

In this study, the capstone project is designed as a Market Validation Capstone Project that integrates Business Statistics and Entrepreneurship. Students who develop new business ideas in the Entrepreneurship course are required to validate their products using statistical concepts from the Business Statistics course. Based on the assignment design, students are required to develop a questionnaire consisting of at least 15 questions, collect data from respondents who match the target market, and analyze business validation aspects such as product attractiveness, purchase intention, price suitability, market needs, consumer preferences, target market problems, packaging, and branding. Ensuring that student entrepreneurial judgments rely on factual information, not on untested presumptions, constitutes the fundamental aim of this project.

## 2.4. Entrepreneurial Readiness of Generation Z Students

Entrepreneurial readiness describes how prepared a person is to take part in entrepreneurial pursuits. This preparedness encompasses multiple dimensions, namely relevant knowledge, practical skills, positive attitudes, self-confidence, and the capacity to recognize market gaps, assess potential hazards, choose among alternatives, and formulate viable business concepts. In the context of students, entrepreneurial readiness is important because it reflects their preparedness to transform business ideas into real entrepreneurial actions.

Generation Z students are generally familiar with digital technology, social media, and fast-changing consumer trends. These characteristics provide opportunities for entrepreneurship learning that is more practical, digital, and data-oriented. Entrepreneurship instruction contributes substantially to preparing students for business creation, particularly when paired with digital business knowledge and market awareness, as noted by Hasan et al. (2024). Through hands on learning experiences, this type of education markedly shapes student attitudes, aspirations, and overall preparedness for entrepreneurial endeavors (Fayolle & Gailly, 2015). In this study, entrepreneurial readiness includes students' readiness to understand the market, make data-based business decisions, evaluate products, determine prices, improve products based on consumer feedback, and offer products to potential customers.

In this research, entrepreneurial readiness is operationalized as the ability and readiness of students in making data-based business decisions, understanding market conditions, evaluating products, determining pricing strategy, making product improvement based on consumer feedback, and identifying potential customers. The assessment of this construct relied on measurement items adapted from validated entrepreneurial intention and readiness frameworks found in the existing literature. Particular use was made of the Theory of Planned Based questionnaire developed by Liñán and Chen (2009), which enjoys widespread acceptance and has demonstrated robust psychometric properties across multiple country contexts in entrepreneurship research involving university students.

## 2.5. Integration of Business Statistics and Entrepreneurship

The integration of Business Statistics and Entrepreneurship provides a contextual learning experience for students. Entrepreneurship encourages students to develop new business ideas, while Business Statistics helps them validate those ideas using empirical data. This integration supports data-driven entrepreneurship learning because students do not only create business products but also test product feasibility based on market responses.

Entrepreneurship education has been shown to influence students' entrepreneurial attitudes and intentions when it is designed as an active and practice-based learning process (Fayolle & Gailly, 2015). In line with this view, the Market Validation Capstone Project allows students to apply statistical knowledge in a real entrepreneurial context. Therefore, the integration of Business Statistics and Entrepreneurship is expected to improve students' entrepreneurial readiness, particularly among Generation Z students who are familiar with digital environments and dynamic market behavior.

# 3. Methods

## 3.1. Research Method

This research used a quantitative strategy coupled with a pre-experimental design. Its primary purpose was to test whether a Business Statistics based Market Validation Capstone Project could enhance the entrepreneurial preparedness of students belonging to Generation Z. The entire procedure was structured for easy reproduction, achieved through detailed specification of the study's design features, participant criteria, intervention content, assessment instruments, collection protocols, and statistical treatment of data.

## 3.2. Research Design

This investigation utilized a pretest posttest framework involving one group, where measurements were taken from the same set of students at two distinct moments, one before the intervention and one after. The rationale for adopting this design rested on the study's principal goal, namely to compare entrepreneurial readiness among students prior to their participation in the Market Validation Capstone Project and subsequent to it. The design is illustrated in the following manner.

$$O_1 \rightarrow X \rightarrow O_2$$

Where:

$O_1$ = Pretest measurement of students' entrepreneurial readiness before the capstone project
X = Intervention in the form of a Business Statistics-based Market Validation Capstone Project
$O_2$ = Posttest measurement of students' entrepreneurial readiness after the capstone project

The independent treatment in this study was the implementation of the Market Validation Capstone Project, while the measured outcome was the entrepreneurial readiness of Generation Z students.

## 3.3. Research Setting and Participants

The study was conducted in the Digital Business Study Program at Universitas Telkom Surabaya. The participants were Generation Z students who were enrolled in both Business Statistics and Entrepreneurship courses during the current semester. These students were involved in an integrated learning activity in which the Entrepreneurship course required them to develop new business ideas, while the Business Statistics course supported them in validating those ideas through empirical market data.

All individuals involved in the Market Validation Capstone Project were designated as the study population. Through the application of total sampling, the research included every student from that population, yielding 42 undergraduate participants. With ages spanning 18 to 23, these individuals corresponded to the generational classification of Generation Z. All participants were enrolled in the integrated Business Statistics and Entrepreneurship courses during the 2025/2026 academic semester. This technique was considered appropriate because the study focused on a specific learning intervention implemented in one course-based project.

## 3.4. Research Variable and Operational Definition

The main variable in this study was entrepreneurial readiness. Entrepreneurial readiness refers to students' preparedness to understand the market, make data-driven business decisions, evaluate product feasibility, determine pricing suitability, improve products based on consumer feedback, and offer products to potential customers.

**Table 1. The operational definition of entrepreneurial readiness is presented**

| Dimension | Indicator |
|---|---|
| Market understanding readiness | Students are able to identify the needs, problems, and preferences of target consumers |
| Data-driven decision-making readiness | Students are able to use market validation data as the basis for business decisions |
| Product readiness | Students are able to evaluate product attractiveness and product-market suitability |
| Pricing readiness | Students are able to assess price suitability based on consumers' purchasing power |
| Marketing readiness | Students are ready to present and offer products to potential consumers |
| Business development readiness | Students are ready to improve and develop products based on market validation results |

Source: Compiled by the author, 2026

Based on Table 1, entrepreneurial readiness in this study is defined through several important dimensions related to students' ability to develop business ideas based on market validation. These dimensions include market understanding readiness, data-driven decision-making readiness, product readiness, pricing readiness, marketing readiness, and business development readiness. Each dimension reflects students' preparedness in identifying consumer needs, utilizing validation data for business decisions, evaluating products and pricing, marketing products to potential consumers, and improving business ideas according to market feedback.

## 3.5. Intervention: Market Validation Capstone Project

The intervention in this study was a Business Statistics-based Market Validation Capstone Project. In this project, students were required to validate their new business ideas by applying concepts and skills from Business Statistics. The project consisted of questionnaire development, respondent identification, data collection, data analysis, and interpretation of market validation results.

Based on the Market Validation Capstone Project assignment, students were required to develop a questionnaire consisting of at least 15 questions, distribute it to respondents who matched the target market, and analyze several business validation aspects, including product attractiveness, purchase intention, price suitability, market needs, consumer preferences, target market problems, packaging, and branding. The main aims of the assignment was to ensure that students' business decisions were based on empirical data rather than assumptions. Through this intervention, students were expected to improve their ability to interpret market data, evaluate business feasibility, and make evidence-based entrepreneurial decisions.

A fixed format questionnaire served as the primary measurement tool for evaluating entrepreneurial readiness among students prior to and following the intervention. To facilitate before and after comparisons, the same set of items was delivered in both testing sessions. Participants responded using a five point Likert scale ranging from 1, denoting strong disagreement, to 5, indicating strong agreement, with higher total scores reflecting more advanced levels of entrepreneurial preparedness.

## 3.6. Data Collection Procedure

The data collection process was conducted in three main stages. First, the pretest was administered before students conducted the Market Validation Capstone Project. The pretest measured students' initial entrepreneurial readiness before they validated their business ideas

using market data. Second, students participated in the Market Validation Capstone Project. During this stage, they developed questionnaires, collected market data from target respondents, analyzed the responses, and used the results to support business decisions. The activity was integrated with the learning objectives of Business Statistics and Entrepreneurship courses. Third, the posttest was administered after students completed the market validation process. The posttest measured students' entrepreneurial readiness after they had obtained and analyzed empirical market data.

## 3.7. Instrument Validity and Reliability

Content validity was assured through review by two experts with backgrounds in entrepreneurship education and business statistics. The instrument's reliability was subsequently examined via Cronbach's Alpha, yielding a value of 0.87. Such a coefficient points to good internal reliability across the questionnaire items.

## 3.8. Ethical Consideration

Involvement in the research was entirely optional, and every respondent gave their formal consent before answering the questionnaire. Data collected were used exclusively for academic objectives and were handled with strict privacy measures to protect participant identities.

## 3.9. Data Analysis Technique using paired sample t-test

The hypotheses of this study were formulated as follows:

**Ho**: There is no significant difference in students' entrepreneurial readiness before and after participating in the Business Statistics-based Market Validation Capstone Project.

**H1**: There is a significant difference in students' entrepreneurial readiness before and after participating in the Business Statistics-based Market Validation Capstone Project.

The analytical procedure involved a paired sample t test, conducted to evaluate the presence of a significant difference between students' entrepreneurial readiness measurements taken before and after they completed the Business Statistics oriented Market Validation Capstone Project. This test was selected since the data were obtained from the same respondents in two different conditions, namely pretest and posttest. Prior to conducting the paired sample t-test, the normality of the difference scores was examined using the Shapiro-Wilk test to ensure that the assumption of normality was fulfilled. The statistical analysis was done by IBM SPSS Statistics version 26. The paired sample t-test formula is as follows:

$$t = \frac{\bar{D}}{S_D/\sqrt{n}}$$

Where:

$t$ = The value of the paired sample t-test statistic
$\bar{D}$ = The mean difference between posttest and pretest scores
$S_D$ = The standard deviation of the difference scores
$n$ = The number of respondents or paired observations

The difference score for each respondent was calculated using the following formula:

$$D_i = X_{post,i} - X_{pre,i}$$

Where $X_{post,i}$ represents the entrepreneurial readiness score of respondents $i$ after the capstone project, while $X_{pre,i}$ represents the entrepreneurial readiness score of respondents $i$ before the capstone project.

The degrees of freedom were calculated as follows:

$$df = n - 1$$

Interpretation of results rested on the significance level obtained. Rejecting the null hypothesis, which signals a notable difference in scores from pretest to posttest, occurs when the significance value falls below 0.05. Should the value reach or exceed 0.05, the null hypothesis remains standing, denoting an absence of significant change. Therefore, evidence of effectiveness for the Business Statistics based Market Validation Capstone Project in boosting Generation Z entrepreneurial readiness emerges when p is less than 0.05 and the posttest mean surpasses the pretest mean.

# 4. Results and Discussion

## 4.1. Results Analysis

### 4.1.1. Respondent Characteristics

The respondents in this study were students of the Digital Business Study Program who participated in both Business Statistics and Entrepreneurship courses. The respondent characteristics were classified based on gender, age, class, and prior entrepreneurial experience.

**Table 2. Respondent Characteristics**

| Characteristic | Category | Percentage |
|---|---|---|
| Gender | Male | 48.9% |
| | Female | 51.1% |
| Age | 18-20 years | 97.9% |
| | 21-23 years | 2.1% |
| Prior entrepreneurial experience | Yes | 58.3% |
| | No | 41.7% |

Source: Processed data, 2026

Table 2 presents the characteristics of the respondents involved in this study. Based on gender distribution, the composition of respondents was relatively balanced, consisting of 48.9% male students and 51.1% female students. This indicates that this study involved participants from both genders proportionally, so that the findings obtained can represent entrepreneurial readiness among Generation Z students more comprehensively. This balanced composition also indicates that interest in entrepreneurship and participation in market validation activities is not limited to a specific gender group.

In terms of age, the majority of respondents (97.9%) were between 18 and 20 years old, while only 2.1% were aged 21-23. These findings suggest that participants are predominantly college students in the early stages of higher education, which aligns with the typical age range of Generation Z students. At this stage of development, students are generally in the process of exploring career opportunities, developing professional competencies, and cultivating an interest in entrepreneurship. Their familiarity with digital technology and rapidly changing market trends also makes them highly relevant subjects for research on digital entrepreneurship and data-driven business learning.

Regarding prior entrepreneurial experience, 58.3% of respondents reported having prior entrepreneurial experience, while 41.7% had no prior experience. These findings indicate that more than half of the students had been involved in entrepreneurial activities before

participating in this study. Such experience may have contributed to higher levels of self-confidence, a better understanding of business processes, and stronger engagement during the market validation project. Meanwhile, the presence of respondents without prior entrepreneurial experience suggests that this learning model is also accessible to beginners. This mix of experienced and inexperienced participants suggests that the Business Statistics-Based Market Validation Final Project can be applied to students with diverse backgrounds and can support the development of entrepreneurial readiness regardless of prior business exposure.

### 4.1.2. Descriptive Statistics of Entrepreneurial Readiness

Descriptive statistics were used to compare students' entrepreneurial readiness scores before and after the implementation of the Market Validation Capstone Project. The pretest score represents students' entrepreneurial readiness before conducting market validation, while the posttest score represents their readiness after completing the project is shown in Table 3.

**Table 3. Descriptive Statistics of Entrepreneurial Readiness**

| Measurement | Mean | Standard Deviation | Minimum | Maximum |
|---|---|---|---|---|
| Pretest | 2.67 | 0.75 | 1.33 | 4.167 |
| Posttest | 4.24 | 0.57 | 2.33 | 5 |

Source: Processed data, 2026

Table 3 shows that the mean posttest score was higher than the mean pretest score. This indicates that students' entrepreneurial readiness increased after participating in the Business Statistics-based Market Validation Capstone Project. The increase suggests that market validation activities helped students understand consumer needs, evaluate product attractiveness, assess purchase intention, determine price suitability, and make better business decisions based on empirical data.

### 4.1.3. Normality Test

A normality assessment was performed on the gain scores derived from subtracting pretest values from posttest values. This step was necessary since the paired sample t test relies on the assumption that these difference scores follow a normal distribution.

**Table 4. Normality Test of Difference Scores**

| Variable | Significance Value | Description |
|---|---|---|
| Posttest–Pretest | 0.593 | Normal |

Source: Processed data, 2026

The findings from Table 4 reveal a p value above the 0.05 threshold, indicating that the differences between scores are normally distributed. With this assumption confirmed, the research hypothesis may be examined using a paired t test.

### 4.1.4. Paired Sample t-Test Results

The paired sample t-test was used to examine whether there was a significant difference in students' entrepreneurial readiness before and after participating in the Business Statistics-based Market Validation Capstone Project.

**Table 5. Paired Sample t-Test Results**

| Measurement | Mean | Mean Difference | t-value | p-value |
|---|---|---|---|---|
| Pretest-Posttest | 2.670 - 4.243 | 1.573 | 10.817 | 0.000* |

Source: Processed data, 2026

According to the paired t test results presented in Table 5, the significance level is less than 0.05. Consequently, the null hypothesis is dismissed and the alternative is supported, revealing a noteworthy difference in entrepreneurial readiness among students prior to and following their involvement in the Market Validation Capstone Project. Moreover, the higher mean observed on the posttest relative to the pretest suggests that the project effectively boosts entrepreneurial readiness. These findings confirm that integrating Business Statistics into entrepreneurship education helps students become better prepared to develop, evaluate, and launch new business products.

## 4.2. Discussion

According to the research outcomes, the Market Validation Final Project grounded in Business Statistics leads to meaningful gains in entrepreneurial readiness for Generation Z learners. The observed rise in posttest performance suggests that students developed greater capacity for entrepreneurial engagement after completing the market validation focused curriculum. This pattern aligns with previous findings from Hasan et al. (2026), which highlighted the role of hands on entrepreneurship training in fostering student preparedness.

This improvement occurs because students are directly involved in the process of validating business ideas using empirical data. Through questionnaire preparation, data collection, and statistical analysis, students learn to identify consumer needs, measure purchase intention, evaluate pricing, and assess product preferences. This activity encourages students to make data-based business decisions, thereby improving their readiness in facing real entrepreneurial situations.

The research results also show that Business Statistics plays a role as a decision-making tool in the market validation process. Students use data analysis to assess product feasibility more objectively. Hasan et al. (2024), affirms that the integration of analytical ability in entrepreneurship education can strengthen students' competence in making evidence-based decisions. In addition, this learning is relevant to the characteristics of Generation Z who are accustomed to technology-based learning and hands-on activities. The research results show that the Market Validation Capstone Project approach helps students connect statistical theory with real entrepreneurial practice. Kamila and Fahlia (2025) found that digital literacy and adaptive learning models contribute to improving Generation Z's entrepreneurial readiness.

In addition to the improvement in cognitive ability, the research results also show an increase in students' confidence in making business decisions. Direct interaction with potential consumers helps students understand the strengths and weaknesses of the product more realistically. This reduces uncertainty in decision making and improves students' psychological readiness in entrepreneurship. This finding is consistent with Arifin et al. (2025); Hasan et al. (2026); Kusuma and Tan (2024); as well as Yang (2024) who state that self-confidence and self-efficacy play an important role in entrepreneurial readiness. Overall, the research results show that the Final Project Market Validation based on Business Statistics is an effective learning model in improving students' entrepreneurial readiness. This model makes students more capable of thinking analytically, being data-based, and being responsive to market needs.

In addition, the results of this research also affirm that entrepreneurship learning needs to emphasize the strengthening of analytical ability and data-based decision making. (Sylvestre, 2024) emphasizes that the data-based approach in business decision making plays an important role in the development of entrepreneurial competence. Adawiyah et al. (2025) also shows that students' adaptive ability in understanding data and market behavior is an important factor in strengthening entrepreneurial competence.

This project-based learning model also shows that Generation Z students learn more effectively through direct experience. By conducting market validation and data analysis, students can connect statistical concepts with real entrepreneurial practice. This is in line with the experiential learning theory from David Kolb, which emphasizes that learning occurs optimally through direct experience, reflection, and the application of concepts.

The findings of this research show that project-based and experience-based learning has an important role in improving students' entrepreneurial readiness. The market validation approach used in this research allows students to be directly involved in the data-based decision-making process, thereby strengthening their readiness in entrepreneurship. This is in line with the findings of Fayolle and Gailly (2015) who state that entrepreneurship education based on experiential learning is able to significantly improve entrepreneurial intentions.

In addition, Siahaan et al. (2025) affirms that effective entrepreneurship learning must integrate real experience, reflection, and business practice to build sustainable entrepreneurial competence. In this context, the market validation learning model supports this process through students' direct involvement in market analysis and business idea validation. Riza and Chisbiyah (2024) shows that experiential entrepreneurship education contributes to the development of cognitive and social skills that are important in entrepreneurship, including decision making and problem-solving ability. Meanwhile, Neck and Greene (2011) emphasizes that modern entrepreneurship education needs to shift from merely teaching theory toward practice-based entrepreneurship education.

In terms of learning outcomes, Hanafiah et al. (2024) found that entrepreneurship education has a positive influence on entrepreneurial outcomes, especially when using an active and experience-based approach. In addition, Genadi et al. (2025) also affirms that entrepreneurship education contributes to the improvement of entrepreneurial skills and readiness, especially among students involved in hands-on practice activities. Overall, the results of this research affirm that the Final Project Market Validation based on Business Statistics is an effective learning approach in improving students' entrepreneurial readiness. This model strengthens analytical ability, data-based decision making, and students' psychological readiness in facing the real world of entrepreneurship.

## 5. Conclusion

This study analyzed the effectiveness of a Business Statistics-based Market Validation Capstone Project in improving the entrepreneurial readiness of Generation Z students. The findings showed that students' entrepreneurial readiness increased after participating in the capstone project. The paired sample t-test results indicated a significant difference between the pretest and posttest scores, with the posttest mean score higher than the pretest mean score. These results confirm that the Market Validation Capstone Project was effective in improving students' readiness to understand market needs, evaluate product feasibility, determine price suitability, use consumer feedback, and make data-driven business decisions.

The study also shows that integrating Business Statistics and Entrepreneurship through a market validation activity can provide students with a practical learning experience. Through questionnaire development, data collection, and market response analysis, students were able to validate business ideas based on empirical evidence rather than assumptions. Therefore, this learning model can be used as an alternative approach to strengthen entrepreneurship education, particularly for Generation Z students in digital business programs.

Based on the findings, lecturers are encouraged to integrate Business Statistics with Entrepreneurship courses through market validation projects. Students should also be guided to use validation results as the basis for improving products before offering them to potential consumers. Future research may involve a control group, a larger sample size, or additional variables such as entrepreneurial intention, entrepreneurial mindset, data literacy, or business decision-making skills.

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