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Analysis of Entrepreneurial Interest of Mathematics Education Students: A Study at Higher Education

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ABSTRACT

Mapping the entrepreneurial intention of pre-service exact science teachers is crucial for understanding graduate readiness in competitive job markets, particularly within the unique socio-economic context of border regions. This study analyzes the level of entrepreneurial intention among Mathematics Education students at Universitas Borneo Tarakan (UBT) and identifies its key drivers and barriers. Employing a quantitative descriptive-exploratory design, primary data were gathered from 53 active students via a validated questionnaire. The empirical results demonstrate a high level of entrepreneurial intention (Grand Mean = 3.72 on a 1–5 scale). The absolute majority (70%) fell into the high-interest category, with 15% already managing active businesses. The primary internal drivers had a very high positive attitude (4.10) and robust self-efficacy (3.85), which translated into a strong preference for "edupreneurship" ventures like independent tutoring centers and digital learning content development. Conversely, a critical psychological bottleneck was identified in risk management; the courage to take risks scored the lowest (3.25, medium category) due to capital anxiety and a highly calculative mathematical mindset. However, environmental influences (subjective norms) served as a strong counterweight (3.68). To bridge the intention-action gap, university policymakers must reform the curriculum by integrating practical business simulations and financial risk mitigation to foster regional economic resilience.

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1. INTRODUCTION

The contemporary global labor market presents increasingly complex challenges for higher education graduates, particularly within the field of teacher education (Okolie et al., 2019). The widening disparity between the burgeoning number of education graduates and the limited availability of formal teaching positions has created a critical employment bottleneck (Sidauruk et al., 2025). This phenomenon is further exacerbated by structural shifts in the public sector, where regular teacher recruitment can no longer match the high graduation rates from various teacher training institutions (Suryani,

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2021). Consequently, cultivating economic independence among university students has transitioned from an optional career pathway to a strategic necessity (Isbah et al., 2023). Entrepreneurial intention serves as a pivotal solution to mitigate this systemic imbalance, offering a viable mechanism to reduce intellectual unemployment among young professionals (Sarhan & Ab. Aziz, 2023; Xanthopoulou & Sahinidis, 2024). Higher education institutions are increasingly pressured to shift their pedagogical paradigm, moving beyond the traditional mandate of preparing students as passive job seekers toward fostering their capabilities as proactive job creators (Audretsch et al., 2016; Handayati et al., 2020). However, within exact science programs such as mathematics education, career orientations frequently remain rigidly confined to formal, conventional teaching tracks, leaving graduates ill-prepared for broader socioeconomic fluctuations.

In the context of mathematics education, undergraduate students' entrepreneurial inclinations are often marginalized or dismissed as misaligned with their core disciplinary competencies (Sun & Yang, 2025). Many pre-service teachers still perceive business activities as a distraction from their primary identity as educators (Arslan & Haser, 2025). This viewpoint overlooks the fact that the intrinsic characteristics of mathematical training—characterized by logical reasoning, systematic problem-solving (Krawitz et al., 2025), and rigorous analytical modelling—constitute fundamental assets for calculated strategic business decision-making. Furthermore, mathematical modeling skills allow individuals to assess financial risks and calculate market forecasting with higher precision (Wang, 2024). Integrating entrepreneurship into non-business STEM fields, or what is broadly recognized as "edupreneurship," enables students to synthesize pedagogical content knowledge with commercial viability, such as developing digital learning media or educational technology startups (Bandera, 2022; Stenard, 2023). This integration transforms traditional teaching tools into sustainable educational products that cater to modern market demands (Hynes et al, 2023; Ijeoma & Oluwarotimi, 2022). Despite these theoretical intersections, empirical investigations focus specifically on how prospective mathematics teachers perceive, evaluate, and act upon entrepreneurial opportunities amidst diminishing linear job markets remain remarkably scarce in international literature.

This research gap is even more pronounced when considering specific geopolitical and socio-economic contexts. At Universitas Borneo Tarakan (UBT), situated in North Kalimantan, the institutional mandate is inextricably linked to its unique position within Indonesia’s frontier, outermost, and remote border regions. Border economies possess distinct dynamics, characterized by cross-border trade fluctuations, specific localized resource dependencies, and infrastructure challenges that diverge significantly from urban metropolitan hubs (Ahmed, 2024; Taubenböck et al., 2023). Economic activities in these frontier zones are heavily shaped by bilateral trade policies and accessibility issues, forcing local communities to be more self-reliant (Lili et al., 2024). Mapping the entrepreneurial intentions of university students in such a setting becomes highly critical. In border areas, higher education acts as a central anchor for regional economic development, making student career choices impactful for the surrounding community

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(Cruz García et al., 2026). While the geographical region is currently undergoing rapid infrastructural and digital transformations, empirical data regarding how these macroeconomic changes influence the career mindsets and risk perceptions of pre-service exact science teachers remains vastly under-researched.

To address these empirical omissions, this study introduces a multi-dimensional novelty that departs from conventional entrepreneurship research. While mainstream literature predominantly evaluates entrepreneurial drive within business or economics faculties (Crysdian, 2022; Goldstein, 2010), which often utilizes generalized frameworks that do not account for specific scientific backgrounds, this study dissects entrepreneurship through the specific lens of mathematics education. It explores how computational thinking, statistical literacy, and mathematical logic inherently shape the cognitive processes of pre-service teachers when scanning and exploiting market opportunities. By understanding these specialized cognitive pathways, institutions can tailor entrepreneurship programs that complement rather than contradict logical-mathematical intelligences. By examining this specific scientific intersection, the study illuminates how advanced analytical training can be repurposed to generate high-value, knowledge-based enterprises rather than traditional retail-oriented businesses.

Furthermore, this study establishes a distinctive geographical locus by utilizing Universitas Borneo Tarakan as its empirical backdrop. The socio-economic realities of a border region provide a starkly different baseline for entrepreneurial motivation compared to heavily saturated, highly developed urban centers such as those on Java Island. Students in less-developed regions often face unique challenges in terms of credit access and formal business networks, which shapes their entrepreneurial self-efficacy differently (Sulistyani & Suhariadi, 2022). In frontier areas, entrepreneurship is frequently driven by a combination of necessity due to limited formal corporate infrastructure, and opportunity resulting from untapped cross-border market niches (Kurowska-Pysz, 2016). This dual nature of necessity and opportunity creates a resilient yet volatile business mindset among local youths. Investigating how prospective mathematics educators navigate these localized constraints offers a fresh, context-specific contribution to the broader discourse on regional economic resilience and the decentralization of entrepreneurial education.

Additionally, this investigation integrates the modern catalyst of digital transformation. Rather than assessing entrepreneurial intent through static, conventional frameworks, this paper evaluates the degree to which digital technology adaptation and data literacy act as crucial accelerators for contemporary ventures. The fast adoption of digital platforms allows geographical constraints in remote areas to be bypassed, connecting border entrepreneurs with national markets (Fernhaber & Schwens, 2026). Given that mathematics students possess an innate affinity for algorithmic thinking and structured data management, they are uniquely positioned to leverage the digital ecosystem of the industry 4.0 era. Their familiarity with structured code and analytical software lowers the barrier to entry for developing tech-based solutions. This study scrutinizes how this technological readiness serves as a cognitive bridge, turning abstract mathematical knowledge into digital entrepreneurship intention, which is

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highly essential for boosting local economic competitiveness. Compelled by these interconnected dynamics, a rigorous empirical investigation is warranted to unpack the variables driving or inhibiting this career pivot. Understanding the exact predictors of entrepreneurial drive among non-business, exact-science students can provide actionable insights for curriculum designers and regional policymakers alike. Ultimately, reforming curriculum structures to bridge professional teaching skills and digital commerce is vital for contemporary academic sustainability. Therefore, this study aims to systematically analyze the level of entrepreneurial interest among mathematics education students within the Faculty of Teacher Training and Education at Universitas Borneo Tarakan and to identify the dominant structural, psychological, and contextual factors that influence this interest.

2. METHOD

This study adopted a quantitative research approach utilizing an exploratory descriptive design to systematically measure and map the entrepreneurial intentions among undergraduate students. The empirical investigation was explicitly conducted at the Mathematics Education Study Program, Faculty of Teacher Training and Education, Universitas Borneo Tarakan, North Kalimantan, Indonesia. The target population encompassed all active students enrolled in the program. To ensure an equitable and proportional representation across different academic cohorts, a stratified random sampling technique was deployed. This stratification was critical to account for variations in student career maturity and their unequal exposure to higher education entrepreneurship curricula across different year levels. By utilizing the Slovin formula with a strictly defined 5% margin of error to guarantee statistical power, a final representative sample of 53 students was successfully selected for empirical observation.

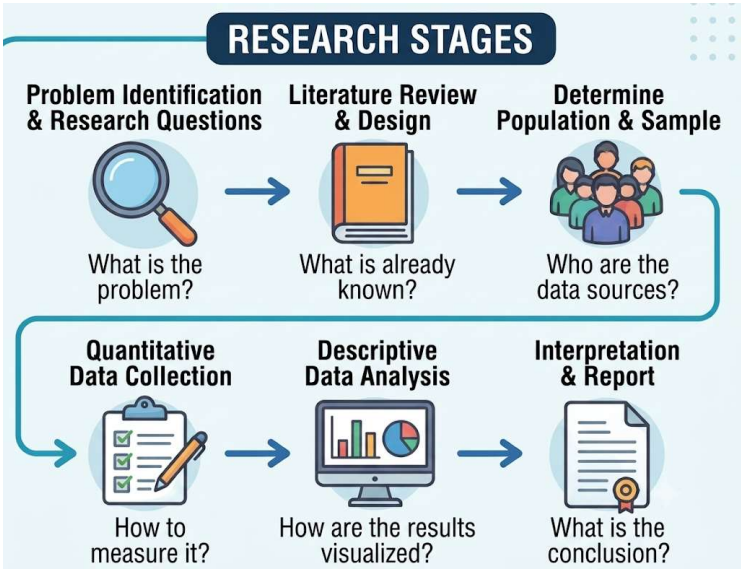

Figure 1. Exploratory Descriptive Design

The core construct under investigation was operationalized as a single multi-dimensional variable—entrepreneurial intention—theoretically grounded in the three

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primary determinants of Ajzen's Theory of Planned Behavior (Zafar & Jafar, 2026). The first determinant, attitude toward behavior, evaluated the pre-service teachers' personal valuation and internal attraction toward financial autonomy and business ownership. The second determinant, subjective norms, captured the perceived social pressure and encouragement emanating from immediate family units, academic peers, and the unique socio-cultural framework of the Tarakan coastal community. The third determinant, perceived behavioral control or entrepreneurial self-efficacy, explicitly measured the students' self-assessed capability to integrate mathematical logical-analytical thinking to navigate, manage, and mitigate operational business risks within a complex geopolitical border region.

Primary data collection was executed synchronously through the administration of a digitally driven, closed-ended survey via Google Forms. To capture nuanced behavioral variations, the measurement instrument utilized a standardized five-point Likert scale, ranging from Strongly Disagree (score 1) to Strongly Agree (score 5). The structural matrix of the questionnaire was adopted and contextualized from the established Entrepreneurial Intention Questionnaire (EIQ), which was meticulously modified to align with the specific psycho-pedagogical characteristics of prospective mathematics educators. Prior to actual field deployment, the instrument was subjected to rigorous psychometric evaluation; construct validity was verified using Pearson's Product-Moment correlation, while internal consistency was established using Cronbach's Alpha reliability coefficients computed via SPSS software. Measurement items were strictly retained as valid if the calculated r-value exceeded the critical table value ($r_{count} > r_{table}$) at a 5% significance level and deemed highly reliable if the alpha coefficient exceeded the standard threshold (alpha > 0.60).

The statistical framework of this study utilized a dual-stage analytical approach comprising both descriptive and inferential statistics. First, descriptive statistical analysis was performed to calculate the mean, standard deviation, and percentage frequency distributions. These outputs were then integrated into a standardized interval matrix to classify the students' entrepreneurial drive into explicit categorical levels: Very High, High, Moderate, Low, or Very Low. Prior to conducting advanced inferential testing, essential statistical assumptions were rigorously evaluated, including the Kolmogorov-Smirnov test for normality of data distribution, alongside robust tests for linearity and homoscedasticity.

Once all classical assumption criteria were fully satisfied, multiple linear regression analysis was applied as the primary inferential tool. This regression model was instrumental in assessing the statistical significance of each independent variable's contribution to the outcome variable. Ultimately, this modeling allowed the researchers to isolate and identify which specific TPB determinant—among personal attitude, subjective norms, and perceived behavioral control—exerted the most dominant structural influence in shaping the entrepreneurial intentions of Mathematics Education students operating within the socio-economic confines of the North Kalimantan border region.

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3. RESULTS AND DISCUSSION

Results

The presentation of the results of this study is divided into two main sections: a general overview of respondent characteristics and a descriptive analysis of the entrepreneurial interest of Mathematics Education students at the Faculty of Teacher Training and Education, Universitas Borneo Tarakan (UBT).

Respondent Characteristics

The primary data in this study were collected full of 53 respondents, active students in the UBT Mathematics Education Study Program. The distribution of respondents by gender and year of enrollment is presented in detail in Table 1.

Table 1. Distribution of Respondent Profiles

Characteristics	Category	Frequency (f)	Percentage (%)
Gender	Male	16	30.20%
	Female	37	69.80%
Force	2nd Year	19	35.80%
	3rd Year	17	32.10%
	4th Year	17	32.10%
Total		53	100%

The respondent profile data in Table 1 shows a strong gender predominance among female students in the UBT Mathematics Education Study Program. Of the 53 respondents, 37, or approximately 69.80%, were female, while only 16 were male, representing 30.20%. This gender imbalance is a common phenomenon in education study programs, where interest in the teaching profession tends to be higher among women than men.

Meanwhile, in terms of cohort characteristics (year of study), respondents were relatively evenly distributed, from second to fourth year students. The largest number of respondents came from second-year students, with 19 (35.80%). Meanwhile, third year and fourth-year students had precisely identical proportions, with 17 each representing 32.10%. This balanced distribution of classes provides benefits for research because the data obtained can fairly represent the perspectives and academic experiences of students at various semester levels.

Descriptive Analysis of Entrepreneurial Interest

Data processing using a 1–5 Likert scale questionnaire, an overall average score (Grand Mean) of 3.72 was obtained. This value indicates that, in general, the entrepreneurial interest of UBT Mathematics Education students is in the High category. Details of the empirical achievements for each indicator that makes up the entrepreneurial interest variable are presented in Table 2.

Table 2. Achievement of Entrepreneurial Interest Indicators

No	Indicators	Average Score	Category
1	Self-Efficacy (Self-Confidence)	3.85	High

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No	Indicators	Average Score	Category
2	Interest (Positive Attitude)	4.1	Very High
3	Risk-Taking Courage	3.25	Moderate
4	Environmental Influence (Subjective Norms)	3.68	High
	Total	3.72	Tinggi

The descriptive analysis results in Table 2 show that the overall entrepreneurial interest of UBT Mathematics Education students is in the High category, with a grand mean of 3.72 on a Likert scale of 1–5. When examined per indicator in Table 2, the highest achievement was achieved by the Interest (Positive Attitude) indicator, with an average score of 4.1, falling into the Very High category. This was followed by the Self-Efficacy (Self-Confidence) indicator at 3.85 and the Environmental Influence (Subjective Norms) indicator at 3.68, both of which are in the High category. This high level of positive attitude and self-confidence indicates that students possess an optimistic outlook and strong motivation to start their own businesses.

On the other hand, the Courage to Take Risks aspect recorded the lowest average score among the other indicators, at 3.25, falling into the medium category. This contrast between a very positive attitude and a moderate level of risk-taking indicates a psychological gap among students. Although they are highly interested and confident in the concept of entrepreneurship, they tend to remain cautious, hesitant, or anxious about uncertainty and potential financial loss in the real world. Therefore, future entrepreneurship education programs need to focus more on risk management, practical business simulations, and strengthening a risk-taking mentality so that this already high interest in entrepreneurship can be translated into concrete actions.

In addition, based on the results of tabulation and descriptive analysis of questionnaire data, the frequency distribution and percentage of students' level of interest in entrepreneurship are presented in detail in Table 3.

Table 3. Distribution of Student Entrepreneurial Interest Levels (N = 53)

Interest Categories	Number of Students (f)	Percentage (%)	Dominant Main Reasons
Tall	37	70%	Financial independence and autonomy/freedom at work
Currently	11	20%	Dual career orientation (formal sector/teaching)
Low	5	10%	Fear of business uncertainty and lack of experience
Total	53	100%	

The distribution of interest levels presented in Table 3 shows that most Mathematics Education students at the Faculty of Teacher Training and Education (FKIP) UBT demonstrated a positive orientation toward entrepreneurship after completing their undergraduate studies. Thirty-seven students, representing an absolute majority (70%), were categorized as having a high interest in entrepreneurship. This phenomenon indicates that most prospective mathematics educators are not simply focused on

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conventional career paths in teaching but also possess strong motivation and mental readiness to seize opportunities and create new jobs in the community.

On the other hand, a small number of students still displayed a more moderate and conservative response to this career path. Eleven students (20%) were identified as having moderate interest, while the remaining five students (10%) still had a low interest in exploring the entrepreneurial ecosystem. The presence of these groups of students with moderate and low interest indicates the need for external reinforcement from the study program, such as integrating a more applicable entrepreneurship curriculum, business mentoring programs, or motivational workshops to alleviate their doubts and convert their potential interest into concrete actions after graduation.

Individual Student Interest Categorization

To examine the distribution of individual entrepreneurial interest levels among the 53 students sampled, scores were categorized based on standard interval criteria. The analysis revealed that most respondents had a very positive entrepreneurial orientation, with the High category dominating the sample, comprising 29 students (55%). This group has a strong interest in entering the business world but currently prioritizes completing their academic studies. Meanwhile, the most progressive indication was seen in the Very High category, comprising 8 students (15%), who not only harbor entrepreneurial intentions but have also actualized them by starting side businesses while juggling their studies.

On the other hand, career ambivalence and a linear orientation were still found among some other respondents. The Medium category comprised the second largest portion, comprising 13 students (25%), who were in a state of indecision and had not yet made a firm decision between pursuing a formal career as educators or becoming entrepreneurs. The lowest percentage was in the Low category, represented by only 3 students (5%). The reluctance of this minority group to explore the business world is due to their career focus being completely linearly oriented, such as the target of becoming a Civil Servant (PNS) or a permanent teacher, which is considered to offer more certain professional stability.

Research Findings

The potential for edupreneurship development among UBT Mathematics Education students demonstrates a strong orientation toward knowledge-based business models aligned with their field of study. Students demonstrate a strong preference for business opportunities in the education sector, such as establishing independent tutoring institutions, developing digital content based on mathematics learning media, and providing intensive private tutoring services for Olympiad competitions. This trend demonstrates that students can transform the pedagogical competencies and mathematics content they acquire in college into creative economic opportunities with high added value for society.

Although the cumulative entrepreneurial interest of students is in the high category with a total score of 3.72, this research identified crucial barriers in the risk management

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aspect. The "Courage to Take Risks" indicator recorded the lowest score, at 3.25, reflecting psychological limitations in the form of anxiety about potential capital failure and uncertainty about future income. This phenomenon is strongly influenced by the mindset typical of exact science students, who tend to be highly calculative, analytical, and cautious about business risks, especially in the context of border regions with specific economic dynamics.

On the other hand, the acceleration of students' entrepreneurial interest is strongly supported by environmental factors as a significant positive catalyst. Supportive social support from the family environment, combined with the integrated internalization of entrepreneurship courses in the curriculum of the Faculty of Teacher Training and Education (FKIP) UBT, has proven effective in increasing students' self-efficacy to enter the business world. The synergy between an adaptive academic ecosystem and family moral support is a key driver capable of converting students' theoretical intentions into practical confidence in pioneering careers in the business sector.

Discussion

The empirical findings of this study establish a compelling narrative regarding the career orientations of prospective educators, revealing an overall grand mean score of 3.72 for entrepreneurial interest among Mathematics Education students at Universitas Borneo Tarakan (UBT). This quantitative result categorizes their general entrepreneurial inclination as "High". This outcome significantly challenges the conventional assumption that pre-service exact science teachers solely pursue traditional, formal teaching trajectories (Douglass & Verma, 2022). Instead, the data suggests a robust paradigm shift where prospective educators actively recognize entrepreneurship as a viable and strategic alternative career path, pushing beyond the boundaries of the conventional classroom (Horowitz Gassol, 2025; Igwe et al., 2022).

A granular examination of the underlying indicators highlights that "Interest (Positive Attitude)" achieved the highest average score of 4.10, placing it within the "Very High" category. This exceptional score underscores a robust intrinsic motivation and personal attraction toward the entrepreneurial sector among the academic respondents. Grounded in the Theory of Planned Behavior (TPB) proposed by Ajzen (2020), a highly positive attitude is the strongest predictor of entrepreneurial intentions. In this context, the data indicates that the primary catalyst driving this elevated interest is the fundamental pursuit of financial independence and the professional autonomy associated with self-employment. This aligns with modern entrepreneurial career theories, which suggest that contemporary graduates increasingly prioritize "boundaryless careers" that offer autonomy over traditional organizational structures (Komodromos, 2025). Furthermore, the students' inherent logical-mathematical intelligence and analytical skills, systematically honed through rigorous quantitative training, are likely to optimize their cognitive appraisal of market opportunities. According to the cognitive entrepreneurship theory by Dubard Barbosa and Smith (2024), individuals with highly developed analytical capabilities possess superior

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entrepreneurial alertness, allowing them to identify, assess, and manage independent business risks with greater optimism and strategic efficacy.

This positive attitude directly translates into specific, discipline-aligned business preferences, conceptualized in recent literature as "Edupreneurship". Rather than venturing into unrelated commercial sectors, the Mathematics Education students demonstrate a pronounced preference for knowledge-based business models that directly leverage their specialized pedagogical expertise. Specifically, the most appealing business opportunities identified by the respondents include the establishment of independent tutoring centers, the development of digital mathematics learning content, and the provision of specialized private Olympiad coaching courses. This strategic alignment supports the Resource-Based View (RBV) theory applied to human capital by Barney, which posits that individuals are more likely to achieve a sustainable competitive advantage when they build ventures utilizing rare, inimitable, and specialized internal resources—in this case, advanced mathematical knowledge and pedagogical skills (Kruesi & Bazelmans, 2023; Ployhart, 2021). By leaning toward digital content and specialized coaching, these pre-service teachers are not merely looking for employment; they are actively preparing to commodify their core academic competencies within the modern knowledge economy. This cross-fertilization of mathematics pedagogy and commercial enterprise redefines the traditional path of teacher education, transforming passive jobseekers into proactive market innovators (Hamami, 2025).

The empirical distribution of entrepreneurial interest among the respondents demonstrates a pervasive drive toward business venture creation, with a significant majority (70%) positioned within the high-interest spectrum. Methodologically, this widespread inclination is bifurcated into two distinct behavioral archetypes: a proactive cohort (15%) already engaged in active business operations (side hustles), and a strategically patient cohort (55%) deferring full-scale market entry until the completion of their undergraduate degrees. Grounded in the Theory of Planned Behavior (TPB) proposed by Ajzen, these findings validate that high entrepreneurial intentions serve as immediate cognitive precursors to actual behavior (Rozenkowska, 2023). The fact that a portion of students are already running active ventures underscores a high level of "entrepreneurial alertness", wherein academic knowledge is concurrently translated into market solutions. This high-density interest reflects a structural shift in the career orientations of contemporary pre-service teachers, aligning with the findings of Hjortshøj (2023), who argue that modern graduates increasingly view entrepreneurship not as a fallback option, but as a primary, high-status career trajectory.

Conversely, the data also delineates a distinct segment characterized by career ambivalence (20%) or explicit risk aversion (10%), where traditional, linear career paths remain dominant. This professional hesitation, which manifests as a strict focus on becoming civil servants (PNS) or securing permanent formal teaching positions, can be analyzed through Wang et al.'s (2022) Social Cognitive Career Theory (SCCT). According to SCCT, career choices are heavily regulated by outcome expectations and contextual barriers; for this minority cohort, the perceived lack of prior business

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experience and the fear of financial instability heavily outweigh the perceived benefits of autonomy. This behavioral pattern corresponds with the observations of Riad et al. (2025), indicating that a traditional socio-cultural mindset regarding employment stability continues to exert a conservative drag on entrepreneurial actualization, particularly within the educational sector where formal teaching roles have historically been equated with long-term socioeconomic security.

The primary systemic bottleneck hindering the conversion of these high entrepreneurial intentions into concrete market actualization lies in the domain of risk management. Although cumulative interest is demonstrably robust, the "Courage to Take Risks" indicator recorded the lowest evaluation (3.25), exposing a critical psychological and cognitive barrier. This phenomenon can be theoretically framed using Kahneman and Tversky's prospect theory, which posits that individuals exhibit strong loss aversion, evaluating potential losses far more severely than equivalent gains when operating under conditions of acute uncertainty (Regenwetter et al., 2022). In this study, this risk aversion is uniquely compounded by the students' academic discipline; as exact science majors, their rigorous training in logical-mathematical paradigms naturally cultivates a highly calculative, cautious, and deterministic mindset. While this analytical rigor is advantageous for strategic planning, it simultaneously intensifies their sensitivity to capital failure and income volatility, a disposition further exacerbated by the volatile economic dynamics typical of geographically peripheral or border regions.

To counteract these inherent personal anxieties, external environmental variables emerge as vital institutional accelerators. The high score achieved by the "Environmental Influence (Subjective Norms)" indicator (3.68) emphasizes that robust familial social support and institutional backing act as critical buffers against the fear of failure. More importantly, the structural integration of formal entrepreneurship curricula within the Faculty of Teacher Training and Education (FKIP) functions as a decisive mechanism for enhancing Entrepreneurial Self-Efficacy (ESE) (. This curricular intervention bridges the gap identified by converting raw mathematical aptitude (mean ESE: 3.85) into market-ready capabilities. Consequently, while higher education institutions have successfully fostered the motivational and social infrastructure required for entrepreneurship, the future mandate requires an experiential evolution of the curriculum. Universities must transition from theoretical education to active risk-mitigation simulations, thereby empowering pre-service mathematics teachers to confidently transition from risk-averse job seekers into resilient, autonomous innovators capable of driving regional economic development.

4. CONCLUSION

The research results show that students in the Mathematics Education Study Program, Faculty of Teacher Training and Education, Borneo Tarakan University (UBT), have a relatively high interest in entrepreneurship, with a Grand Mean of 3.72 on a scale of 1–5. This positive orientation is evidenced by the absolute majority of respondents (70% or 37 students) who fall into the high interest category, with 15% of them even actualizing this intention through active side businesses (side hustles) during

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their studies. The main internal drivers of this phenomenon are the Interest/Positive Attitude indicator, which recorded a Very High score (4.10) and a strong level of Self-Efficacy (3.85). Interestingly, this interest is strongly focused on the edupreneurship sector, where students tend to utilize their pedagogical and mathematical knowledge to develop knowledge-based businesses, such as independent tutoring institutions, digital learning media content, and private Olympiad courses. This finding also breaks the conventional stigma that the career orientation of students in the exact sciences group tends to be rigid and only oriented towards the formal teaching profession.

Despite the significant potential of edupreneurship, this research identified crucial psychological barriers in the risk management aspect, with the "Courage to Take Risks" indicator scoring the lowest in the Medium category (3.25). This gap reflects that despite students' high internal motivation, they remain plagued by anxiety about capital failure and income uncertainty; a characteristic consistent with the highly calculative and cautious mindset of exact science students in responding to the economic dynamics of border regions. Fortunately, these psychological limitations are offset by external factors in the form of Environmental Influence (Subjective Norms) which is categorized as High (3.68). The synergy between family social support and the internalization of the entrepreneurship curriculum at FKIP UBT has proven effective as a catalyst in increasing student self-efficacy. As a recommendation, universities need to reform their curriculum by prioritizing practical business simulations and financial risk mitigation to bridge the gap between intention and action, so that students' analytical skills can be converted into independent businesses that support regional economic resilience.

As a recommendation, it is recommended that the Mathematics Education Study Program management and the leadership of the Faculty of Teacher Training and Education at the University of Borneo Tarakan (UBT) reform the entrepreneurship curriculum by shifting the focus from mere theoretical understanding to a tactical-applicative approach oriented towards risk mitigation. This can be realized through the provision of business incubator programs, practical business simulations, financial crisis management workshops, and partnerships with local business actors in border areas to familiarize students with facing market uncertainty. This intervention is crucial to erode psychological barriers such as anxiety about capital and income uncertainty, so that students' already very high interest in edupreneurship can be safely facilitated and accelerated into concrete actions after graduation.

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