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ENGINEERING STUDENTS' INCLINATION TOWARDS DIGITAL ENTREPRENEURSHIP AS A CAREER CHOICE

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ABSTRACT

In the context of the Fourth Industrial Revolution (IR4.0), engineering graduates are increasingly challenged by dynamic labour market demands and the need to explore alternative and flexible career pathways. Digital entrepreneurship has emerged as a promising option that integrates technological innovation with economic opportunities. Despite its growing relevance, the factors influencing engineering students' inclination toward this career choice remain insufficiently explored. This study aims to examine engineering students' inclination toward digital entrepreneurship, focusing on three key determinants: motivation, digital literacy, and environmental encouragement. A quantitative survey design was employed, involving 175 final-year engineering students at Universiti Tun Hussein Onn Malaysia (UTHM). The research instrument was a structured questionnaire measuring four main constructs: motivational factors, digital literacy, environmental encouragement, and students' inclination toward digital entrepreneurship, using a Likert-scale format grounded in established theoretical frameworks. The data were analysed using SPSS through both descriptive and inferential statistical techniques to address the research questions empirically. The findings indicate that engineering students generally demonstrate a strong inclination toward digital entrepreneurship. Motivation and environmental encouragement emerge as dominant influencing factors, highlighting the importance of internal drive and supportive ecosystems such as family, peers, and digital communities. Digital literacy also contributes meaningfully by enhancing students' confidence and capability to engage in digital business environments, although certain advanced competencies require further development. The study underscores that the interaction between personal motivation, technological competence, and environmental support plays a critical role in shaping students' entrepreneurial intentions. These findings suggest that higher education institutions should strengthen digital entrepreneurship education, enhance practical skill development, and foster supportive learning environments to better prepare engineering students for emerging career opportunities beyond traditional engineering pathways.

Keywords: *Motivation, digital literacy, environmental encouragement, digital entrepreneurship, engineering students.*

INTRODUCTION

In the era of the Fourth Industrial Revolution (IR4.0), the career landscape for engineering graduates has become increasingly challenging due to labor market mismatches and issues of underemployment. Technical graduates frequently face a dilemma when their entry-level salaries do not correspond with their academic qualifications. This situation creates a need to explore alternative career pathways that

are more flexible and competitive. One increasingly relevant option is digital entrepreneurship, which integrates technology, creativity, and new economic opportunities. Previous studies emphasize that digitalization has accelerated innovation and expanded access to broader global markets (Nambisan, 2017).

Motivational factors play a significant role in encouraging engineering students to choose digital entrepreneurship as a career. Based on the framework of Self-Determination Theory (SDT), intrinsic motivation such as interest in technology and personal satisfaction, and extrinsic motivation, such as prospects for higher income, complement each other in shaping entrepreneurial intentions (Deci & Ryan, 1985). Empirical studies indicate that students' motivation toward emerging technologies increases their inclination to engage in digital entrepreneurship (Nadarajah et al., 2025).

In addition to motivation, digital literacy has become a critical factor in determining the success of engineering students in entrepreneurship. Digital literacy encompasses technical, cognitive, and social competencies in mastering modern technologies. Ng (2012), through the Digital Literacy Framework, emphasizes that digital literacy extends beyond technical abilities and also includes the capacity to critically evaluate and utilize information. A study by Zhou et al. (2025) found that digital analytical skills and social media utilization are key determinants of success among young entrepreneurs.

Environmental encouragement is another dominant factor influencing students' inclination toward digital entrepreneurship. Social Cognitive Theory (SCT) proposed by Bandura (1986) explains that individual behavior is shaped by the dynamic interaction between personal factors, behavior, and the social environment. Research by Kurniawan et al. (2025) demonstrates that support from family, community, and cultural contexts plays an important role in strengthening entrepreneurs' confidence and success. Support from the university community and the digital ecosystem also increases students' interest in pursuing this field.

Government policies and higher education strategies further strengthen the position of digital entrepreneurship as a viable career option for engineering graduates. The aspirations outlined in the MyDIGITAL Malaysia Digital Economy Blueprint (2021) and the National Entrepreneurship Policy 2030 (DKN2030) emphasize the integration of IR4.0 technologies in national economic development. A systematic review conducted by Fadzil et al. (2025) found that formal education in digital entrepreneurship significantly enhances students' intentions to pursue this field as a career. This indicates that government policy support not only creates opportunities but also fosters a conducive learning ecosystem.

Overall, this introduction highlights that motivation, digital literacy, and environmental support are key factors influencing engineering students' inclination toward digital entrepreneurship. With strong policy support and expanding global opportunities, this field not only addresses graduate unemployment but also fosters the development of competitive young techno-entrepreneurs at the international level. Therefore, this study seeks to empirically examine the relationship between these factors and engineering students' inclination to choose digital entrepreneurship as an alternative career path.

Digital Entrepreneurship

Digital entrepreneurship is not merely a local phenomenon but also a rapidly growing global trend. Digitalization has transformed the way businesses operate, shifting from traditional models to technology-based platforms that are faster, more flexible, and capable of penetrating international markets (Nambisan, 2017). In the Malaysian context, digital entrepreneurship is viewed as a national strategy to address issues of graduate unemployment and labor market mismatches. Government aspirations through the National Entrepreneurship Policy 2030 and the MyDIGITAL Malaysia Digital Economy Blueprint emphasize the importance of digital technology as a primary driver of national economic growth.

Engineering graduates, with their strong technical foundations, have significant potential to combine their technical knowledge with digital business creativity, thereby producing young techno-

entrepreneurs capable of competing at the globally. Furthermore, international reports indicate that digital sectors such as fintech, green technology, and e-commerce have become major drivers of new job creation. Consequently, digital entrepreneurship is not only relevant but also strategically important for the future career prospects of graduates.

Motivational Factors

Motivation is a key factor encouraging engineering students to pursue digital entrepreneurship as a career. Based on Self-Determination Theory (SDT), intrinsic motivation such as interest in technology, personal satisfaction, and career aspirations—and extrinsic motivation such as prospects for higher income, social status, and time flexibility—complement each other in shaping entrepreneurial intentions (Deci & Ryan, 1985).

Empirical studies indicate that students who possess a strong interest in digital technologies are more inclined to venture into entrepreneurship, as they perceive significant opportunities within the rapidly expanding digital market (Nadarajah et al., 2025). Formal education also plays an important mediating role in strengthening students' motivation, as exposure to digital entrepreneurship courses enhances their confidence and aspirations to pursue this field as a future career (Isa et al., 2024).

In addition, practical experiences through incubator programs and industrial training further enhance students' motivation because they are able to observe real opportunities for building digital businesses. Critically, engineering students' motivation toward digital entrepreneurship emerges from a combination of internal and external factors that mutually reinforce each other, making them better prepared to face the challenges of the modern labor market.

Digital Literacy Factors

Digital literacy is a critical factor that determines the success of engineering students in digital entrepreneurship. Ng (2012), through the Digital Literacy Framework, emphasizes that digital literacy encompasses technical, cognitive, and social dimensions, enabling students not only to master technology but also to critically evaluate and utilize information.

A study by Nor Asiah et al. (2018) found that digital literacy and self-efficacy serve as significant predictors of students' inclination to become entrepreneurs. Similarly, Zhou et al. (2025) highlighted that digital analytical skills, data privacy awareness, and social media utilization are key determinants of success among young entrepreneurs.

Although engineering students generally demonstrate high levels of digital literacy, gaps remain in strategic competencies such as paid digital advertising management and business analytics. This indicates the need for targeted training to strengthen strategic digital skills (Jusoh et al., 2024). Digital literacy not only enhances graduates' employability but also enables them to combine technical knowledge with business creativity to generate innovations. In the global context, digital literacy is increasingly regarded as a strategic skill that determines graduates' ability to adapt to technology-oriented labor markets.

Environmental Encouragement Factors

Environmental encouragement also plays a significant role in shaping students' inclination toward digital entrepreneurship. Social Cognitive Theory (SCT) proposed by Bandura (1986) explains that individual behavior is influenced by the dynamic interaction between personal factors, behavior, and the social environment.

Research by Kurniawan et al. (2025) indicates that support from family, community, and cultural contexts plays an important role in strengthening entrepreneurs' confidence and success. Support from the university community through incubator programs and industrial training also increases students' interest in entering this field (Syuhada Musa et al., 2023).

Environmental encouragement not only inspire but also strengthens students' practical skills and self-confidence in applying digital technologies for entrepreneurial purposes. Current economic conditions also serve as an important driving factor, as uncertainties in the job market encourage students to consider digital entrepreneurship as a promising alternative career path. Overall, environmental encouragement functions as a supportive ecosystem that strengthens students' motivation and confidence to pursue digital entrepreneurship.

Conceptual Framework

The conceptual framework of this study is developed to identify the relationships between three main factors: motivation, digital literacy, and environmental encouragement and engineering students' inclination toward digital entrepreneurship as an alternative career choice.

This framework is grounded in the integration of several theoretical perspectives. Self-Determination Theory by Deci and Ryan underpins the motivation construct (Deci & Ryan, 1985), the Digital Literacy Framework by Ng supports the digital literacy construct (Ng, 2012), Social Cognitive Theory by Bandura informs the environmental encouragement construct (Bandura, 1986), and the Theory of Planned Behavior by Ajzen explains the construct of students' inclination toward entrepreneurial behavior (Ajzen, 1991).

In this framework, final-year engineering students at Universiti Tun Hussein Onn Malaysia (UTHM) represent the focal population of the study, as they are in a critical stage of making career decisions. The three independent variables motivation, which includes internal and external drivers (Nadarajah et al., 2025); digital literacy, which involves technical, cognitive, and social competencies (Nor Asiah et al., 2018; Zhou et al., 2025); and environmental encouragement, which includes family support, digital community influence, and current economic conditions (Kurniawan et al., 2025; Syuhada Musa et al., 2023) are hypothesized to have a direct influence on engineering students' inclination.

This inclination subsequently influences their decision to choose digital entrepreneurship as a career option. The conceptual framework not only organizes the relationships between constructs visually but also serves as the foundation for developing research hypotheses and selecting appropriate analytical methods. It strengthens the academic foundation of the study and enables researchers to empirically examine the relationships among the investigated factors, thereby providing deeper insights into engineering students' inclination toward digital entrepreneurship in the modern economic era.

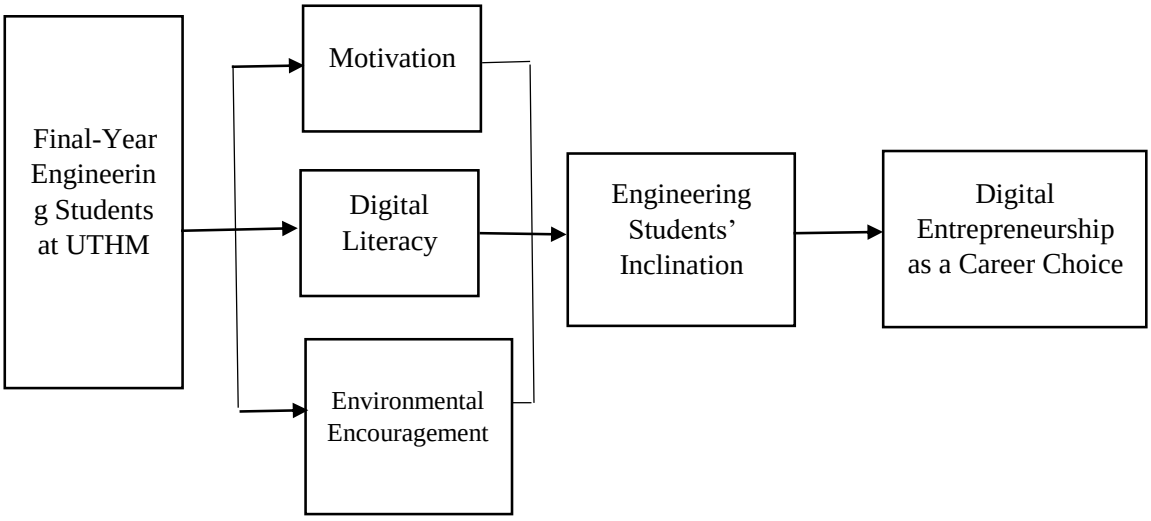

Figure 1. *Conceptual Framework*

Research Hypothesis

Based on the developed conceptual framework, the null hypothesis of this study is formulated as follows: H_0: There is no significant relationship between motivation, digital literacy, and environmental encouragement and engineering students' inclination toward choosing digital entrepreneurship as an alternative career option.

RESEARCH METHODOLOGY

Research Approach and Research Design

This study adopts a quantitative approach using a survey research design, as it is appropriate for measuring the factors influencing engineering students' inclination toward digital entrepreneurship. The quantitative approach enables the collection of objective numerical data, which can then be analyzed using descriptive statistics, normality tests, and Pearson correlation analysis.

The selection of a survey design is consistent with previous studies that examined motivational factors, digital literacy, and environmental encouragement within the context of digital entrepreneurship (Isa et al., 2024; Nadarajah et al., 2025).

Population and Sample Size

The population of this study consists of final-year Bachelor of Engineering students at Universiti Tun Hussein Onn Malaysia (UTHM), which includes two main faculties, namely the Faculty of Civil and Built Environment Engineering (FKAAB) for the Civil Engineering department and the Faculty of Electrical and Electronics Engineering (FKEE) for the Electrical Engineering department (Adam et al., 2023; Hazwan et al., 2025). A simple random sampling method was employed to ensure that each student had an equal probability of being selected as a respondent (Syuhada Musa et al., 2023). Overall, the total population of final year students for both faculties is 316, with a breakdown of 177 Civil Engineering students and 139 Electrical Engineering students. The selection of this population is in line with the study's objectives, which examines the Inclination of UTHM engineering students towards digital entrepreneurship as a career alternative. Final year students were selected because they are at a critical phase in making career decisions after graduation, thus providing a more mature perspective on the issue of marketability of technical graduates. Recent studies have shown that final year students are more likely to evaluate alternative career options such as digital entrepreneurship because they are already exposed to the challenges of the current job market (Adam et al., 2023).

The sample size was determined using the Krejcie and Morgan (1970) Table. For a population of 316 students, the minimum sample size was set at 175 respondents. This is because the closest value in the table is a population of 320, which is equivalent to 175 respondents. This size is considered sufficient to provide high reliability and reduce sampling error. Recent studies have also emphasized that the Krejcie and Morgan method is still relevant in higher education research because it provides clear guidance in determining the optimal sample size (Taherdoost, 2016).

Measurement of Constructs

The measurement of constructs in this study consists of four main dimensions: motivation, digital literacy, environmental encouragement, and students' inclination toward digital entrepreneurship.

The motivation construct was adapted from Abdullah and Yaacob (2020) and grounded in Self-Determination Theory (Deci & Ryan, 1985). The digital literacy construct was measured based on the study by Nor Asiah et al. (2018), supported by the Digital Literacy Framework proposed by Ng (2012). The environmental encouragement construct was adapted from Kurniawan et al. (2025), which is grounded in Social Cognitive Theory (Bandura, 1986). Meanwhile, the students' inclination toward digital entrepreneurship construct was adapted from the study by Abdullah and Yaacob (2020) and supported by the Theory of Planned Behavior (Ajzen, 1991).

All constructs were measured using a five-point Likert scale (1 = strongly disagree to 5 = strongly agree), consistent with previous studies on digital literacy and entrepreneurship (Nor Asiah et al., 2018; Zhou et al., 2025).

Research Instrument

The research instrument consisted of a structured questionnaire developed through adaptation from valid and relevant previous studies. The questionnaire was divided into five sections:

- Respondent demographics
- Motivation items
- Digital literacy items
- Environmental encouragement items
- Students' inclination toward digital entrepreneurship items

Experts in education and digital entrepreneurship have reviewed the content validity of the instrument. The reliability of the instrument was tested using Cronbach's Alpha analysis, with a threshold value of ≥ 0.70 considered an indicator of acceptable reliability (Fadzil et al., 2025; Jusoh et al., 2024).

Data Collection Procedures and 14-Week Timeline

The data collection procedure for this study was carried out using a combination of online and face-to-face methods to ensure comprehensive coverage and inclusivity of respondents. Primarily, questionnaires were distributed through Google Forms, which provided a practical and cost-effective approach for data collection. This method enabled rapid dissemination and automatic recording of responses in digital format, thereby reducing manual data entry errors. The Google Form link was shared with final-year students from FKKEE and FKAAB through multiple communication channels, including student email, WhatsApp, Telegram, and official social media platforms, to maximize reach and participation.

In addition to the online distribution, printed questionnaires were administered through face-to-face sessions at the respective faculties. This approach was particularly important to include students who may have limited internet access or those who prefer completing surveys in a traditional format. During these sessions, the researcher provided a brief explanation of the study's purpose, clarified questionnaire items when necessary, and encouraged participation to improve the response rate and data quality.

The integration of both online and face-to-face data collection methods allowed the study to accommodate diverse respondent preferences, minimize potential sampling bias, and enhance the overall validity of the findings. Following data collection, the responses were systematically analyzed using the SPSS software. The analysis was conducted in stages, beginning with descriptive statistics to summarize demographic characteristics and assess key constructs such as motivation, digital literacy, environmental encouragement, and student inclination based on mean scores. Subsequently, inferential statistical techniques were employed to test relationships and answer the research questions empirically. A 14-Week Data Collection Timeline as shown in Table 1.

Table 1. *14-Week Data Collection Timeline*

Week	Phase / Main Activity	Method / Action	Output / Quality Control
1	Final preparation	Finalize the instrument, permission letters, respondent list and faculty visit schedule.	Instrument and work plan verified.
2	Technical review	Test the Google Form link, access settings, item sequence and prepare printed questionnaires.	Online and printed forms ready.

3	Initial dissemination	Distribute the link through student email, WhatsApp, Telegram and official faculty channels.	Initial responses recorded.
4	Online collection Phase 1	Monitor Google Form responses and review participation rate by faculty/program.	Weekly response report.
5	Face-to-face distribution FKKEE	Conduct a brief briefing, distribute printed forms and collect responses at the faculty.	FKKEE printed forms collected.
6	Face-to-face distribution FKAAB	Conduct a brief briefing, distribute printed forms and collect responses at the faculty.	FKAAB printed forms collected.
7	First reminder	Send reminders to non-response groups through official communication channels.	Response rate improved.
8	Additional collection	Provide manual/online response opportunities for respondents with limited internet access.	Broader respondent coverage.
9	Follow-up with low-response groups	Identify programs/faculties with low responses and conduct targeted dissemination.	Response gaps reduced.
10	Preliminary data review	Download online data; check duplicates, incomplete data and damaged printed forms.	Data issues identified.
11	Final collection	Close collection in stages and complete any delayed printed questionnaire collection.	Dataset almost complete.
12	Entry of printed data	Enter manual responses into Excel/SPSS and conduct random cross-checking.	Combined data file prepared.
13	Data cleaning	Code variables; check missing values, outliers and scale consistency.	Clean dataset ready for analysis.
14	Closure and documentation	Store raw files, procedural documentation, response logs and SPSS analysis files.	Final data ready for descriptive and inferential analysis.

Data Analysis

Data analysis was conducted using the Statistical Package for the Social Sciences (SPSS) software. Descriptive analysis was used to describe the respondents' profiles and the level of each construct, while normality tests were conducted to ensure that statistical assumptions were satisfied (Field, 2018; George & Mallery, 2024; Pallant, 2020). Subsequently, inferential analysis using Pearson correlation was performed to examine the relationships between motivation, digital literacy, and environmental encouragement and engineering students' inclination toward digital entrepreneurship (Nadarajah et al., 2025; Zhou et al., 2025). Pearson correlation analysis was employed because it is appropriate for measuring the strength and direction of linear relationships between continuous variables. In this study, all constructs (motivation, digital literacy, environmental encouragement, and the outcome variable) were treated as continuous variables derived from scale-based measurements. The mean scores were interpreted into three levels, namely low, moderate, and high, based on the interpretation range used in this study (Nunnally & Bernstein, 1994). Using Pearson correlation also allows researchers to identify the magnitude of relationships (weak, moderate, strong) and determine whether these relationships are statistically significant, thereby providing foundational evidence for hypothesized associations among variables.

FINDINGS

This study involved 175 final-year Bachelor of Civil and Electrical Engineering students at Universiti Tun Hussein Onn Malaysia (UTHM). This number not only meets the minimum sample requirement based on the Krejcie and Morgan (1970) sample size table, but also exceeds the recommended threshold, thereby strengthening the validity and reliability of the study findings.

Data analysis was conducted using descriptive statistics (mean score, standard deviation, and percentage) and inferential statistics (normality test and Pearson correlation). The discussion is presented immediately after the findings to explain their implications for digital entrepreneurship.

Normality Test

Table 2. *Skewness and Kurtosis Normality Test*

Construct	Skewness	Kurtosis
Motivation	-1.110	1.982
Digital literacy	-0.665	0.869
Environmental Encouragement	-0.737	0.321
Students' Inclination	-0.930	1.384

A normality test was conducted to ensure the suitability of using parametric analysis methods in this study. Based on Table 2, the normality of the data for the four constructs motivation, digital literacy, environmental support, and student inclination was assessed using Skewness and Kurtosis indicators. This approach is more appropriate for large samples, as the Kolmogorov-Smirnov (KS) and Shapiro-Wilk (S-W) tests are known to be overly sensitive to sample size, often yielding significant results even for minor deviations (Gravetter et al., 2021).

The results indicate that all constructs fall within the acceptable range of normality. The Motivation construct recorded Skewness = -1.110 and Kurtosis = 1.982; Digital Literacy recorded Skewness = -0.665 and Kurtosis = 0.869; Environmental Support recorded Skewness = -0.737 and Kurtosis = 0.321; while Student Inclination recorded Skewness = -0.930 and Kurtosis = 1.384. All these values fall within the acceptable thresholds of ±2 for Skewness and ±7 for Kurtosis.

The data are considered normally distributed when Skewness values fall within ±2 and Kurtosis within ±7, as suggested by the original study (Kim, 2013). This is further supported by recent studies emphasizing the appropriateness of these indicators for large samples (Demir, 2022). Negative skewness values indicate that the data distribution is slightly skewed to the left, while moderate kurtosis values suggest that the distribution is neither too flat nor too peaked. This pattern is still considered normal as it does not exceed the acceptable range.

Therefore, the data in this study meet the assumption of normality. Overall, the results of the normality test confirm that the data are normally distributed. The implication for the study is that parametric analysis can be applied, as the normality assumption is satisfied. Accordingly, Pearson correlation was selected to assess the strength and direction of the relationships between the study constructs. This choice is appropriate, as Pearson correlation is the most suitable method for measuring linear relationships when the assumption of normality is met. As emphasized by Saccenti (2023), violations of fundamental assumptions such as normality and data independence can lead to incorrect and biased results. Therefore, ensuring that the data meet the normality assumption enhances the validity and defensibility of the findings in an academic context.

Level of Motivation

The findings indicate that the motivation level of engineering students toward digital entrepreneurship is high, with an overall mean score of M = 4.01 (SD = 0.784). The highest-rated items were the determination to increase knowledge related to digital entrepreneurship (M = 4.13) and flexibility in working time (M = 4.10). These findings demonstrate that students' motivation is driven by a

combination of intrinsic factors, such as interest, career aspirations, and self-confidence, including extrinsic factors, including income potential, time flexibility, and networking opportunities.

Table 3. *Mean Scores and Standard Deviation for the Level of Motivation*

Item	Statement	Mean	SD	Interpretation
B1	I am motivated to pursue digital entrepreneurship due to its higher income potential	3.99	0.910	High
B2	My interest in technology motivates me to become a digital entrepreneur	3.90	0.901	High
B3	Flexible working time in digital entrepreneurship increases my motivation	4.10	0.889	High
B4	I am determined to increase my knowledge of digital entrepreneurship for future preparation	4.13	0.862	High
B5	I am interested in attending seminars or workshops related to digital entrepreneurship	3.99	0.944	High
B6	I am confident in my potential to succeed in digital entrepreneurship	3.92	0.947	High
B7	I intend to pursue digital entrepreneurship to improve my quality of life	4.05	0.893	High
B8	I am motivated to pursue digital entrepreneurship because of the opportunity to build beneficial business networks	4.05	0.877	High
B9	My career goals motivate me to pursue digital entrepreneurship	3.95	1.002	High
Overall Mean		4.01	0.784	High

This discussion aligns with Self-Determination Theory, which emphasizes intrinsic and extrinsic motivation as key determinants of entrepreneurial intention. Previous research also indicates that interest in technology is a dominant factor shaping students' inclination toward digital-related fields.

Level of Digital Literacy

The level of digital literacy among students is also high, with an overall mean score of M = 3.96 (SD = 0.647). Students demonstrated strong skills in using e-commerce platforms (M = 4.30) and learning new digital applications (M = 4.20). However, weaknesses were identified in paid digital advertising (M = 3.65) and business analytics (M = 3.77).

Table 4. *Mean Scores and Standard Deviation for the Level of Digital Literacy*

Item	Statement	Mean	SD	Interpretation
C1	I am proficient in using e-commerce platforms (Shopee, Lazada)	4.30	0.782	High
C2	I am skilled in using social media for digital marketing	3.92	0.838	High
C3	I can learn new digital applications to support digital business	4.20	0.662	High
C4	I know how to manage customer data securely in digital business	3.81	0.845	High
C5	I am confident in managing digital financial transactions	4.07	0.825	High
C6	I have skills in using digital advertising (Facebook Ads, Google Ads)	3.65	1.100	High
C7	I can evaluate online information before using it for business purposes	3.97	0.931	High
C8	I am aware of how to protect privacy in digital business	4.03	0.834	High

C9	I am able to use sales or website analytics to evaluate business performance	3.77	0.935	High
C10	I can create digital marketing graphics or videos	3.88	1.032	High
Overall Mean		3.96	0.647	High

These findings are consistent with the Digital Literacy Framework, which highlights technical, cognitive, and social dimensions of digital competence. Previous studies also emphasize digital literacy as a key determinant of success among young entrepreneurs. Although students demonstrate strong digital literacy, the skill gap in paid advertising and data analytics indicates the need for targeted training to prepare them for the complex digital business ecosystem.

Level of Environmental Encouragement

The level of environmental encouragement among students was found to be high, with an overall mean score of M = 4.17 (SD = 0.663). The current economic situation (M = 4.22) and belief in income potential (M = 4.35) were identified as the main motivating factors, alongside support from family, peers, digital communities, and social media inspiration.

Table 5. *Mean Scores and Standard Deviation for the Level of Environmental Encouragement*

Item	Statement	Mean	SD	Interpretation
D1	Family encouragement increases my confidence in pursuing digital entrepreneurship	4.03	0.947	High
D2	Support from friends encourages me to participate in digital entrepreneurship activities	4.07	0.859	High
D3	Social media inspires me to pursue digital business	4.21	0.783	High
D4	Support from digital communities encourages my interest in digital business	4.16	0.863	High
D5	The current economic situation motivates me to consider digital entrepreneurship as a career	4.22	0.801	High
D6	I believe digital entrepreneurship can increase my income	4.35	0.717	High
D7	My interest in new technologies motivates me to pursue digital entrepreneurship	4.13	0.862	High
D8	The development of digital technology increases my confidence in starting an online business	4.21	0.879	High
Overall Mean		4.17	0.663	High

These findings align with Social Cognitive Theory, which emphasizes the role of the social environment in shaping individual behavior. The results indicate that social and economic ecosystems significantly influence students' inclination toward digital entrepreneurship.

Level of Students' Inclination

The inclination of engineering students toward digital entrepreneurship was also high, with an overall mean score of M = 4.13 (SD = 0.679). Students expressed confidence in combining engineering careers with digital business (M = 4.17) and pursuing digital business as a side income (M = 4.23).

Table 6. *Mean Scores and Standard Deviation for Students' Inclination*

Item	Statement	Mean	SD	Interpretation
E1	My engineering knowledge helps me understand how to start a digital business	4.06	0.819	High
E2	My engineering academic background gives me an advantage in digital entrepreneurship	4.00	0.849	High

E3	I believe I can combine an engineering career with digital business	4.17	0.759	High
E4	I believe I can run a digital business as a side income while working as an engineer	4.23	0.819	High
E5	Project experience during my studies gives me confidence to venture into digital business	4.16	0.860	High
E6	I aspire to use engineering knowledge to develop a global digital business	4.05	0.925	High
E7	The combination of engineering and digital knowledge can help me achieve my entrepreneurial career goals	4.19	0.805	High
E8	I am willing to face risks in digital entrepreneurship due to the critical thinking skills developed during engineering studies	4.14	0.873	High
Overall Mean		4.13	0.679	High

These findings support the Theory of Planned Behavior, which highlights intention as the primary predictor of behavior.

Relationship Between Factors and Students' Inclination

Inferential analysis using Pearson correlation revealed a significant relationship between motivation, digital literacy, and environmental encouragement and engineering students' inclination toward digital entrepreneurship. Environmental encouragement showed the strongest relationship, followed by motivation, while digital literacy showed a moderate but significant relationship.

Table 7. *Relationship Between Factors and Students' Inclination Toward Digital Entrepreneurship*

Construct	Pearson Correlation (r)	Sig. (2-tailed)	Interpretation
Motivation	0.744	.000	Strong and significant
Digital Literacy	0.561	.000	Moderate and significant
Environmental Encouragement	0.796	.000	Strong and significant

A Pearson correlation analysis was conducted to examine the relationships between motivation, digital literacy, environmental encouragement, and engineering students' Inclination toward digital entrepreneurship. The results indicated that all three factors were positively and significantly related to students' Inclination toward digital entrepreneurship. Environmental encouragement showed the strongest relationship, $r(174) = .796$, $p < .001$, followed by motivation, $r(174) = .744$, $p < .001$. Digital literacy also demonstrated a significant positive relationship, although the strength of the association was moderate, $r(174) = .561$, $p < .001$. These findings suggest that students with stronger environmental support, higher motivation, and better digital literacy are more likely to demonstrate a greater Inclination toward digital entrepreneurship. Overall, the correlation analysis demonstrated that all constructs were significantly related to engineering students' Inclination toward digital entrepreneurship. Motivation and environmental encouragement showed strong positive relationships, whereas digital literacy showed a moderate but still significant positive relationship. These findings support the theoretical framework underpinning the study. Specifically, SDT emphasizes the importance of intrinsic motivation, DLF identifies digital literacy as a prerequisite for competence, SCT highlights the influence of social and community support, and the Theory of Planned Behavior (TPB) underlines the role of social norms and perceived behavioral control. Taken together, these theories suggest that the combined influence of internal motivation, technological competence, and environmental support shaped students' Inclination toward digital entrepreneurship. The findings also imply that educational ecosystem development should place greater emphasis on enhancing student motivation, strengthening digital literacy, and fostering a supportive community environment to reinforce students' Inclination toward digital entrepreneurship.

DISCUSSION

This study examined the relationship between motivation, digital literacy, and environmental support and engineering students' inclination to choose digital entrepreneurship as an alternative career option. The findings indicate that these factors play an important role in shaping students' entrepreneurial tendencies in the digital era. The results are consistent with established theoretical perspectives and previous empirical studies that emphasize the importance of individual motivation, technological competence, and environmental influences in entrepreneurial intention.

First, motivation was found to be a significant factor influencing students' inclination toward digital entrepreneurship. This finding aligns with the principles of the Theory of Planned Behavior, which suggests that attitudes, perceived behavioral control, and subjective norms shape behavioral intentions (Ajzen, 1991). Students who possess strong intrinsic motivation and a desire for independence are more likely to consider entrepreneurial ventures as viable career alternatives. The results are also consistent with the Self-Determination Theory proposed by Deci and Ryan (1985), which emphasizes that individuals are driven by internal psychological needs such as autonomy, competence, and relatedness. When these needs are fulfilled, individuals become more motivated to pursue challenging and innovative career pathways, including digital entrepreneurship.

Furthermore, the findings support the Social Cognitive Theory developed by Bandura (1986), which highlights the role of self-efficacy and personal beliefs in influencing career-related decisions. Students who believe in their abilities and are motivated to utilize their technical knowledge may be more confident in pursuing entrepreneurial opportunities within the digital economy. Previous studies have also demonstrated that entrepreneurial motivation among university students significantly contributes to their entrepreneurial intentions and career preferences (Nadarajah et al., 2025; Syuhada Musa et al., 2023).

Second, digital literacy emerged as a crucial factor affecting students' Inclination toward digital entrepreneurship. In the context of the Fourth Industrial Revolution, digital literacy has become an essential competency for students, particularly in technology-oriented fields such as engineering. According to Ng (2012), digital literacy encompasses the ability to effectively access, evaluate, and utilize digital technologies for communication, learning, and innovation. Engineering students who possess strong digital skills are more capable of identifying online business opportunities, utilizing digital platforms, and developing innovative technological solutions.

This finding is supported by recent studies indicating that digital literacy significantly enhances students' innovation capability and entrepreneurial potential (Zhou et al., 2025). Similarly, Nor Asiah et al. (2018) found that digital literacy and ICT competency positively influence students' entrepreneurial inclination. As digital technologies continue to transform business models and economic structures, students equipped with digital competencies are more likely to explore entrepreneurship within digital ecosystems.

In addition, the digital entrepreneurship ecosystem within higher education institutions plays a significant role in nurturing entrepreneurial capabilities among students. According to Adam et al. (2023), universities are increasingly adopting initiatives to strengthen digital entrepreneurship ecosystems by integrating entrepreneurial education, technological resources, and industry collaboration. Such initiatives help students gain exposure to digital business models and enhance their confidence in pursuing entrepreneurial ventures.

Third, environmental support was also found to influence students' entrepreneurial tendencies. Environmental factors include support from family, educational institutions, peers, and the broader entrepreneurial ecosystem. The findings are consistent with previous research suggesting that supportive environments can significantly strengthen entrepreneurial intentions among university students (Nadarajah et al., 2025). When students are surrounded by positive encouragement,

mentorship, and institutional support, they are more likely to develop confidence and interest in entrepreneurial activities.

Educational institutions, particularly universities, play a critical role in fostering entrepreneurial culture among students. Entrepreneurship education programs, practical training, and exposure to entrepreneurial role models can significantly influence students' perceptions of entrepreneurship as a viable career option (Isa et al., 2024). Similarly, Jusoh et al. (2024) emphasize that technical and vocational education systems must adapt to the demands of the Fourth Industrial Revolution by equipping students with entrepreneurial and digital competencies.

Moreover, Abdullah and Yaacob (2020) highlight that engineering students possess strong potential for entrepreneurship due to their technical knowledge and problem-solving skills. When combined with digital competencies and supportive environments, these attributes can encourage engineering students to pursue digital entrepreneurship as an alternative career pathway.

The results of this study also align with the concept of digital entrepreneurship, which refers to entrepreneurial activities that rely heavily on digital technologies, platforms, and infrastructures to create new business opportunities (Satish Nambisan, 2016). Digital entrepreneurship offers significant opportunities for young graduates, particularly in an era where technological innovation and digital transformation are reshaping traditional employment structures.

Overall, the findings of this study highlight the importance of strengthening students' motivation, enhancing digital literacy skills, and providing supportive entrepreneurial environments within higher education institutions. By addressing these factors, universities can play a crucial role in encouraging engineering students to explore digital entrepreneurship as a viable and sustainable career alternative.

CONCLUSION

Based on the findings, several recommendations are proposed to strengthen the digital entrepreneurship ecosystem among engineering students. Universities and faculties are encouraged to enhance their curricula by incorporating digital entrepreneurship modules that focus more specifically on strategic competencies such as data analytics, paid digital marketing, and online business management. In addition, institutions should provide more practical training programs, business incubators, and industry networking opportunities to increase students' real-world experience.

The government and the Ministry of Education should also expand financial support and incentives for students interested in pursuing digital entrepreneurship, particularly in start-up grants and market access opportunities. Furthermore, graduate employability policies should be integrated with the development of digital competencies to ensure that technical graduates are better prepared to face the challenges of the digital economy. Future researchers are encouraged to conduct further studies involving more diverse samples, including students from different academic disciplines, in order to examine differences in digital entrepreneurship tendencies. Longitudinal research designs may also be employed to evaluate the extent to which digital entrepreneurial intentions are translated into actual entrepreneurial activities after graduation.

This study demonstrates that final-year Bachelor of Engineering students from the Faculty of Civil Engineering and Built Environment (FKAAB) and the Faculty of Electrical and Electronic Engineering (FKEE) at Universiti Tun Hussein Onn Malaysia exhibit a high Inclination to engage in digital entrepreneurship. The analysis indicates that motivation, digital literacy, and environmental encouragement are at high levels and significantly affect students' inclination to choose digital entrepreneurship as an alternative career option. Environmental encouragement and motivation were identified as the most dominant factors, while digital literacy, although moderate, still plays an important role in shaping entrepreneurial intentions.

These findings are consistent with the theoretical frameworks of Self-Determination Theory, the Digital Literacy Framework, Social Cognitive Theory, and the Theory of Planned Behavior. This suggests that engineering students' inclination toward digital entrepreneurship is formed through the interaction of internal factors such as motivation and career aspirations, technical factors such as digital literacy and technological competencies, and social factors such as support from family, peers, and the surrounding ecosystem. Overall, this study provides empirical evidence that digital entrepreneurship represents a relevant, flexible, and competitive career option, particularly in addressing the increasingly challenging and dynamic nature of the contemporary labor market.

Practical Implications of the Study

This study provides several important practical implications for students, universities, and relevant stakeholders. For students, the findings indicate that motivation, digital literacy, and environmental encouragement are key factors influencing their inclination toward digital entrepreneurship. This highlights the importance for students to strengthen their digital competencies and expand their social networks in order to better prepare themselves for the challenges of the labor market.

For universities, the findings emphasize the importance of providing curricula and training programs that focus on developing digital competencies, entrepreneurial support, and industry networking opportunities. Universities should also strengthen the learning ecosystem by establishing business incubators, mentorship programs, and providing access to start-up funding.

From a policy perspective, the findings send a clear message that financial support, incentives, and graduate employability policies should be integrated with digital competency development. Such integration would help ensure that technical graduates are more prepared and competitive within the evolving digital economy.

Limitations of the Study

Although this study provides significant findings, several limitations should be acknowledged. First, the study only involved final-year Bachelor of Civil Engineering and Electrical Engineering students at Universiti Tun Hussein Onn Malaysia (UTHM). Therefore, the generalizability of the findings to students from other disciplines or institutions may be limited.

Second, the research instrument used was a questionnaire, which may not fully capture the nuances of students' real experiences since it relies on respondents' perceptions and self-assessments. Third, this study employed a purely quantitative approach without incorporating qualitative methods such as interviews or case studies that could provide deeper insights into factors related to motivation, digital literacy, and environmental encouragement.

Finally, the study was conducted within a specific institutional context, namely UTHM. Cultural, economic, and social ecosystem factors at other universities may lead to different findings.

Recommendations for Future Research

Based on the limitations identified, several suggestions for future research can be proposed. First, future studies should involve more diverse samples, including students from other academic disciplines such as computer science, business, or technical education, in order to examine differences in tendencies toward digital entrepreneurship.

Second, longitudinal studies could be conducted to evaluate the extent to which students' digital entrepreneurial intentions are translated into actual entrepreneurial activities after graduation.

Third, a mixed-methods approach combining quantitative and qualitative methods is recommended to produce more comprehensive findings. For example, in-depth interviews with students or young entrepreneurs could provide richer insights into their real experiences.

Fourth, future studies may examine the role of external factors such as government support, access to funding, industry networks, and cultural influences in strengthening digital entrepreneurship tendencies. Finally, comparative studies between technical universities in Malaysia and those in other countries may be conducted to evaluate how educational and social ecosystems influence students' inclination toward digital entrepreneurship.

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