



INTERNATIONAL JOURNAL OF ACADEMIC RESEARCH IN BUSINESS & SOCIAL SCIENCES



An Investigation of Digital Entrepreneurship Intention Activation among University Undergraduates

Shathees Baskaran¹ (Corresponding Author),
Nomahaza Mahadi¹, Logaiswari Indiran², Teh Zahara Yaacob²
and Yogeeswari Subramaniam²

¹Azman Hashim International Business School, Universiti Teknologi Malaysia, ²Faculty of
Management, Universiti Teknologi Malaysia

Abstract

Most university students are digital natives, so they ought to make fantastic web entrepreneurs. They are more risk-averse than entrepreneurs who are just starting in their careers and have new ideas and endless enthusiasm. Therefore, they are the upcoming digital entrepreneurs. The majority of the literature on entrepreneurship concentrates on tiny businesses, many of which fail for want of a clientele. The exact reverse is true in the digital economy. Each startup has millions of consumers despite there being considerably fewer of them. In certain ways, the importance of the digital entrepreneurship ecosystem in the development of entrepreneurship, particularly in the context of graduate entrepreneurs, has not been well studied by entrepreneurship research. As a result, we have a huge knowledge gap when it comes to graduate entrepreneurs and the digital entrepreneurship ecosystem. Accordingly, a quantitative research design was employed at the individual level. The final-year students from higher learning institutions were chosen to address their perspective to observe digital entrepreneurship as a value in becoming digital entrepreneurs. SPSS was used to analyze the data and it was found that digital information quality, digital user citizenship, digital marketplace, and digital infrastructure governance positively influence digital entrepreneurship intention. The study made a theoretical contribution to digital entrepreneurship ecosystem literature while offering practical contributions to creating more digital entrepreneurs. To the best of the investigators' knowledge, this cross-sectional study is the first of its kind in Malaysia that investigates digital entrepreneurship intention based on the digital entrepreneurial ecosystem. The findings have given the insights to develop more robust digital entrepreneurship opportunities for university graduates in driving digital entrepreneurial capacity development in Malaysia.

Keyword: Information Content Quality, Information Expression Quality, Information Utility Quality, Information Quality, Digital User Citizenship, Digital Marketplace, Digital Infrastructure Governance, Digital Entrepreneurship Intention

Introduction

Since the majority of college students are digital natives, they should be terrific web entrepreneurs. They have more to gain than mid-career entrepreneurs starting, including new ideas, endless energy, and less to lose. They are the upcoming generation of internet entrepreneurs. Digital entrepreneurs are frequently described as youthful, educated, and self-employed. Digital entrepreneurs use social media to identify new opportunities. Although they don't necessarily do it within a formal organization, digital entrepreneurs are quick to act on their entrepreneurial intentions. The use of digital technology in business processes is expected to be most appealing for various forms of entrepreneurial activities given the rapid rise of digital activities in many industries. Utilizing the Internet and digital networks is necessary for conducting business in this type of digital world. Entrepreneurs now have tremendous potential to build businesses using electronic commerce models thanks to this involvement. For researchers who examine this link, as well as the invention of this new term (Digital Entrepreneurship) and its ecosystem, the junction between the recently introduced technologies and entrepreneurship, has generated interesting concerns. The expanding number of entrepreneurs who have started their enterprises utilizing the Internet and technology has generated a lot of interest in digital entrepreneurship (DE) study.

There is a lot of uncertainty as a result of the Covid-19 pandemic, particularly economic instability. This includes the rate of recovery, government intervention, and regulations; modifications in consumer spending habits and their effects on business viability; the emergence of new businesses; R&D; human capital investment; and other factors that have a medium- and long-term impact on productivity (Baker et al., 2020). In light of these circumstances, entrepreneurial action under uncertainty is at the center of entrepreneurship research (Bylund & McCaffrey, 2017). According to Delmar & Shane (2004); Giones et al (2020), entrepreneurial action is a result of the challenges in gathering and processing information about various factors that support an organized and rational response. According to research, encountering failure and uncertainty in business is common for businesses Ucbasaran et al (2013), especially when the uncertainty is brought on by a crisis like the Covid-19 outbreak (Kuckertz et al., 2020). In connection with this entrepreneurial act, a new generation of companies outfitted with digital technology has emerged over the past 20 years or so, playing a significant role in a variety of industries, including finance, communications, advertising, operating systems, and various Internet-based sectors from real estate to transportation (Song, 2019). Rapid and revolutionary changes brought about by the digitization phenomenon have several repercussions (Kraus et al., 2018). Along with the creation of brand-new firms as a result of opportunities brought about by digitalization, existing branches, and businesses have also switched from being offline to being online, creating "digital entrepreneurship" as a new type of entrepreneurial activity (Kraus et al., 2018). Technology resources like the Internet and information and communication technology are what give rise to the phenomena known as "digital entrepreneurship" (Le Dinh et al., 2018). According to Hsieh and Wu (2019), digital platforms are virtual locations that allow for the connecting of consumers and businesspeople.

Self-employment is a basic way to define entrepreneurship (Gohmann, 2012). However, because it incorporates entrepreneurial activities that take place on a digital platform, digital entrepreneurship deviates from this definition (Giones & Brem, 2017). To pursue their business opportunities, digital entrepreneurs rely on IT and digital media platforms (Giones

& Brem, 2017). Although the contribution of entrepreneurship to regional economic development has long been understood, progress in this area of context-based research has lagged (Chatterji et al., 2014). In contrast to earlier literature that viewed entrepreneurial processes as unitary, atomistic, and individualistic, Cooke (2016) contends that the emerging research on entrepreneurial ecosystems uses evolutionary, socially interactive, and non-linear approaches. The "Digital Entrepreneurial Ecosystem" framework, first presented by Sussan and Acs (2017), is built around the digital ecosystem. The "Digital Entrepreneurial Ecosystem" (DEE) is a new framework to help understand entrepreneurship in the digital era, especially digital entrepreneurship in the context of platforms, users, and larger digital institutions. It was developed by integrating literature on digital ecosystems and entrepreneurial ecosystems (Song, 2019). However, entrepreneurship research that has addressed this topic and literature on digital entrepreneurship are still rather scarce given the growing popularity of this field (Kraus et al., 2018). Because entrepreneurship research lacks a cohesive method for analyzing the effects of digitalization and has not yet been contextualized in the digital economy, there are still large gaps in our understanding of entrepreneurship in the digital era (Sussan & Acs, 2017). The same is true for research on the digital entrepreneurial ecosystem. According to Song (2019), the framework created for the Digital Entrepreneurial Ecosystem still has limits because there hasn't been much discussion about it up to this point.

By using the digital entrepreneurial ecosystem as its basis, this study seeks to analyze the intention behind digital entrepreneurship within its framework. This study is anticipated to add to the body of knowledge about digital entrepreneurship and the ecosystem that supports it. It will also give policymakers in Malaysia guidance on how to encourage the growth of this sector among graduates.

In designing a favorable economic future, the role of university graduates is critical, especially in the digital world. In delineating a model of digital entrepreneurship among university graduates, patterns in the past can provide subtle directions toward realistic images of the desired future. Because the majority of university students are born digital, they should be exceptional digital entrepreneurs. They have new ideas, unlimited enthusiasm, and less to lose than mid-career entrepreneurs. As a result, they are the future digital entrepreneurs. Digital entrepreneurs are typically described as youthful, well-educated, and self-employed. Besides, students who are in their final year have been fully exposed to various components of social and technical aspects through their learning and are more prepared to embark on digital entrepreneurial endeavors. Considering the prominence of digital-oriented graduates in the development of the digital entrepreneurship ecosystem development direction of the country, these final-year university graduates were chosen as the scope of the research.

Our comprehension of the digital economy in a digital world has a substantial knowledge gap. Through the integration of two pieces of literature, the entrepreneurial ecosystem and the digital ecosystem, the study presents a framework for comprehending entrepreneurship in the digital age. Digital user citizenship, digital technological entrepreneurship, digital multisided platforms, and digital infrastructure governance make up the framework of the digital entrepreneurial ecosystem. Hence, this research aims to gain insight into elements of information quality and entrepreneurship ecosystem that promotes digital entrepreneurship intention among final-year undergraduate students.

Literature Review

From Entrepreneurship to Digital Entrepreneurship

Entrepreneurship involves exploring how, by whom, and with what outcomes opportunities are found, assessed, and taken advantage of to produce future commodities and services (Esmaeeli, 2011). Entrepreneurship is the pursuit of opportunities beyond the resources currently in control. It has been said that entrepreneurship causes economic disruption by fostering both new and destructive economic situations. When it comes to digital entrepreneurship, this vision is simple to implement because new business models, communication channels, and industry transformations have been made possible by the Internet, digital technology, and social media (Porter et al., 2001). According to Esmaeeli (2011), digital entrepreneurship is a subtype of entrepreneurship in which all or part of what would typically be physical in an organization has been converted to digital form (Hull et al., 2007). Therefore, the term "digital entrepreneurship" refers to business ventures involving some degree of digital goods or services or other digital activity. Accordingly, the term "digital entrepreneurship" refers to the production of new value through the use of a new business model based on digital products or services, digital distribution, a digital workplace, a digital marketplace, or a combination of these (Esmaeeli, 2011; Hafezieh et al., 2011).

Digital Entrepreneurship: Entrepreneurship in the Digital Sphere

Digital entrepreneurship can be defined as entrepreneurial opportunities being created and pursued through the use of technological platforms and other information-communicating equipment (Giones & Brem, 2017). The digital economy is viewed as a new system with a genuine market opportunity where the demand for new business models is real, as stated by Hafezieh et al. (2011). As a result, digital entrepreneurship may fit within a variety of company sectors (Richter et al., 2017). These categories (such as marketing, sales, products, distribution, stakeholder management, and operations) will evolve and develop along with technology, and new categories may develop as well (Gohmann, 2012). Digital entrepreneurship has a variety of facets and combines institutional, business, and knowledge entrepreneurship in a mutually beneficial way (Davidson & Vaast, 2010). The most well-known and frequently discussed type of entrepreneurship is business entrepreneurship. It describes the process of looking for or spotting commercial possibilities that can be taken advantage of (Cuervo et al., 2007). These practices include developing new goods or services, identifying and using raw materials, developing new industries, developing new business models, and more (Shane & Venkataraman, 2000). Knowledge entrepreneurship is defined by the discovery and pursuit of informational or knowledge-based opportunities, and it includes both the growth of already-existing knowledge bases and the creation of new ones (Rowley, 2000). Entrepreneurs who employ resources to build new organizations or improve existing ones are said to engage in institutional entrepreneurship. As a result, digital entrepreneurship combines the aforementioned three entrepreneurial methods. To be able to take established practices, such as the business categories stated above, and transform them digitally, digital entrepreneurs mix business, institutional, and knowledge entrepreneurship synergistically (Davidson & Vaast, 2010; Hull et al., 2007).

Digital Entrepreneurial Ecosystem

A promising area of entrepreneurship study that has recently gained attention is the entrepreneurial ecosystem (Cavallo et al., 2019; Jacobides et al., 2018). Tansley (1935) was the first to introduce the idea of an ecosystem, although Lansiti and Levien (2004) later

modified the framework to refer to corporate ecosystems in the strategy literature. The groundbreaking studies by Cohen (2006); Isenberg (2010); Stam (2015) gave the entrepreneurial ecosystem concept impetus. Since then, a wide range of other literary works has done the same, including literature on entrepreneurial ecosystems (Feld, 2020; Stam & van de Ven, 2019), digital ecosystems (Boley & Chang, 2007; Weill & Woerner, 2015), and more. According to the "systemic view of entrepreneurship" adopted by the entrepreneurial ecosystem, it is primarily a mechanism for allocating resources that are fueled by individuals seeking out opportunities and starting new businesses (Acs et al., 2018).

Sussan and Acs (2017) were one of the first studies to acknowledge that entrepreneurship research overlooked the roles that users and agents play in digital entrepreneurship as well as the role that digital technologies play in entrepreneurship. They developed a unique paradigm called the "Digital Entrepreneurial Ecosystem" to fill this gap in the literature by combining two distinct but related bodies of literature on ecosystems: the entrepreneurial ecosystem and the digital ecosystem. Four concepts—Digital User Citizenship, Digital Entrepreneurship, Digital Marketplace, and Digital Infrastructure Governance—are produced by combining the literature from the two ecosystems in a 2x2 matrix. The framework for a digital entrepreneurial ecosystem's key contribution is to start a conversation about the function of technology in general and digital technology in particular concerning entrepreneurial ecosystems. The potential of the digital ecosystem as a business model and as a platform for digital innovation that offers a setting for digital entrepreneurs to test out their ideas is highly valued by entrepreneurs (Hsieh & Wu, 2019; Kraus et al., 2018). Song (2019) established a framework for the digital entrepreneurial ecosystem after conducting additional studies and identifying its three basic parts: digital user citizenship, digital technology entrepreneurship, and digital multisided platform. The topic of explicit legitimacy and implicit social norms that permit users or internet users to participate in the digital society while promoting entrepreneurial activity is covered in the digital user citizenship component of the digital entrepreneurial ecosystem. A Digital multisided platform is a component of the digital entrepreneurial ecosystem that discusses intermediary transactions for goods and services as well as a medium for communication. Digital technology entrepreneurship is another component of the ecosystem that discusses industry participants, application developers, and all other organizations that produce connected goods and services.

Anyone who uses digital technologies in a venture, whether it is commercial, social, governmental, or corporate, is said to be engaging in digital entrepreneurship. In other words, the emphasis is on digital entrepreneurship across all spheres of political, economic, and social life. The future digital entrepreneur will develop, market, and operate in the digital environment rather than as a conventional brick-and-mortar businessperson, according to the digital entrepreneurship intention. Ideation, also known as opportunity recognition and development, is an expansion of the entrepreneur's understanding of market demands (Carrier et al., 2004) and the capacity to translate those needs into a novel digital good or service (Hafezieh et al., 2011). Digital entrepreneurship intends to engage and use existing technologies and digital infrastructure to become digital entrepreneurs within the context of the digital entrepreneurship ecosystem. The digital economy functions as a generative digital infrastructure. The idea that for information quality to positively impact digital entrepreneurial intention, active users' participation or digital user citizenship is vital to enable entrepreneurs to translate their ideas into action forms the basis of the mechanism of

the continuous flow of updated and new quality information. Consequently, we suggest the following:

Hypothesis 1

There is an association between information quality and digital user citizenship

The ability to participate in society online is known as "digital citizenship," according to (Mossberger et al., 2007). According to Isman and Canan Gungoren (2014) and Jennett and Cox (2018), a person who engages in society, politics, and government as it is represented on the Internet, in society, and through participation, demonstrates digital citizenship. According to Choi et al (2018), the phrase "digital citizenship" refers to a user's acceptable and responsible use of technology. To participate and engage in acceptable behaviour or etiquette associated with the idea of digital citizenship, users must have ICT knowledge and be somewhat skillful in their competent and standard use of digital technology, regardless of the activities (De Moraes & De Andrade, 2015). Aside from skillset, the issue of intellectual property, privacy, and surveillance becomes more crucial and particularly pertinent to entrepreneurial activities as digital citizens continuously contribute content online, leaving a digital footprint that results in a permanent record in bytes (Rice & Sussan, 2016). Digital user citizenship has three direct effects on the intention to engage in the digital enterprise. First off, as user-turned-digital-entrepreneurs multiply, a greater pool of prospective new digital entrepreneurs—the key players in a digital entrepreneurship ecosystem—are available the more skilled and valuable a group of digital users are. The ability of digital entrepreneurs to fill their platforms, a crucial aspect of the ecosystem of digital entrepreneurship, depends in large part on the level of education and participation of their customer base. This is the second direct impact of digital user citizenship. Third, and possibly most significantly, the likelihood that users will be able to collaborate with other users, providers, and others to bring value to the ecosystem of digital entrepreneurship will increase with the level of digital user citizenship involvement. Digital user citizenship thus has a linear relationship with digital entrepreneurship intention. More formally, we propose the following:

Hypothesis 2

There is an association between digital user citizenship and digital entrepreneurship intention

The key to digital entrepreneurship is the online marketplace. Users' pro-social behaviour and efforts will, both directly and indirectly, allow entrepreneurial activities as they continuously produce content and give freely of their time, labour, and engagement to interact with and stay involved with other for-profit, nonprofit, and government user entities. In such a scenario, businesspeople will take full use of opportunities that arise from user interaction and maximize opportunity recognition, while users support such opportunity exploitation that will enable entrepreneurial operations. As a result, the digital market places value on e-government, e-transport, e-education, e-commerce, and e-social networking-based enterprises like Facebook, Uber, Yelp, eHarmony, Wikipedia, and others. The consumer base for a digital marketplace must change to keep up with the quick-paced new digital offers. By bringing on new users, making existing users more engaged, and encouraging highly adaptive users, the user base can evolve. In essence, the relationship between digital user citizenship and digital entrepreneurial intention is moderated by the digital market space. Formally, we suggest

Hypothesis 3

There is an association between the digital marketplace and digital entrepreneurship intention

Digital infrastructure governance is necessary for the interaction between digital user citizenship and digital entrepreneurial intention. The generation, storage, transmission, and processing of digital information and services are made possible by physical and virtual assets (Brookings Institution, 2022). The framework for creating responsibility, roles, and decision-making power for an organization's digital presence, which includes websites, mobile sites, social channels, and any other Internet- and Web-enabled products and services, is known as digital infrastructure governance. The regulation of digital infrastructure, for instance, affects how willingly people engage in activities inside the ecosystem of digital entrepreneurship. Digital infrastructure governance in such a society is likely to lessen the positive effects of digital user citizenship on intentions for digital entrepreneurship. This is because such societies are unlikely to welcome users to participate in the process of new regulations formation regarding the digital economy. In contrast, a society with open institutions will be more likely to encourage user input and participation in the creation of new rules governing the digital economy. As a result, the governance of the digital infrastructure in such a society will probably strengthen the favourable effects of digital user citizenship on the intention of digital entrepreneurship. New entrepreneurs will be inspired to enter the market if there is an open, transparent, and entrepreneurial-friendly institutional framework. In this spirit, we suggest:

Hypothesis 4

There is an association between digital infrastructure governance and digital entrepreneurship intention

Research Model

The literature review led to the development of the conceptual model and four hypotheses. We advocate four main constructs that influence digital entrepreneurial intention: information quality, digital user citizenship, digital marketplace, and digital infrastructure governance in line with the digital entrepreneurship ecosystem concept. Digital entrepreneurs use virtual space to maintain relationships with stakeholders. A limitation of the entrepreneurial ecosystem framework is that until recently there has been little discussion of digitization in particular. This framework will be useful to policymakers in identifying key components and bottlenecks to creating an entrepreneur-friendly environment. The conceptual model of the research is presented below (figure 1).

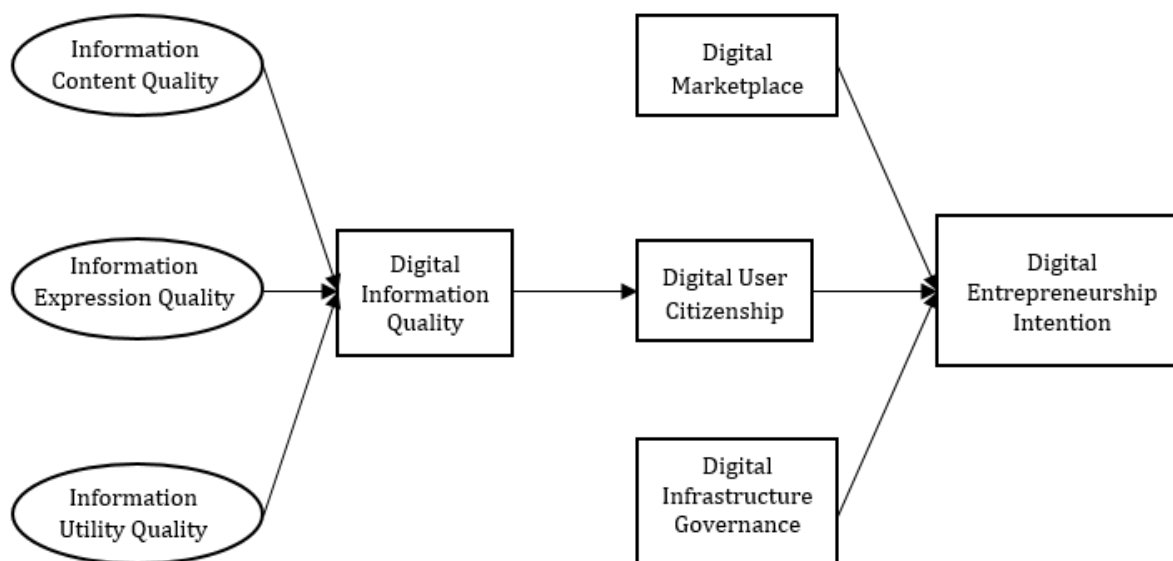


Figure 1: Conceptual Framework

Research Method

Research Design

This research uses a quantitative, descriptive design because it is more accurate and reliable and because it measures specific characteristics of a sample that can be generalized to a population easily and precisely (Creswell & Creswell, 2017). This is done to improve the predictive understanding of digital entrepreneurship. Therefore, quantitative research is required to anticipate and explain phenomena over a larger sample size (Cooper et al., 2006). Additionally, this strategy assumes that behaviour is both highly predictable and comprehensible (Johnson & Christensen, 2019).

Population, Sample, Sampling Method, and Sample Size Determination

All things being equal, the higher the sample size, the better the population's representation, claim (Ary et al., 2018). To explore the entire population in a study on the claim that it is almost finite is exceptional, but it is not feasible (Etikan et al., 2016). However, Mandeville and Roscoe (1971) contend that the majority of studies should use a sample size greater than 30 and lower than 500. However, Lowhorn (2007) stated that as long as the pertinent individual who fits into the study is taken into account, the size of the population, whether limited or large, is not an issue in research. Students in their final year of undergraduate studies at Malaysia's universities make up the research's target demographic.

According to Nunan et al (2020), the sample size depends on the suggested data processing methods. The PLS-SEM method, which is suggested for this study, has no universally agreed guidelines for calculating sample size (Hair et al., 2014). Hair et al (2010) recommended a minimum of 100 samples for research models that take into account five or fewer constructs, 150 to 300 samples for models that take into account seven or fewer constructions, and more than 500 samples for models that take into account a high number of constructs.

Convenient sampling, as suggested by Gall and Gall (2007), was used in this study since the respondents (i.e., final-year undergraduate students) are naturally occurring, easily

accessible, and require less complexity to conduct the study. More importantly, the respondents are reasonably reachable given their proximity to Malaysia's higher education institutions. Although convenience sampling is frequently employed, it is neither purposeful nor strategic (Palinkas et al., 2015) since it assumes that members of the target population are homogeneous (Etikan et al., 2016).

Research Instrument

Measures and test tools created for earlier studies were modified for this investigation. The survey was created using a five-point Likert scale. The five-point Likert scale is one of the typical continuums for the respondents to locate their attitudes (Wolfer & Jacoby, 2007). Although there are different degrees of intensity measured, most settle on a minimum of 4-5 dimensions (Isaac & Michael, 1995; Neuman, 2014; Wolfer & Jacoby, 2007). For them to determine their level of agreement, respondents' replies to the test items ranged from 1 ("strongly disagree") to 5 ("strongly agree"). Strongly disagree, disagree, neutral, agree, and strongly agree are the five options on the Likert scale.

Data Collection and Analysis Procedures

A survey is a popular and common data collection method in business and management studies (Saunders et al., 2009) that is simple to administer because people are accustomed to survey mechanisms (Fraenkel & Wallen, 2006). It allows a researcher to collect a sizable amount of data economically (Mukhopadhyay & Gupta, 2014). Burton (2000) asserts that the survey is also highly helpful for evaluating theories that examine connections between constructs used in quantitative research. As an Internet-based web survey is a typical strategy for the study's population, which is geographically diversified, it was used as the main method of data collecting in this study (Dillman, 2011). For data analysis, returned Internet-based responses were coded. The suggested model's ability to predict outcomes and model quality were evaluated using SPSS.

Analysis and Findings

Respondent Profiling

The data collection was done across 2 months to achieve a high response rate. As a result, 323 respondents participated in the survey. After filtering the respondent to match the study objectives, 232 respondents were found to be valid for the research. About 54% of respondents were female. In terms of age, 97% of the respondents were in the age range of 18-24 years old.

Confirmatory Factor Analysis

A factor analysis was performed. A principal component analysis occupying varimax rotation was performed taking into consideration by Tabachnick and Fidell (2013) that any loading below 0.32 shall be ignored in the analysis. All items in factor analysis recorded factor loading above 0.700. Since the loadings are well above threshold levels, all items were retained. A subsequent analysis of confirmatory factor analysis (CFA) was performed to generate a fit model for the research. To ensure the reliability of the constructs, composite reliability, and average variance extracted were calculated. The results of the finalized are provided in Table 1.

Table 1
Exploratory Factor Analysis

Construct	Item	Loading	Cronbach's Alpha	Composite Reliability	Average Variance Extracted
Digital Information Content Quality	DICQ1	.731	.823	.808	0.584
	DICQ2	.752			
	DICQ3	.807			
Digital Information Expression Quality	DIEQ1	.706	.844	.849	0.584
	DIEQ2	.806			
	DIEQ3	.775			
	DIEQ4	.767			
Digital Information Utility Quality	DIUQ1	.761	0.866	0.855	0.596
	DIUQ2	.772			
	DIUQ3	.808			
	DIUQ4	.746			
Digital User Citizenship	DUC1	.854	.944	0.933	0.638
	DUC2	.723			
	DUC3	.780			
	DUC4	.810			
	DUC5	.845			
	DUC6	.835			
	DUC7	.708			
	DUC8	.823			
Digital Marketplace	DM1	.744	.944	0.901	0.603
	DM2	.767			
	DM3	.795			
	DM4	.765			
	DM5	.806			
	DM6	.781			
Digital Infrastructure Governance	DIG1	.770	.905	0.859	0.550
	DIG2	.723			
	DIG3	.711			
	DIG4	.744			
	DIG5	.757			
Digital Entrepreneurship Intention	DEI1	.695	.943	0.920	0.657
	DEI2	.843			
	DEI3	.832			
	DEI4	.860			
	DEI5	.792			
	DEI6	.830			

Hypotheses Testing

Following the EFA assessment, hypotheses testing was performed. The results of the hypotheses testing are provided in Table 2.

Table 2

Hypotheses Testing Results

Hypothesis	Beta Value	t-stats	p-value	Conclusion
H1: DIQ → DUC	0.729	15.928	0.04	Supported
H2 DUC → DEI	0.026	0.375	0.05	Supported
H3 DM → DEI	0.531	8.214	0.00	Supported
H4 DIG → DEI	0.240	3.226	0.01	Supported

Based on the results, all hypotheses were significant and therefore, retained. A positive significant association was found between digital information quality, digital user citizenship, digital marketplace, digital infrastructure governance, and digital entrepreneurship intention.

Discussion

The first hypothesis tested the relationship between digital information quality and digital user citizenship and the results were found to be significant therefore the hypotheses were accepted. Information quality and digital user citizenship are two interrelated concepts that affect how people use technology in their personal and professional lives. Information quality refers to the accuracy, reliability, validity, and relevance of the information that is available online. Digital user citizenship refers to the ethical and responsible behavior of individuals who use technology to communicate, learn, create, and participate in society. Information quality and digital user citizenship are important for several reasons. First, they help users to make informed decisions based on credible and trustworthy sources of information. Second, they foster a culture of respect, empathy, and collaboration among users who interact online. Third, they promote the development of digital skills and literacies that are essential for the 21st century. Information quality and digital user citizenship are not static or fixed concepts. They evolve as technology changes and new challenges emerge. Therefore, users need to keep learning and updating their knowledge and skills to be good digital citizens in a dynamic and complex digital world.

An assessment of the relationship between digital user citizenship and digital entrepreneurship intention was tested through H2. The result shows that there positive significant relationship between both constructs. Digital user citizenship is the use of technology and the internet responsibly and safely, which involves respecting oneself and others, educating oneself and others, and protecting oneself and others. It also includes cultivating values, skills, attitudes, and knowledge that allow positive engagement with digital technologies. Digital user citizenship is a lifelong learning process that applies to anyone who uses the internet regularly and is part of one or more online communities. Digital entrepreneurship intention is the self-acknowledged conviction by a person that they intend to set up a new business venture on the Internet and consciously plan to do so at some point in the future (Hejazinia, 2015). There is a positive relationship between digital user citizenship and digital entrepreneurship intention, as both concepts require similar competencies, values, and attitudes. For example, both digital user citizens and digital entrepreneurs need to have digital literacy (The ability to find, evaluate and cite digital materials (ISTE, 2021)), digital communication (The ability to choose the right tools according to their audience and message (ISTE, 2021)), digital innovation (The ability to generate novel and useful ideas for online products or services Mir et al (2022) and digital responsibility (The ability to understand and respect the rights and obligations of oneself and others in the digital sphere (ISTE, 2021)). Moreover, both digital user citizens and digital entrepreneurs can benefit from each other's

presence and contribution to online communities. For instance, digital user citizens can support digital entrepreneurs by providing feedback, sharing information, promoting their products or services, or becoming their customers. On the other hand, digital entrepreneurs can enhance digital user citizenship by creating value-added solutions, addressing social problems, fostering collaboration and diversity, or inspiring others to pursue their passions. In summary, digital user citizenship and digital entrepreneurship intention are interrelated concepts that reflect the responsible and positive use of technology and the internet. Both concepts require similar competencies, values, and attitudes, such as digital literacy, communication, innovation, and responsibility. Both concepts can also benefit from each other's presence and contribution to online communities. Various factors can influence digital user citizenship and digital entrepreneurship intention, such as digital access, education, role models, and culture.

H3 attempted to test the relationship between the digital marketplace and digital entrepreneurship intention. Based on the results, the hypothesis was retained. A digital marketplace is a digital platform and infrastructure that enables buyers to purchase products and services from multiple sellers. Digital marketplaces can be classified by various criteria, such as the type of products or services offered, the type of participants involved, the type of business model adopted, or the type of technology used (Digital Commerce 360, 2021). The digital marketplace can play a significant role in fostering digital entrepreneurship intention by providing various benefits and advantages for potential and existing digital entrepreneurs. Some of these benefits are access to a large and diverse customer base i.e. digital marketplaces can help digital entrepreneurs reach a wider and more varied audience across different regions, countries, and markets. This can increase their customer acquisition, retention, and loyalty, as well as their revenue and profitability (The Future of Commerce, 2021). Apart from this, the digital marketplace can provide access to network effects by leveraging the network effects phenomenon, which is when increased numbers of people or participants improve the value of a good or service. By attracting more buyers and sellers to join the platform, digital marketplaces can enhance their reputation, trustworthiness, and competitiveness, as well as create positive feedback loops for digital entrepreneurs (EIB, 2020). Access to resources and support is another important facet because digital marketplaces can provide digital entrepreneurs with various resources and support to start and grow their online businesses. These can include technical infrastructure, payment systems, logistics services, marketing tools, analytics tools, customer service, legal advice, mentoring, and training (Digital Commerce 360, 2021).

The final hypothesis, H4 tested the relationship between digital infrastructure governance and digital entrepreneurship intention. A positive significant association was found between these constructs and therefore the hypothesis was retained. According to a systematic review by Alkhalaileh (2021), the most common factor that has a positive and significant effect on predicting digital entrepreneurship intention among the reviewed articles is digital entrepreneurial competence (The knowledge, skills, and abilities related to creating and managing online businesses), innovative cognition (The ability to generate novel and useful ideas for online products or services), social media adroitness (The proficiency in using social media platforms for communication, marketing, and networking purposes), digital entrepreneurship role models (The presence of successful online entrepreneurs who inspire and motivate potential entrepreneurs). A recent study by Mir et al (2022) also confirmed the

significant impact of these factors on the digital entrepreneurial volition of potential entrepreneurs. Digital infrastructure governance can play a crucial role in facilitating or constraining digital entrepreneurship by affecting the availability, accessibility, affordability, and quality of digital infrastructure. For example, Cosgrave et al (2017) argued that digital infrastructure governance can enable urban innovation by providing open data platforms, smart city applications, and citizen engagement mechanisms. On the other hand, Brookings Institution (2022) warned that poor digital infrastructure governance can lead to negative socio-economic consequences such as inequality, distrust, and erosion of social norms. In conclusion, digital infrastructure governance can support or hinder digital entrepreneurship by affecting the design, implementation, and quality of digital infrastructure. Therefore, policymakers, practitioners, and researchers need to pay attention to both aspects when promoting or studying digital entrepreneurship.

Conclusion

Digital information quality refers to the degree to which digital information is accurate, complete, timely, relevant, and consistent. Digital information quality affects how digital users perceive, process, and use digital information in various contexts. Digital user citizenship is the set of norms, values, and behaviors that digital users adopt when interacting with digital information and other digital users. Digital user citizenship influences how digital users contribute to, benefit from, and respect the digital commons. A digital marketplace is an online platform where digital users exchange goods, services, and information. The digital marketplace enables digital users to access a wider range of opportunities, resources, and networks. Digital infrastructure governance is the system of rules, policies, and institutions that regulate the development, operation, and maintenance of the digital infrastructure. Digital infrastructure governance shapes how digital users access, share, and protect the digital infrastructure. Digital entrepreneurship intention is the intention to start or grow a new venture that leverages digital technologies. Digital entrepreneurship intention reflects how digital users exploit the potential of the digital environment for innovation and value creation.

The above concepts are interrelated and form a framework for understanding the dynamics of the digital environment. Digital information quality affects Digital user citizenship by influencing the trust, credibility, and reliability of digital information and its sources. Digital user citizenship affects the digital marketplace by influencing the quality, quantity, and diversity of digital information and its exchange. The digital marketplace affects digital infrastructure governance by influencing the demand, supply, and distribution of digital infrastructure and its services. Digital infrastructure governance affects digital entrepreneurship intention by influencing the feasibility, desirability, and viability of digital entrepreneurship.

The study provided theoretical contributions to digital entrepreneurship ecosystem literature while offering practical contributions to creating more digital entrepreneurs. To the best of the investigators' knowledge, this cross-sectional study is the first of its kind in Malaysia that investigates digital entrepreneurship intention based on the digital entrepreneurial ecosystem. The findings will help to develop more robust digital entrepreneurship opportunities for university graduates in driving digital entrepreneurial capacity development in Malaysia.

Acknowledgments

The authors would like to thank Universiti Teknologi Malaysia (Vot: 20J40) for providing financial support to conduct the research and publish the article.

References

- Acs, Z. J., Estrin, S., Mickiewicz, T., & Szerb, L. (2018). Entrepreneurship, Institutional Economics, and Economic Growth: An Ecosystem Perspective. *Small Business Economics*, 51(2), 501-514.
- Alkhalailah, M. (2021). Systematic Review: Digital Entrepreneurship Intention. *Network Intelligence Studies*, 9(17), 138-147.
- Ary, D., Jacobs, L. C., Irvine, C. K. S., & Walker, D. (2018). *Introduction to Research in Education*. Cengage Learning.
- Baker, S., Bloom, N., Davis, S., & Terry, S. (2020). *Covid-Induced Economic Uncertainty*. <https://doi.org/10.3386/w26983>.
- Boley, H., & Chang, E. (2007, February 21–23). Digital Ecosystems: Principles and Semantics. *Digital EcoSystems and Technologies Conference*, Cairns, QLD, Australia.
- Brookings Institution (2022) What is 'good' digital infrastructure? Measuring digital infrastructure to maximize development outcomes and mitigate risks. Available at: <https://www.brookings.edu/wp-content/uploads/2022/02/Good-Digital-Infrastructure.pdf>
- Burton, D. (2000). Sampling Strategies in Survey Research. *Research Training for Social Scientists*, 307–319. <https://doi.org/10.4135/9780857028051.d31>.
- Bylund, P. L., & McCaffrey, M. (2017). A Theory of Entrepreneurship and Institutional Uncertainty. *Journal of Business Venturing*, 32(5), 461-475.
- Carrier, C., Raymond, L., & Eltaief, A. (2004). Cyberentrepreneurship: A multiple Case Study. *International Journal of Entrepreneurial Behavior & Research*, 10(5), 349-363.
- Cavallo, A., Ghezzi, A., & Balocco, R. (2019). Entrepreneurial ecosystem research: Present Debates and Future Directions. *International Entrepreneurship and Management Journal*, 15(4), 1291-1321.
- Chatterji, A., Glaeser, E., & Kerr, W. (2014). Clusters of Entrepreneurship and Innovation. *Innovation Policy and the Economy*, 14(1), 129-166.
- Chin, W. W., Marcolin, B. L., & Newsted, P. R. (2003). A Partial Least Squares Latent Variable Modeling Approach for Measuring Interaction Effects: Results from a Monte Carlo Simulation Study and An Electronic-Mail Emotion/Adoption Study. *Information Systems Research*, 14(2), 189-217.
- Choi, M., Cristol, D., & Gimbert, B. (2018). Teachers as Digital Citizens: The Influence of Individual Backgrounds, Internet Use and Psychological Characteristics on Teachers' Levels of Digital Citizenship. *Computers & Education*, 121, 143-161.
- Cohen, B. (2006). Sustainable Valley Entrepreneurial Ecosystems. *Business Strategy and the Environment*, 15(1), 1-14.
- Cooke, P. (2016). The Virtues of Variety in Regional Innovation Systems and Entrepreneurial Ecosystems. *Journal of Open Innovation: Technology, Market, and Complexity*, 2(3), 1-19.
- Cooper, D. R., Schindler, P. S., & Sun, J. (2006). *Business Research Methods*. McGraw-Hill New York.
- Council of Europe. (2016). Competences for Democratic Culture: Living together as equals in culturally diverse democratic societies. Available at: <https://rm.coe.int/16806ccc07>

- Creswell, J. W., & Creswell, J. D. (2017). *Research design: Qualitative, Quantitative, and Mixed Methods Approaches*. Sage Publications.
- Cuervo, A., Ribeiro, D., & Roig, S. (2007). *Entrepreneurship: Concepts, Theory, and Perspective*. Introduction In *Entrepreneurship* (pp. 1-20). Springer.
- Davidson, E., & Vaast, E. (2010). *Digital Entrepreneurship and Its Sociomaterial Enactment*. *43rd Hawaii International Conference on System Sciences*, Honolulu, HI, USA.
- De Moraes, J. A., & De Andrade, E. B. (2015). Who are the Citizens of the Digital Citizenship? *The International Review of Information Ethics*, 23.
- Delmar, F., & Shane, S. (2004). Legitimizing First: Organizing Activities and the Survival of New Ventures. *Journal of Business Venturing*, 19(3), 385-410.
- Digital Governance. (n.d.). What Is Digital Governance? Available at: <https://digitalgovernance.com/dgblog/what-is-digital-governance/>
- Dillman, D. A. (2011). *Mail and Internet Surveys: The Tailored Design Method-2007 Update with New Internet, Visual, and Mixed-Mode Guide*. John Wiley & Sons.
- Esmaeeli, H. (2011). The Study of Effecting Factors on Digital Entrepreneurship (A Case Study). *Interdisciplinary Journal of Contemporary Research in Business*, 2(12), 163-172.
- Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of Convenience Sampling and Purposive Sampling. *American Journal of Theoretical and Applied Statistics*, 5(1), 1-4.
- Feld, B. (2020). *Startup Communities: Building An Entrepreneurial Ecosystem in Your City*. John Wiley & Sons.
- Fraenkel, J., & Wallen, N. (2006). *How to Design and Evaluate Research in Education*. McGraw Hill.
- Gall, G., & Gall, J. (2007). *Borg Educational Research*. Boston: Pearson Edu.
- Giones, F., & Brem, A. (2017). Digital Technology Entrepreneurship: A Definition and Research Agenda. *Technology Innovation Management Review*, 7(5), 44-51.
- Giones, F., Brem, A., Pollack, J. M., Michaelis, T. L., Klyver, K., & Brinckmann, J. (2020). Revising Entrepreneurial Action in Response to Exogenous Shocks: Considering the COVID-19 Pandemic. *Journal of Business Venturing Insights*, 14, e00186.
- Gohmann, S. F. (2012). Institutions, Latent Entrepreneurship, and Self-Employment: An International Comparison. *Entrepreneurship Theory and Practice*, 36(2), 295-321.
- Hafezieh, N., Akhavan, P., & Eshraghian, F. (2011). Exploration of Process and Competitive Factors of Entrepreneurship in Digital Space: A Multiple Case Study in Iran. *Education, Business, and Society: Contemporary Middle Eastern Issues*, 4(4), 267-279.
- Hair, J. F., Black, W. C., Babin, B. J. & Anderson, R. E. (2014). *Multivariate Data Analysis*. 7th Edition, Pearson, New York.
- Hsieh, Y.-J., & Wu, Y. J. (2019). Entrepreneurship Through the Platform Strategy in the Digital Era: Insights and Research Opportunities. *Computers in Human Behavior*, 95, 315-323.
- Hull, C. E. K., Hung, Y.-T. C., Hair, N., Perotti, V., & DeMartino, R. (2007). Taking Advantage of Digital Opportunities: A Typology of Digital Entrepreneurship. *International Journal of Networking and Virtual Organisations*, 4(3), 290-303.
- Iansiti, M., & Levien, R. (2004). Strategy as Ecology. *Harvard Business Review*, 82(3), 68-78, 126.
- Isaac, S., & Michael, W. B. (1995). *Handbook in Research and Evaluation: A Collection of Principles, Methods, and Strategies Useful in The Planning, Design, and Evaluation of Studies in Education and the Behavioral Sciences*. Edits publishers.
- Isenberg, D. J. (2010). How to Start an Entrepreneurial Revolution. *Harvard Business Review*, 88(6), 40-50.

- Isman, A., & Canan Gungoren, O. (2014). Digital Citizenship. *Turkish Online Journal of Educational Technology-TOJET*, 13(1), 73-77.
- Jennett, C., & Cox, A. L. (2018). Digital Citizen Science and the Motivations of Volunteers. *The Wiley Handbook of Human-Computer Interaction*, 2, 831-841.
- Johnson, R. B., & Christensen, L. (2019). *Educational Research: Quantitative, Qualitative, and Mixed Approaches*. Sage publications.
- Kesari, B., & Atulkar, S. (2016). Satisfaction of Mall Shoppers: A Study on Perceived Utilitarian and Hedonic Shopping Values. *Journal of Retailing and Consumer Services*, 31, 22-31.
- Kline, R. B. (2015). *Principles and Practice of Structural Equation Modeling*. Guilford Publications.
- Kraus, S., Palmer, C., Kailer, N., Kallinger, F. L., & Spitzer, J. (2018). Digital Entrepreneurship: A Research Agenda on New Business Models for the Twenty-First Century. *International Journal of Entrepreneurial Behavior & Research*. 25(2), 353-375.
- Kuckertz, A., Brandle, L., Gaudig, A., Hinderer, S., Reyes, C. A. M., Prochotta, A., Steinbrink, K. M., & Berger, E. S. (2020). Startups in Times of Crisis - A Rapid Response to the COVID-19 Pandemic. *Journal of Business Venturing Insights*, 13, e00169.
- Le Dinh, T., Vu, M. C., & Ayayi, A. (2018). Towards a Living Lab for Promoting the Digital Entrepreneurship Process. *International Journal of Entrepreneurship*, 22(1), 1-17.
- Lowhorn, G. L. (2007). Qualitative and Quantitative Research: How to Choose the Best Design. *Academic Business World International Conference*. Nashville, Tennessee,
- Malecki, E. J. (2018). Entrepreneurship and Entrepreneurial Ecosystems. *Geography Compass*, 12(3), e12359.
- Mossberger, K., Tolbert, C. J., & McNeal, R. S. (2007). *Digital Citizenship: The Internet, Society, and Participation*. Cambridge, MA: MIT Press.
- Mukhopadhyay, S., & Gupta, R. K. (2014). Survey of Qualitative Research Methodology in Strategy Research and Implication for Indian Researchers. *Vision*, 18(2), 109-123.
- Neuman, L. W. (2014). *Social Research Methods: Qualitative and Quantitative Approaches*. Pearson Education.
- Nunan, D., Malhotra, N. K., & Birks, D. F. (2020). *Marketing Research: Applied Insight*. Pearson UK.
- Palinkas, L. A., Horwitz, S. M., Green, C. A., Wisdom, J. P., Duan, N., & Hoagwood, K. (2015). Purposeful Sampling for Qualitative Data Collection and Analysis in Mixed Method Implementation Research. *Administration and Policy in Mental Health and Mental Health Services Research*, 42(5), 533-544.
- Rice, J. C., & Sussan, F. (2016). Digital Privacy: A Conceptual Framework for Business. *Journal of Payments Strategy & Systems*, 10(3), 260-266.
- Richter, C., Kraus, S., Brem, A., Durst, S., & Giselsbrecht, C. (2017). Digital Entrepreneurship: Innovative Business Models for the Sharing Economy. *Creativity and Innovation Management*, 26(3), 300-310.
- Mandeville, G. K., & Roscoe, J. T. (1971). Fundamental Research Statistics for the Behavioral Sciences. *Journal of the American Statistical Association*, 66(333), 224.
- Rowley, J. (2000). From Learning Organisation to Knowledge Entrepreneur. *Journal of Knowledge Management*, 4(1), 7-15.
- Saunders, M., Lewis, P., & Thornhill, A. (2009). *Research Methods for Business Students* (5th ed). In Pearson Education eBooks.
- Shane, S., & Venkataraman, S. (2000). The Promise of Entrepreneurship As a Field of Research. *Academy of Management Review*, 25(1), 217-226.

- Song, A. K. (2019). The Digital Entrepreneurial Ecosystem - A Critique and Reconfiguration. *Small Business Economics*, 53(3), 569-590.
- Stam, E. (2015). Entrepreneurial Ecosystems and Regional Policy: A Sympathetic Critique. *European Planning Studies*, 23(9), 1759-1769.
- Stam, E., & Van De Ven, A. H. (2021). Entrepreneurial Ecosystem Elements. *Small Business Economics*, 56(2), 809–832.
- Sussan, F., & Acs, Z. J. (2017). The Digital Entrepreneurial Ecosystem. *Small Business Economics*, 49(1), 55-73.
- Tansley, A. G. (1935). The Use and Abuse of Vegetational Concepts and Terms. *Ecology*, 16(3), 284-307.
- Ucbasaran, D., Shepherd, D. A., Lockett, A., & Lyon, S. J. (2013). Life After Business Failure: The Process and Consequences of Business Failure for Entrepreneurs. *Journal of Management*, 39(1), 163-202.
- Weill, P., & Woerner, S. L. (2015). Thriving in an Increasingly Digital Ecosystem. *MIT Sloan Management Review*, 56(4), 27.
- Wolfer, L. T., & Jacoby, J. E. (2007). *Real Research: Conducting and Evaluating Research in The Social Sciences*. Pearson/Allyn and Bacon Boston, MA.

Research Instrument

Digital Information Content Quality

1. I believe digital information is a real consumption experience.
2. I believe the image that the digital information contains is an accurate reflection of the entrepreneurial opportunity.
3. I believe the digital information of the entrepreneurial opportunity is objective.

Digital Information Expression Quality

4. I believe the quantity of digital information is large.
5. I believe the spread of digital information is suitable.
6. I believe digital information is comprehensive.
7. I believe digital information is easily understood.

Digital Information Utility Quality

8. I believe the digital information is up-to-date.
9. I believe the digital information is updated frequently.
10. I believe digital information is beneficial to make decisions.
11. I believe that digital information is appropriate for me to make decisions.

Digital User Citizenship

12. I can use the Internet as an effective way of connecting with others.
13. I can write any posts or comments on the Internet that other people will read and be interested in.
14. I can offer other people important and interesting information by posting on the Internet.
15. I can use the Internet to answer other people's questions productively.
16. I can use the Internet to answer my questions productively.
17. I can use social networking sites as an effective way of connecting with others.
18. I can be very effective at communicating using social networking sites
19. I can use the Internet to find good information about topics that are important to me.

Digital Marketplace

20. I am aware of my digital marketplace customers.
21. I am aware of my digital business model
22. I know my niche in the digital marketplace
23. I know what technology should I choose in my digital marketplace
24. I know what problem I am trying to solve through the digital marketplace
25. I know who are my competitors in the digital marketplace

Digital Infrastructure Governance

26. I believe that there has been an effective, comprehensive, and well-documented legal and institutional framework on issues related to e-transactions.
27. I believe that there has been legal and regulatory system to support well to e-commerce
28. I am aware of supportive incentives for web-based e-commerce
29. I believe that Internet infrastructure is effective in terms of connectivity, speed, performance, and reliability
30. Digital infrastructure can support e-commerce in the industry

Digital Entrepreneurship Intention

31. I have an aspiration to be a successful cyber-entrepreneur
32. I am sure that I will run my own online business in the future
33. I prefer to be an online entrepreneur rather than work for others
34. I will be an online entrepreneur in 5-years' time
35. I keep myself updated with the news of successful techno-entrepreneurs
36. I will choose a digital entrepreneurial career once I have completed my study