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Society 5.0—Unlocking Entrepreneurial Competencies in Farmer Scope

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Abstract
This study was designed to investigate the relationship between Society 5.0 and the development of entrepreneurial competencies. The research employed a questionnaire-based interview involving 159 dragon fruit farmers in the Indonesian Capital City/Ibu Kota Nusantara (IKN). The collected questionnaire data were analyzed using moderated regression techniques. The results indicate a correlation between the proposed hypotheses and the findings, demonstrating that digital skills, understanding of information technology (IT), and relevant education significantly influence adaptive attitudes and mental readiness. Furthermore, both adaptive attitudes and mental readiness have a substantial effect on entrepreneurial competence. Digital skills, understanding of IT, and relevant education, when moderated by adaptive attitudes, can enhance entrepreneurial competence. However, mental readiness does not serve as a moderating factor. These findings contribute valuable insights to both academic discourse and practical policies aimed at enhancing farmers' entrepreneurial competencies within the framework of a sustainable Society 5.0.

Keywords: Digital Skills, Understanding of IT, Relevant Education, Adaptive Attitude, Mental Readiness, Entrepreneurial Competence

Society 5.0—Membuka Kunci Kompetensi Kewirausahaan pada Lingkup Petani

Abstrak
Studi ini didesain untuk menyelidiki kaitan antara *Society 5.0* dalam membangun kompetensi wirausahaan. Metode wawancara via data kuesioner mengundang 159 petani buah naga di Ibu Kota Negara (IKN). Data kuesioner ditabulasi dengan teknik regresi moderasi. Terdapat kecocokan antara usulan hipotesis dan hasil dimana, baik keterampilan digital, pemahaman tentang informasi teknologi (IT), ataupun pendidikan yang relevan berdampak signifikan terhadap sikap adaptif dan kesiapan mental. Baik sikap adaptif maupun kesiapan mental berpengaruh signfifikan terhadap kompetensi kewirausahaan secara signifikan. Keterampilan digital, pemahaman tentang IT, dan pendidikan yang relevan yang dimoderasi oleh sikap adaptif mampu mendorong kompetensi kewirausahaan. Sayangnya, kesiapan mental tidak mampu menjadi moderasi. Temuan saat ini berkontribusi terhadap perspektif akademik dan kebijakan praktis dalam pengembangan kompetensi kewirausahaan petani melalui *Society 5.0* yang berkelanjutan.

Kata Kunci: Keterampilan Digital, Pemahaman tentang IT, Pendidikan yang Relevan, Sikap Adaptif, Kesiapan Mental, Kompetensi Kewirausahaan

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INTRODUCTION

Massive shifting in time have propelled the world toward greater advancement rather than stagnation. The Covid-19 pandemic, which has recently subsided, has imparted numerous impacts and valuable lessons. The virus, which affected nearly all countries, has motivated many individuals to enhance their cognitive abilities, generate innovative ideas, and devise new strategies. Today, technological advancements serve as a crucial foundation for opening new markets and opportunities for entrepreneurs, particularly farmers, to promote agricultural commodities. By embracing Information Technology (IT), farmers can effectively supply and sell their crops to various locations (Nugroho et al., 2020; Zhang et al., 2021). Haloui et al. (2024) noted that the transition between two eras—from Industry 4.0 to Society 5.0—has had a complex impact on the agricultural sector regarding the utilization of IT.

Facing the transition to Society 5.0 undoubtedly necessitates careful planning, which includes both skills development and a shift in mindset (Wu et al., 2023). According to Rojas et al. (2021), Society 5.0 was initiated by the Japanese government, positioning humans not only as objects but also as active participants in achieving economic and social equilibrium through the simultaneous integration of cyber and physical spaces. In practice, Society 5.0 embodies an innovation aimed at creating an intelligent and transformative society (Holroyd, 2020). Currently, humanity is confronted with the rapid advancement of Artificial Intelligence (AI) across various domains. The terminology of Society 5.0 is closely associated with AI (Ramírez-Márquez et al., 2024; Wright, 2023). The information capacity of sensors in both physical and cyber spaces is harnessed leveraged by AI and communicated back to humans in various forms.

When discussing AI, Indonesia emerges as the most optimistic country regarding the integration of this technology into daily life. Nugroho & Hakim (2023) reported that among ten countries exhibiting significant optimism towards AI, Indonesia ranks highest, with 78% of its population believing that the benefits of AI outweigh its disadvantages. The other nine countries, ranked by their levels of optimism, are Thailand (74%), Mexico (73%), Malaysia (69%), Peru (67%), Turkey (67%), South Korea (66%), Colombia (65%), India (65%), and Brazil (65%). This optimistic outlook is further supported by various stakeholders, including the government, which is implementing the Society 5.0 education program aimed at fostering a competitive and professional workforce in the 21st century. This program is centered on four key competencies: (1) collaboration, (2) communication, (3) critical thinking, and (4) creativity. Troisi et al. (2024) revealed three essential components for success in Society 5.0: (1) data literacy, (2) technological literacy, and (3) human literacy. First, data literacy emphasizes the ability to read, analyze, and utilize information, particularly big data in the digital landscape. Second, technological literacy involves understanding how various technologies function and applying them, which includes skills in coding, artificial intelligence, machine learning, engineering principles, and biotechnology. Third, human literacy focuses on the humanities, effective communication, and design principles.

Society 5.0 represents a civilization capable of addressing various challenges by leveraging innovations that have emerged since the Fourth Industrial Revolution (Tavares et al., 2022). A fundamental issue in the agricultural sector is the lack of IT resources, which are essential for improving farmers' living standards. For instance, farmers require tools and devices that facilitate the dissemination of information, enable efficient production management, assist in determining product prices, and provide data analysis to monitor market share. IT can be particularly beneficial when it delivers critical data and knowledge that enhance farmers' skills and capabilities. In developing markets, the most essential IT services include Short Message Service (SMS), internet access, social media, computers, and other digital platforms.

At the same time, the primary reason for relocating the administrative center from Jakarta to East Kalimantan is to promote equitable development (Fitriadi et al., 2023). The plan to move the IKN is scheduled for implementation in 2024. One of the targets of the IKN is to maximize the resource potential of East Kalimantan as a strategic region. Geographically, East Kalimantan occupies a highly strategic position, as it is located in the center of Indonesia and traversed by the equator. The area designated to become the IKN is known as Sepaku. Initially, this area was part of North Penajam Paser Regency (PPU). Subsequently, it was established as a new autonomous entity under the central government, with a distinct division of authority from the PPU Government. Within the IKN planning framework, five clusters support the development of IKN (Jiuhardi et al., 2024; Priyagus et al., 2024). First, Paser Regency serves as a residential cluster. Second, PPU Regency is designated to become an economic development zone. Third, Balikpapan City functions as a hub for transportation and trade. Fourth, Kutai Kartanegara is designated as an agricultural industrial area. Fifth, Samarinda City is identified as an educational center and historical site.

Although IKN's priority is to revitalize IT infrastructure, this endeavor incurs significant costs related to selective governance, maintenance, and oversight. In examining the prospects for the agricultural sector in Kutai Kartanegara, there is considerable potential for growth in agricultural enterprises. However, a major obstacle for this sector is the inadequate access to IT resources, a challenge also faced by dragon fruit farmers. The cultivation of dragon fruit has gained popularity in the Samboja District since the arrival of migrants from Java Island in the 1990s, particularly in East Kalimantan. More specifically, Samboja District is recognized as one of the primary production centers for dragon fruit in East Kalimantan. The majority of residents in Samboja earn their livelihoods as dragon fruit farmers (Wahyuni et al., 2021). This fruit is classified as a horticultural plant and is favored by consumers from various demographics due to its high commercial value. The red and white varieties of dragon fruit are the most widely cultivated and traded.

The implementation of IT in the agricultural sector not only facilitates interactions among farmers, consumers, and distributors but also enables farmers to assess the condition of agricultural land. Rajkhowa & Baumüller (2024) argue that IT can be utilized to measure the quality of agricultural land. Crop productivity is closely linked to soil fertility; therefore, it is essential to first map the agricultural land. High-quality soil can be classified into

categories: soil that is suitable for planting, free from diseases, and devoid of pests that could harm crops. One effective tool for surveying soil characteristics is the Geographic Information System (GIS). The integration of IT ensures that the marketing chain for agricultural products operates according to established procedures. Products are marketed not only at the local level but also facilitate export opportunities, thereby increasing potential profits. To capture buyers' interest, products are promoted online.

To develop entrepreneurial competencies within the framework of Society 5.0, dragon fruit farmers are expected to possess five advantages: (1) digital skills, (2) understanding of IT, (3) relevant education, (4) adaptive attitudes, and (5) mental readiness. Implicitly, adaptive attitudes and mental readiness also enhance digital skills, IT understanding, and the relevance of education among farmers, thereby contributing to their overall entrepreneurial competence. The inclusion of adaptive attitudes and mental readiness is essential for enabling farmers to maintain a competitive edge. In the context of Society 5.0, these five criteria serve as critical indicators of success. Drawing on observed phenomena in the field and a review of the literature, this study aims to examine the causal relationships between digital skills, IT understanding, and relevant education on entrepreneurial competence among dragon fruit farmers, with adaptive attitudes and mental readiness serving as moderating factors.

Currently, there is no scientific research that establishes a direct link between digital skills, IT understanding, and relevant education with entrepreneurial competence, particularly as moderated by adaptive attitudes and mental readiness. Singh & Dwivedi (2022) examined how digital competence influences entrepreneurial intentions through motivation. Drydakis (2022) reviewed business application training and corporate digital competency, highlighting the importance of entrepreneurs' willingness to adapt their attitudes. Botha et al. (2019) conducted repeated tests on the influence of entrepreneurial competence on entrepreneurial intentions, controlling for perceived attitudes and behaviors. Devi et al. (2021) measured entrepreneurial competency and readiness by considering factors such as involvement in entrepreneurship and age. Ncube & Matlala (2024) detected a fundamental influence of entrepreneurial competence on business start-up success through entrepreneurship education. The principle of entrepreneurship education programs is to enhance entrepreneurial competence. By critically examining the existing literature, this study lays the groundwork for new studies to dissect the role of adaptive attitudes and mental readiness in improving digital skills, IT understanding, and relevant education, and entrepreneurial competencies. Ultimately, the key distinction from similar research lies in its objectivity. The originality of this study is its focus on farmers, a demographic that has not been previously addressed in earlier research.

Digital Skills

Recently, the concept of digital skills has been frequently emphasized by scholars, practitioners, and business professionals, particularly in relation to digital transformation. Numerous platforms and media highlight digital business channels. Literally, digital skills are defined as the ability to navigate and utilize digital technologies for business purposes.

The current emphasis on digital skills centers around the effective delivery of information. Deschênes (2024) describes digital skills as the proficiency to discover, verify, and create content using both hardware and software.

There are five categories of basic fundamental digital skills (Karcioğlu & Binic, 2023; Nikou et al., 2022). First, effective communication is essential. Since the output of digital skills involves both the delivery and reception of content, individuals must possess strong communication abilities to ensure that the information conveyed is accurately received. Second, content management is crucial. As previously discussed, the function of digital skills encompasses the processes of distributing and receiving content. The ability to process information is invaluable, enabling individuals to select, organize, and comprehend the material presented. Third, transaction skills are important. Understanding the dynamics of digital transactions can assist individuals in acquiring services and products online. These skills are designed to protect consumers from online fraud. Fourth, maturity plays a significant role. Challenges will inevitably arise at any time and in any place, including in the digital realm. With maturity, individuals can approach problems wisely and effectively. They need not worry when faced with obstacles, as appropriate solutions can resolve these issues. Fifth, digital literacy is vital. Some digital services or websites are not freely accessible, and certain content may be illegal due to safety concerns, copyright violations, or legal infractions. By developing digital literacy, users can better protect themselves from cybercrime.

Discussions regarding the relationship between digital skills and adaptive attitudes, as well as the impact of digital skills on mental readiness, are explored. For instance, Priyagus et al. (2024) emphasize that the adoption of technology significantly influences the prosperity of Indonesian farmers, particularly in their strategies for addressing challenges. By integrating technology, farmers' welfare, including health, can improve positively (Fitriadi et al., 2024; Nurjanana et al., 2024). The first hypothesis is formulated as follows:
Hypothesis 1a: digital skills influence adaptive attitudes.
Hypothesis 1b: digital skills influence mental readiness.

Understanding of IT

Information technology, commonly abbreviated as "IT" is an integral components of today's modern world. Individuals rely on information technology for various elements of life, ranging from communication to business management. Consequently, a solid understanding of IT is essential for navigating contemporary society. The fundamentals of IT encompass its concepts, components, and functions. Basically, IT consists of both software and hardware designed to collect, store, manage, and transmit information (Nouri Hussein et al., 2023). Achmad et al. (2016) noted that the utilization of IT enables individuals to access and process information accurately, optimize business decision-making, and enhance communication. By grasping the principles of IT, individuals can establish a robust foundation for addressing various challenges. The success of most businesses is determined by IT (Awamleh & Ertugan, 2021). In the rapidly evolving digital era, understanding IT is not only essential but also imperative. Studying IT involves more

than just mastering software and hardware; it equips individuals with valuable skills that enhance various aspects of life and opens the door to a wide range of career opportunities. The following are five compelling reasons for the urgency of understanding IT: (1) fostering a continuous learning framework, (2) providing practical experience, (3) encouraging creativity, (4) creating new talents, and (5) expanding job opportunities. The second hypothesis is simulated as follows:

Hypothesis 2a: understanding of IT influences adaptive attitudes.

Hypothesis 2b: understanding of IT influences mental readiness.

Relevant Education

The transition from Industry 4.0 to Society 5.0 places a greater emphasis on human involvement in the utilization of technological components such as AI, big data, and robotics. Success in operating these technologies is closely linked to educational qualifications. The education sector plays a crucial role in fostering the quality and character of human resources (Dung, 2021). Education is essential for addressing disparities, even in the smallest communities or villages, through optimal educational support services. With the advent of Society 5.0, the world is rapidly evolving and advancing. The components of Society 5.0 will enhance the socio-economic activities of society (Alimohammadlou & Khoshsepehr, 2023; Potočan et al., 2021). Education bears the full responsibility for building knowledge for the future (Levrini et al., 2019).

An intelligent nation is one that prioritizes education. In Indonesia, education serves as a cornerstone for national intelligence, as outlined in the 1945 Constitution. To achieve relevant education, several levels must be addressed: formal, non-formal, and informal education. Generally, formal education refers to structured educational activities conducted in schools and universities, while non-formal education encompasses organized activities outside the traditional school system. Informal education, on the other hand, involves learning experiences within the family and the environment, often taking the form of independent study. When these three levels of education are implemented in appropriate proportions, learning outcomes can be improved. For the third hypothesis, the following assumptions:

Hypothesis 3a: relevant education influences adaptive attitudes.

Hypothesis 3b: relevant education influences mental readiness.

Adaptive Attitude

Adaptive attitudes refer to an individual's behavior in adjusting to the norms prevalent in their environment (Apesteguia et al., 2023). When an individual demonstrates adaptive attitudes that align with the norms of their surroundings, it can be concluded that they exhibit effective adaptive behavior. These attitudes are often interpreted as a reflection of social maturity, as they influence how a person navigates daily routines in relation to their age, location, and cultural context. Choi (2022) emphasizes that adaptive attitudes encompass an individual's ability to adjust to ongoing situations and respond to the experiences they encounter. In academic discourse, adaptive attitudes are frequently

referred to by other terms, including social maturity, adaptive fitting, social competence, and adaptive capacity.

The relevance between digital skills and adaptive attitudes was examined by Botha (2024). Entrepreneurship functions as an adaptive resource, driven by self-efficacy in the formation of entrepreneurial intentions. Career adaptability and education can serve as predictors of entrepreneurial behavior. Entrepreneurial competency is not solely a job or professional orientation; it is also associated with an individual's adaptive attitude toward promoting independence. Each person possesses a unique mindset and interest in entrepreneurial competencies that correspond with their business profile. In essence, assertiveness, personality, and empathy are precursors to perceived behavior in entrepreneurship. The next hypothesis is proposed:

Hypothesis 4: adaptive attitudes influence entrepreneurial competence.

Hypotheses 6a, 6b, and 6c: digital skills, understanding of IT, and relevant education moderated by adaptive attitudes influence entrepreneurial competence.

Mental Readiness

Mental readiness is defined as the sensitivity to respond to things related to an individual's nature and mind, while remaining external to the body (Nicki Marquardt et al., 2023; Van Raalte et al., 2019). Thus, mental readiness represents a state in which individuals can think with full confidence when confronting threats. Competent entrepreneurship, or its opposite, can be reflected in an individual's confidence in managing a business. As illustrated by Devi et al. (2021) and Komalasari & Anafarhanah (2022), mental readiness has a direct impact on entrepreneurial competence. Moreover, mental readiness fosters digital skills, IT understanding, and relevant education, which collectively enhance entrepreneurial competence over time (Farradinna et al., 2023; Istiqomah et al., 2022; Pardiman & ABS, 2020; Rakićević et al., 2022; Saputri et al., 2019; Singh et al., 2024; Supardi et al., 2022). Therefore, it is reasonable to propose the following final hypothesis:

Hypothesis 5: Mental readiness influences entrepreneurial competence.

Hypotheses 7a, 7b, and 7c: digital skills, understanding of IT, and relevant education moderated by mental readiness influence entrepreneurial competence.

Entrepreneurship Competency

Entrepreneurial competency encompasses a combination of knowledge, attitudes, and skills that are interrelated and essential for individuals to achieve optimal business management and performance (Ahmad et al., 2022; Sakib et al., 2022; Van Gelderen, 2023). To successfully launch a business, every individual must possess entrepreneurial competence. Hidayah & Rodhiah (2023) identify three key entrepreneurial competencies that business practitioners should develop: (1) skills, (2) attitudes, and (3) knowledge. Entrepreneurs generally aim to avoid business failure while striving for high profits. However, this goal is challenging, as nearly all entrepreneurs compete to establish a sustainable business that serves as their primary source of income or generates additional revenue. To embark on an entrepreneurial journey, individuals can leverage technological resources for promotions,

sales, and services. It is important to note that entrepreneurial competence cannot be acquired instantaneously; rather, it develops through consistent practice and real-world experience. Therefore, sustained engagement in business activities is crucial for cultivating entrepreneurial competence.

METHOD

This study aims to examine the associative relationship between the components of Society 5.0—specifically digital skills, U-IT, and relevant education—on entrepreneurial competence, with adaptive attitudes and mental readiness serving as moderating factors. The data sample covers the entire population of dragon fruit farmers in Samboja, consisting consists of 159 respondents based on field observations. Data collection was conducted through primary interviews, where enumerators performed face-to-face or offline interviews. The interviews utilized a structured questionnaire, that included questions formatted on a Likert scale. Respondents were provided with six options to express their choices: (1) never, (2) rarely, (3) sometimes, (4) usually, (5) often, and (6) always. The statistical method operated to verify the data was moderated regression. Two parameters in the moderated regression analysis used to assess the model's strength include feasibility testing and hypothesis testing. Data were analyzed using SPSS version 28 and the Sobel test.

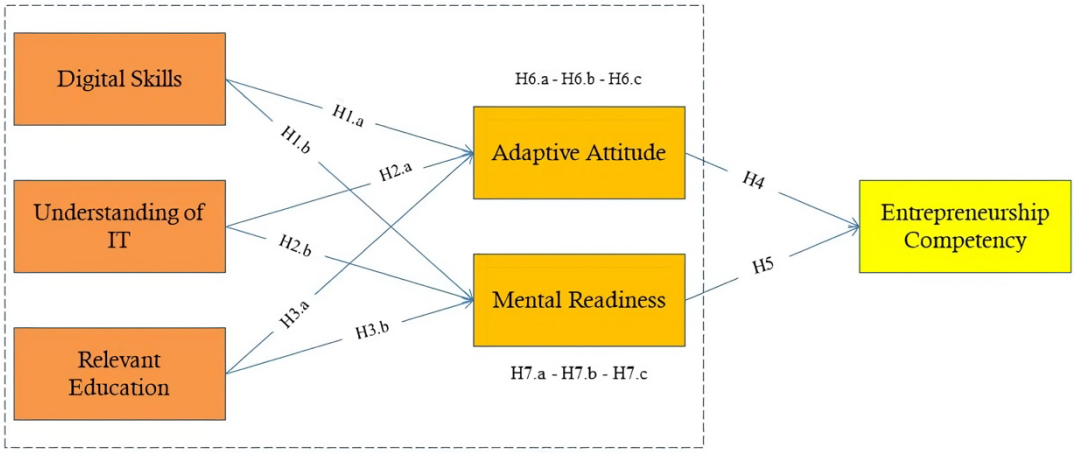

Figure 1. Conceptual Model

Figure 1 illustrates the compiled variables. First, digital skills. The rapid advancement of the digital era necessitates adaptation to ongoing changes. By embracing digital innovations, farmers can align themselves with the evolving dynamics of the work environment and society. The five components of digital skills are: (a) technological literacy, (b) data analysis, (c) digital innovation, (d) communicativeness, and (e) extensive networking and connections. Second, understanding of IT. To thrive in the era of Society 5.0, it is essential for farmers to possess critical thinking skills and a strong awareness of emerging IT. The three components of understanding IT include: (a) AI, (b) Internet of Things/IoT, and (c) blockchain. Third, relevant education. To advance towards Society 5.0, a strong elaboration on information access is necessary. In terms of educational qualifications, farmers must possess knowledge in the field of agriculture, which can be

acquired through both formal and non-formal education. Four components of education are pertinent: (a) educational background according to expertise, (b) agricultural group discussions, (c) participating in seminars, courses, and workshops, as well as (d) certified training programs. Fourth, adaptive attitude. Adaptive attitudes as a response to the uncertainties present in the workforce. The four components of an adaptive attitude include: (a) creative thinking, (b) problem solving skills, (c) teamwork, and (d) new innovation. Fifth, mental readiness. The era of Society 5.0 requires farmers to adapt and respond more swiftly to changing conditions. Mental readiness is a crucial attribute for effectively managing pressure in both work and social environments. It comprises three key components: (a) emotions and stress, (b) mindset, and (c) physical condition. Sixth, entrepreneurial competence. In the agricultural sector, as it reflects a farmer's commitment to developing the skills necessary for optimal performance in agricultural business. The four components of business competency are: (a) personal relationships, (b) financial management, (c) marketing expertise, and (d) competitiveness. The six variables are coded as follows: digital skills (DS), understanding of IT (U-IT), relevant education (RE), adaptive attitude (AA), mental readiness (MR), and entrepreneurial competence (EC).

FINDING AND DISCUSSION

Respondent Description

Results

Sample observations included 159 respondents who were members of the dragon fruit farming group in Samboja. The farmers recorded are those who not only rely on cultivating dragon fruit for their livelihood but also engage in the electronic sale and marketing of the fruit. Table 1 summarizes the characteristics of the respondents, indicating that the average age of farmers is between 36 and 45 years (44.7%), while those aged 25 to 35 years (27%), 45 to 55 years (12.6%), those under 25 years (10.1%), and those over 55 years (5.7%). The predominant gender among farmers is male (66%), compared to female farmers (34%). The majority of dragon fruit farmers possess a formal educational background (57.9%) or are school and college graduates. The level of formal education referenced here includes the 12-year compulsory education program recommended by the government, which encompasses elementary school, middle school, and high school, as well as continued education at the diploma, bachelor's, and master's levels. The percentage of dragon fruit farmers with non-formal educational backgrounds (23.9%) is slightly higher than that of those with informal educational backgrounds (18.2%). Non-formal education is defined as education acquired through seminars, courses, and workshops related to agriculture, or through certified training programs for farmers. In contrast, informal education encompasses independent learning methods, such as group discussions and mentoring focused on agricultural practices.

The highest average farming experience among respondents ranges from 8 to 12 years (56%). The second largest group consists of individuals with 4 to 8 years of experience (37.7%), followed by those with 1 to 4 years (4.4%), and finally, those with more than 12 years (1.9%). The respondents reported owning land areas greater than 7 hectares (48.4%).

Meanwhile, the average land area for dragon fruit plantations owned by farmers falls between 4.1 to 7 hectares (35.8%) and 1 to 4 hectares (15.7%). The types of dragon fruit cultivated include red dragon fruit (80.5%) and white dragon fruit (19.5%), which align with consumer demand and market preferences. Although the skin of both varieties is reddish-purple, their internal appearances differ.

Table 1. *Demographics*

Identity	Items	Frequency (n)	Percent (%)
Age	<25 years	16	10.1
	25-35 years	43	27
	36-45 years	71	44.7
	46-55 years	20	12.6
	>55 years	9	5.7
Sex	Male	105	66
	Female	54	34
Education	Formal	92	57.9
	Non-formal	38	23.9
	Informal	29	18.2
Farming experience	1-4 years	7	4.4
	4-8 years	60	37.7
	8-12 years	89	56
	>12 years	3	1.9
Land area	1-4 hectares	25	15.7
	4.1-7 hectares	57	35.8
	>7 hectares	77	48.4
Types of cultivated dragon fruit	Red dragon fruit	128	80.5
	White dragon fruit	31	19.5
Total manpower	Nothing	33	20.8
	1-3 workers	61	38.4
	4-6 workers	36	22.6
	7-9 workers	29	18.2
Business experience	<2 years	40	25.2
	2-5 years	45	28.3
	>5 years	74	46.5
Sales and marketing segmentation	Local	25	15.7
	Domestic	113	71.1
	International	21	13.2
Turnover (IDR per month)	<7,500,000	65	40.9
	7,500,000-13,000,000	11	6.9
	>13,000,000	83	52.2

In managing dragon fruit plantations, farmers typically employ an average of 1 to 3 workers (38.4%), while those who employ 4 to 6 workers (22.6%) and those with 7 to 9 workers (18.2%). Additionally, 20.8%of farmers manage their plantations independently, with assistance from colleagues and family members who work voluntarily without wages. In the context of managing dragon fruit cultivation, workers can be categorized into two groups: agricultural laborers and administrative employees. Agricultural workers assist landowners with tasks such as planting, tending to, and harvesting the crops. Meanwhile, administrative employees are responsible for reporting, quality control, packaging, and product delivery. The experience levels of these workers vary, with 46.5% having over five

years of experience, 28.3% possessing two to five years, and 25.2% having less than two years of experience. The presence of farmer groups is evident in the sales and marketing segmentation of dragon fruit, which includes local sales (15.7%), domestic sales (71.1%), and exports to international markets (13.2%). The sales and marketing of dragon fruit utilize a virtual system that facilitates payment transactions and ensures security. More than half of the dragon fruit farmers report an average monthly turnover exceeding IDR 13,000,000 (52.2%). Lastly, 40.9% of farmers have an average turnover of IDR 7,500,000 per month (40.9%) and IDR 7,500,000 to IDR 13,000,000 per month (6.9%).

Table 2. *Data Feasibility Test*

Variables (Code)	Components	*r*	*CA*	*F*	R^2
Digital skills (DS)	DS1. Agile technological literacy	0.672	0.933	–	–
	DS2. Flexibility in analyzing data	0.859			
	DS3. Enthusiastic about digital innovation	0.754			
	DS4. Able to communicate well	0.858			
	DS5. I have extensive ties and connections	0.601			
Understanding of IT (U-IT)	U-IT1. I use AI to make decisions	0.893	0.766	–	–
	U-IT2. Job security involving IoT	0.858			
	U-IT3. Providing an inclusive trading system via blockchain	0.717			
Relevant education (RE)	RE1. I feel that my educational background suits my current skills	0.604	0.741	–	–
	RE2. Proactive in agricultural group discussions	0.393			
	RE3. Participate in seminars, courses and workshops related to agriculture	0.588			
	RE4. Job-related certified training	0.692			
Adaptive attitude (AA)	AA1. Think creatively to express the best ideas	0.674	0.758	13.69	0.639
	AA2. I have an alternative in solving the problem	0.499			
	AA3. Leadership that prioritizes team work	0.579			
	AA4. Passion to produce innovation	0.708			
Mental readiness (MR)	MR1. I was able to recover from emotions and stress	0.554	0.857	5.035	0.879
	MR2. I have a positive mindset	0.734			
	MR3. Willingness to maintain physical condition	0.647			
Entrepreneurship competency (EC)	EC1. Close personal relationships with customers	0.713	0.786	8.354	0.715
	EC2. Comprehensive financial control	0.638			
	EC3. Commitment to marketing mastery	0.578			
	EC4. Initiatives in handling competition risks	0.472			

There are four propositions to assess the suitability of the data. First, the validity test is formulated using Degrees of Freedom (DF) with a significance level of 5%. The DF value is calculated as the total sample size minus two (DF - 2 = 157). Typically, validity testing involves comparing the correlation coefficient to the critical value from the r-table (r > 0.156). Second, the reliability test is evaluated using Cronbach's Alpha, with a minimum acceptable threshold of 0.6 (CA > 0.6). Third, the F-test is employed to examine simultaneous regression relationships. The ideal condition for a simultaneous relationship to be deemed valid, the F-value must exceed the critical value from the F-table (F > 2.27). Quantitatively, the F-test operates at a significance level of 5%. The F-table values are derived from the F-distribution at a 5% probability, resulting in F-table columns: $DF1$ (k - 1 = 5) and $DF2$ (n - k = 153). Here, "k" represents the number of variables, while "n" denotes the sample size. Fourth, the coefficient of determination is analyzed. The four categories for interpreting the coefficient of determination are as follows: low (<0.25), moderate (0.25 to 0.5), strong (0.51 to 0.75), and very strong (0.76 to 1).

The assessment of data suitability involves six variables and twenty-three components. Collectively, the digital skills variable is divided into five components, while both the U-IT and mental readiness variables consist of three components each. The remaining three variables—relevant education, adaptive attitudes, and entrepreneurial competence—each include four components. Data extracted using SPSS 28 indicates that the six variables are classified as reliable. In order of highest to lowest Cronbach's Alpha (CA) score, the variables are as follows: digital skills (*0.933*), mental readiness (*0.857*), entrepreneurial competence (*0.786*), U-IT (*0.766*), adaptive attitudes (*0.758*), and relevant education (*0.741*). From Table 2, it can be concluded that all components fall within the valid category. Specifically, the comparison of the largest and smallest correlation coefficient scores for each variable is detailed below: for the first variable, DS2 (*0.859*) and DS5 (*0.601*); for the second variable, U-IT1 (*0.893*) and U-IT3 (*0.717*); for the third variable, RE4 (*0.692*) and RE2 (*0.393*); for the fourth variable, AA4 (*0.708*) and AA2 (*0.499*); for the fifth variable, MR2 (*0.734*) and MR1 (*0.554*); and for the sixth variable, EC1 (*0.713*) and EC4 (*0.472*).

Other facts indicate that the first, second, and third models exhibit a good fit. Simultaneously, adaptive attitudes are influenced by digital skills, U-IT, and relevant education (F = 13.69). Digital skills, U-IT, and relevant education also impact mental readiness (F = 5.035). Both adaptive attitudes and mental readiness can influence entrepreneurial competence (F = 8.354). Table 2 confirms that the models for developing adaptive attitudes (R^2 = 0.639), mental readiness (R^2 = 0.879), and entrepreneurial competence (R^2 = 0.715) are robust. This suggests that both adaptive attitudes and mental readiness can be shaped by digital skills, U-IT, and relevant education. Then, adaptive attitudes and mental readiness are appropriate measures for explaining entrepreneurial competence. The R^2 scores indicate that the model for forming adaptive attitudes and entrepreneurial competence is strong, while the model for developing mental readiness is classified as very strong.

Table 3. *Direct Influence and Indirect Influence*

Linkages	Path	t-Statistics	Coef. (β)	Prob. (p)	Remarks
DS → AA	Direct	3.126	0.375	0.003**	H1a: accepted
DS → MR	Direct	3.237	0.388	0.002**	H1b: accepted
U-IT → AA	Direct	5.192	0.396	0.000**	H2a: accepted
U-IT → MR	Direct	3.768	0.87	0.001**	H2b: accepted
RE → AA	Direct	2.638	0.425	0.017*	H3a: accepted
RE → MR	Direct	2.314	0.37	0.029*	H3b: accepted
AA → EC	Direct	3.317	0.411	0.002**	H4: accepted
MR → EC	Direct	2.134	0.263	0.039*	H5: accepted
DS → AA → EC	Indirect	2.274	0.154	0.023*	H6a: accepted
U-IT → AA → EC	Indirect	2.795	0.163	0.005**	H6b: accepted
RE → AA → EC	Indirect	2.065	0.175	0.038*	H6c: accepted
DS → MR → EC	Indirect	1.782	0.102	0.074	H7a: not accepted
U-IT → MR → EC	Indirect	1.857	0.229	0.063	H7b: not accepted
RE → MR → EC	Indirect	1.569	0.097	0.116	H7c: not accepted

Abbreviations: DS = digital skills, U-IT = understanding of IT, RE = relevant education, AA = adaptive attitude, MR = mental readiness, EC = entrepreneurship competency, *p <5%, and **p <10%.

This study compares t-statistics with the z distribution ($t > 1.96$) and significance levels ($p < 0.01$ and $p < 0.05$) to determine whether the hypothesis is accepted or rejected. At a significance degree of 1%, digital skills ($t = 3.126$; $p = 0.003$) and U-IT ($t = 5.192$; $p = 0.000$) demonstrate a partial relationship with adaptive attitudes. Digital skills ($t = 3.237$; $p = 0.002$) and U-IT ($t = 3.768$; $p = 0.001$) also have a partial impact on mental readiness. Furthermore, adaptive attitudes ($t = 3.317$; $p = 0.002$) partially influence entrepreneurial competence. As summarized in Table 3, at a significance level of 1%, U-IT moderated by mental readiness has a partial impact on competence attitudes ($t = 2.795$; $p = 0.005$). Empirically, three partial causal relationships were identified: between relevant education and adaptive attitudes ($t = 2.638$; $p = 0.017$), between mental readiness and adaptive attitudes ($t = 2.314$; $p = 0.029$), and between mental readiness and entrepreneurial competence ($t = 2.134$; $p = 0.039$), all observed at a significance level of 5%. Besides, digital skills ($t = 2.274$; $p = 0.023$) and relevant education ($t = 2.065$; $p = 0.038$) positively influence entrepreneurial competence through adaptive attitudes. Yet, at both the 1% and 5% significance levels, mental readiness did not demonstrate a moderating effect on the relationships between digital skills ($t = 1.782$; $p = 0.074$), U-IT ($t = 1.857$; $p = 0.063$), and relevant education ($t = 1.569$; $p = 0.116$) with entrepreneurial competence.

Justifications

Of the fourteen proposed hypotheses, eleven were accepted, and three were rejected. In reality, both digital skills and U-IT, along with relevant education, increasingly build adaptive attitudes and mental readiness. The enhancement of entrepreneurial competence is inextricably linked to an adaptive attitude and positive mental readiness. Conversely, the interpretation of the three opposing hypotheses suggests that deficiencies in digital skills, U-IT, and relevant education may impede farmers' mental readiness, thereby disrupting their entrepreneurial competence.

Hypothesis one (H1a and H1b) shows a significant relationship between digital skills, adaptive attitudes, and mental readiness. Several papers found an interconnected relationship between digital skills and adaptive attitudes (Galindo-Domínguez et al., 2024). Likewise, digital skills are positively correlated with mental readiness (Livingstone et al., 2022; Tetri et al., 2024). In hypothesis two (H2a and H2b), adaptive attitudes and mental readiness are significantly influenced by U-IT. The manuscript discusses topics that explore the relationship between U-IT and adaptive attitudes. Integrated technology teaching enhances adaptive skills (Saleh et al., 2023). Positive emotional reactions can significantly affect an individual's attitude toward embracing the efficacy of IT use. From a cognitive shift perspective, the need for innovation stimulates individuals' adaptive attitudes to explore new features in the IT sector (Zha et al., 2020). This phenomenon is also evident in the small and medium-sized enterprise (SMEs), where interest constructs trigger cognitive behaviors related to IT (Maski et al., 2024). Substantively, U-IT and mental readiness are closely interconnected. Readiness to change mediates individual characteristics in understanding technology (Kim & Kim, 2022). Van Der Merwe (2019) estimates that IT usage positively affects mental and psychological well-being. Within virtual communities, optimism and compatibility enhance knowledge-sharing intentions within the technology acceptance model. Hypothesis three (H3a and H3b) posits that relevant education significantly impacts adaptive attitudes and mental readiness. In today's modern age, individuals are not only equipped with knowledge but also possess the ability to think critically. Thus, relevant education inspires individuals to engage in critical thinking when analyzing and solving problems. This includes fostering adaptive attitudes and mental readiness, which inclusive education can effectively cultivate (Afshar & Yar, 2019; Hairuzzamil et al., 2023; Jury et al., 2021; Nopiyanto et al., 2023).

Hypothesis four (H4) and hypothesis six (H6a, H6b, and H6c) propose that an adaptive attitude significantly increases entrepreneurial competence. Notably, a stable adaptive attitude towards digital skills, U-IT, and education can promote entrepreneurial competence. The role of digital skills, U-IT, and education in fostering entrepreneurial competencies through the encouragement of adaptive attitudes has been examined in various studies. Essentially, it was found that adaptive attitudes act as a bridging in the relationship between digital skills, U-IT, and education, all of which are relevant to entrepreneurial competence (Cai & Pan, 2023; Chandra & Hendayana, 2024; Drydakis, 2022; Kusumawijaya & Astuti, 2021; Somwethee et al., 2023; Zarefard & Jeong, 2019).

Hypothesis five (H5) concludes that mental readiness has an insignificant impact on entrepreneurial competence. In addition, hypothesis seven (H7a, H7b, and H7c) indicates that digital skills, U-IT, and relevant education, when considered alongside mental readiness, also have an insignificant effect on entrepreneurial competence. Theoretically, IT can assist farmers in managing the distribution of agricultural commodities. In other words, market information can be accessed easily, which includes enhancing a product's reputation. Digital skills will further facilitate coordination with external parties. Moreover, the focus should not be solely on digital skills and U-IT; attention must also be given to relevant education through the agricultural learning system. This system makes the

workload more manageable, both in group settings and for individual tasks. The three elements mentioned above must be developed with an adaptive mindset and mental preparedness. For instance, in the fields of marketing, sales, and product delivery, farmers can leverage web services that are accessible to potential buyers and customers. By integrating digital skills, IT, and education into a comprehensive agricultural management framework, farmers can develop adaptive mindsets and enhance their entrepreneurial competencies. The findings of this study contradict those of previous articles. Kurniawan et al. (2024) argue that the adoption of IT—such as financial literacy, digital administrative skills, internet connectivity, and computer access—can help agricultural cooperatives restructure their businesses.

CONCLUSION

The synthesis of this study is to explore the landscape of Society 5.0 in relation to the entrepreneurial competencies of dragon fruit farmers affiliated with agricultural groups. Overall, the findings reveal three main points. First, partial testing indicates that digital skills, U-IT, and relevant education significantly influence adaptive attitudes and mental readiness. Second, both adaptive attitudes and mental readiness have a substantial impact on entrepreneurial competence. Third, moderation testing found that adaptive attitudes play a crucial role in the relationship between digital skills, U-IT, and education relevant to entrepreneurial competence.

The integration of Society 5.0 into the agricultural sector has a systematic impact, especially in enhancing farmers' entrepreneurial competencies. Existing research indicates that performance in entrepreneurial competency is generally rated as good. However, follow-up actions are necessary from stakeholders to protect product brands, assist with business permits, provide rewards, recognition, and incentives, offer tax relief for exporters, and re-evaluate international trade policies such as Cost, Insurance, and Freight (CIF) and Free on Board (FoB) for agricultural products. The development of Society 5.0 may lead to excessive dependence on IT, potentially fostering complacency, and jeopardizing the mental well-being of the younger generation due to the effects of automation. The government is expected to provide regular micro-agricultural empowerment and training for farmers. Also, dragon fruit is a horticultural crop that can significantly contribute to food security and can be processed into a variety of products. Too, dragon fruit farmers are encouraged to diversify their offerings in response to declining plant productivity and soil fertility.

The limitations of this study relate to mental readiness, which does not seem to influence the relationship between digital skills, U-IT, and education concerning entrepreneurial competence, contrary to the initial hypothesis. Future research agendas should consider mental readiness as a moderating variable. Another limitation is the sample size; it is advisable to include additional sample units with comparable characteristics.

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