Digitalizing rural entrepreneurship: towards a model of Pangalengan digital agropolitan development

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Abstract. Digital technologies and infrastructures in rural areas offer an opportunity to foster the development of agricultural sector, as they can open up the access to information needed for the development of this sector. However, rural communities might not merely have the capabilities to take advantage of the digital technologies. This study aims to develop a framework for fostering entrepreneurial abilities in agribusinesses in Pangalengan agropolitan area, Bandung Regency. Pangalengan has agricultural potentials, but the local communities have not been able to use digital technology to increase the added value of agricultural products and expand marketing. A case study approach was used to compare the conditions in Pangalengan with some good practices in other regions, namely the Kintamani rural area, in Bali, in which coffee farmers have utilized digital technologies and the internet in gaining new knowledge about production and distribution of the agricultural product. In our model, we proposed a mechanism for developing the digital literacy and entrepreneurial capacity in the community so that they can utilize digital technologies in the agricultural sector.

1. Introduction

Since 1960s, rural development paradigms have placed the agricultural sector as engine of rural growth [1]. Rural communities are assumed to make the agricultural sector as the foundation of their daily life. The agricultural sector tends to be developed to fulfil their daily needs without considering profit. However, traditionally, developing the agricultural sector is considered unable to welfare the community [2, 3, 4]. There is a need to improve the value of the agricultural sector in order to increase the community’s welfare; one of the strategies is to develop an agribusiness system.

Agribusiness is an agricultural system which is implemented intersectoral in the whole system [5]. The agribusiness system covers the upstream subsystem, on-farming subsystem, downstream subsystem, and the supporting business subsystem. The development of the agribusiness system could influence productivity, help manage the commercialization of agriculture, increase the income of farmers, and provide new ways to improve the economic conditions [6, 7]. The agribusiness system is considered the right choice to improve the quality of life of rural people who rely on the agricultural sector because it gives added value to the whole system. The agricultural product is one of the most common of agribusiness implementations in Indonesia.

To develop an agribusiness system in rural areas, one of the significant supporting factors is rural entrepreneurship [8]. In line with the integrated agribusiness system, rural entrepreneurship gives a new perspective on agriculture, such as industrialization (e.g., [9]). Rural entrepreneurship becomes one of
the strategies for the rural community to survive in a rural area. Rural entrepreneurship highlights the utilization of local resources, such as agriculture, as physical resources in a particular area.

Rural entrepreneurship is a key to foster rural development [9, 10]. Rural entrepreneurship opens up the opportunities of new employment, reduces the unemployment rate, increases the community income, and diversifies rural economics so that the rural community do not depend on one sector only [11]. The emergence of new business is viewed as a tool to improve the income and giving stability in rural society. Rural entrepreneurship gives the new perspective about agricultural such as industrialization of agricultural [9]. Nowadays, digital technology is affecting the development of rural entrepreneurship.

The improvement of technology and information is also presenting the digitalization of entrepreneurship in a rural area. Digitalization is an important thing needed to develop rural entrepreneurship because it could improve the competitiveness of the business [12]. Digitalization fosters the provision of information in a rural area [13, 14, 15, 16]. The easiness of information acquisition would improve the rural community’s knowledge that will influence their ability to identify new opportunities and make some innovations. The appearance of new opportunities and innovation will improve the regional economy condition [12]. Unfortunately, not all of the rural communities can utilize the opportunity of digitalization. The availability of digital technology will not deliver a positive impact if the rural community does not have the digital competency to utilize the technologies. This situation is associated with literacy digital of the rural community.

Digital literacy in small communities promises the improvement, welfare, and success in all levels, and has a positive impact on rural daily life [17, 18]. The availability of digital technology in rural area encourages the rural community to have digital competency [19]. If the rural community would like to take benefits from the availability of digital technology, they have to be able to use it.

This study aimed to propose a model that focuses on the mechanism of developing digital literacy and rural community entrepreneurial capacity so that they can utilize digital technology in developing the agricultural sector. Therefore, the case studies were conducted in two rural areas to compare and replicate the successful case. The development of digital literacy and community capacity has been effectively used in agricultural development in other rural contexts. Kintamani Rural Area represents the successful case in utilizing the digital technology in the agricultural sector. The farmers in Kintamani Rural Area used the digital technology in every step of the integrated coffee development. The Kintamani case will be reflected in Pangalengan Agropolitan, which has good physical, environmental and economic potentials in developing agribusiness. However, the use of digital technology in Pangalengan Agropolitan is underdeveloped.

Digital literacy grows in line with collective capacity in a rural community. Both of them encourage the formation of better entrepreneurial capacity. Otherwise, digital literacy and collective capacity are not yet owned by Pangalengan Agropolitan rural community. In the end, this paper shows that digital technologies can be utilized in developing the agricultural sector by fostering entrepreneurial, individual, and collective capacities.

The proposed model will place the farmers as the main actor. In developing agribusiness system, the farmers are expected to have the ability to manage the integrated agricultural sector, starting from the upstream into the downstream. This means they have to manage the seeding process, planting, harvesting, processing, and selling the products. In Kintamani Rural Area, the farmers can develop the agricultural sector in the agribusiness system so that we can call them as an entrepreneur. This is different from the farmers in Pangalengan Agropolitan, in which they are only able to plant the commodity but are not able to process the farm products independently.

The remainder of this paper is structured as follows. The next section discusses the literature review about agribusiness, rural entrepreneurship, and digitalization in a rural area. Following the literature review, the overview of Pangalengan Agropolitan and Kintamani Rural Area case are provided. Finally, the paper explains the mechanism to develop literacy digital and entrepreneurial community capacity in a rural area.
2. Literature review

2.1. Digitalization in rural areas

Nowadays, the agribusiness concept becomes a new perspective on the agricultural sector. The agribusiness concept views the agricultural sector as an integrated system. According to Maulidah [20], agribusiness involves all activities, including the procurement and distribution of production facilities (inputs) to the marketing of products produced by farming and agro-industry, which are interrelated. The agribusiness concept gives new nuances in developing the agricultural sector in a rural area. The development of the agricultural sector, which initially only focused on the cultivation stage, began to develop into integrated agriculture. One of the significant supporting factors to develop agribusiness activity in rural areas is rural entrepreneurship.

Rural entrepreneurship is defined as the creation of a new organization, which introduces a new product, serve or create a new market, or utilize new technology in a rural area [8]. Rural entrepreneurship gives a new perspective about the agricultural sector, such as industrialization of the agricultural sector [9]. In order to develop rural entrepreneurship, the important aspect needed to involve is local resources, such as physical resources [10]. Several studies have revealed that local resources can be used in developing rural entrepreneurship so that have a positive impact to economic condition [10, 21]. Rural entrepreneurship has attached spatial characteristic since it involves a relationship between the location where the activity took place.

Recent evidence suggests that the concept of digital entrepreneurship began to develop [e.g., 22, 23, 24, 25, 26] as a new way to offer the product and the market involves digital technology. A previous study also reported that digital entrepreneurship presents in a rural area (e.g., [12]). Digitalization in rural areas fosters the appearance of digital entrepreneurship. Digitalization is the adoption of the increase of digital technology usage or computer by an organization, industry, or country [27]. Throughout this paper, the term digitalization will refer to the adoption of digital technology usage or computer to develop entrepreneurship in rural areas.

Digitalization can have a positive impact on economic activities, such as increasing creativity and producing an innovative product [28, 29]. In addition, digitalization also encourages up-skilling by providing more time and resources for workers to do skilled work. However, new technology can also be a threat because of the variety of jobs were reduced due to automation. Hence, the provision of technology digital is viewed as potency and threat toward economic activity.

Digitalization also brings disruption effects into economic activities. In an entrepreneurial context, digital technology changes the uncertainty and the strategies to face uncertainty [30]. Digitalization is an important thing needed to develop rural entrepreneurship [12]. Digitalization can increase the competitiveness of the business. The rural community has the opportunity to utilize digital technology in a rural area. Digital technology can simplify the provision of information and facilitate access for rural communities to obtain this information. Information obtained through the use of digital technology can help the rural community develop their business and help identify new opportunities [12]. These things will encourage the emergence of new jobs and increase the regional economy. Likewise, Lekhanya [12] shows that digitalization has an impact on economic diversification in a rural area. Digitalization can be utilized to create innovative product diversification to increase the agricultural sector’s value. The communication process with the consumer becomes easier because of the use of digital technology, the same goes for understanding market needs and information acquisition. Therefore, digitalization in a rural area can be utilized to develop the integrated agricultural sector.

2.2. Digital literacy

Digital literacy is a fundamental aspect for rural communities to develop their business by using digital technology such as online marketing and searching for information from the internet. Digital literacy is viewed as the ability of a rural community to utilize digital technology. The first discussion of digital literacy emerged in 1997 by Paul Gilster [31], which defined digital literacy as the ability to understand and use various resources from several resources accessed through computers. The definition of digital
literacy continues to develop based on the context of the discussion. In 2018, UNESCO [32] defined
digital literacy as an ability to manage, access, understand, integrate, communicate, evaluate, and create
information safely and adequately using digital technology to work, decent work, and entrepreneurship.
Given the dynamics of technological development that cannot be avoided, digital literacy is an important
thing that needs to be owned by the community. Many countries have implemented various strategic
plans and digital literacy frameworks to encourage digital literacy in the community, as reported by
UNESCO [32], i.e. strengthening digital literacy to reduce digital divide and build youth capacity in
Oman [33] and improve efficiency, transparency, and service to the community through public
administration in Korea [34].

The utilization of digital technology in a rural area can have a positive impact on the community’s
economy [16, 35]. However, not all community in a rural area have the same chance to utilize digital
technology because the access is expensive. This condition will cause new problem, such as the digital
divide between rural and urban community [36]. Another technical problem that might be faced by the
rural community is the limited options for choosing a broadband provider [33]. This paper assumed that
digital technology could be a catalyst to accelerate the disappearance of the digital divide. Otherwise,
the digital divide increases because the availability of internet connection is not enough, rural
community must have digital competency to reduce the digital divide [37]. The decent knowledge about
digital innovation and the ability to use digital technology becomes an important factor. Thus, internet
connection can help the development of the community in a rural area [19]. Several studies conducted
earlier showed that digital literacy is an important thing needed to have by the rural community to
support their business.

2.3. Collective capacity
According to Chaskin [39], community capacity is defined as the interaction of human capital,
organization resources, and social capital; the interactions in certain societies can be used to solve
collective problems and improve or maintain the welfare of that community. Collective capacity arises
when interactions between individuals employ different and convergent ways to understand and respond
to reality [40]. The collective capacity will help the community to understand the group’s needs, set the
goals, organize the plan, allocate resources to implement the plan, and do the teamwork [41]. In addition,
the collective capacity will help the community carry out its functions well.

Collective capacity in a rural community will help the process of knowledge accumulation to
understand the use of digital technology. The previous study showed that collective capacity would help
the community do something new; for example, diffusion innovation is easier to occur in farmers groups
with high social capital [4]. Social capital’s existence indicates that each person can gather help and
have the collective capacity to take advantage of a climate of trust. A climate of trust helps farmers
gather knowledge and personal insights into community knowledge, abilities, and insights that are very
strong to encourage the growth of innovation in the community [4]. The use of digital technology in
business development might be a new thing for the rural community. Previous research showed that
collective capacity could help the learning process of digital technology for the community in Kampung
Internet, Yogyakarta [16]. The research showed that the community in Kampung Internet commit to
building digital literacy in the whole community through collective actions. The harmonious social
relations in the community trigger the desire of the rural community to learn how to use digital
technology. In the end, the technology adoption in Kampung Internet has a positive impact on their
social and economic condition. Tremblay’s study [16] showed that is important to build collective
capacity in a community to help build the curiosity learn digital technology.

2.4. Informal learning
Informal learning is the most common learning form in a farmer’s group. However, the form of informal
learning is often ignored, whereas informal learning plays an important role in building the knowledge
of a group of people. Landini [42] shows that informal learning has an important role in linking the
various learning resources and supporting the learning process for a long time. Previous studies reported that informal learning is more important than formal learning [43].

Informal learning is defined as learning form which is not institutionalized or less formal than formal education and nonformal and is outside the institutionalized educational curriculum offered by a training or education agency [42, 43]. Informal learning is associated with learning by doing and learning from mistakes. The informal learning process occurs spontaneously, unrealized, and unstructured. Consequently, the form of informal learning is very diverse and can occur everywhere, such as in a family, groups, and many more. Informal mentoring and learning with peers are also categorized as informal learning forms. The informal learning system will increase the confidence and pleasurable to communicate with each other so that knowledge accumulation will occur easier in a group. Informal learning highlights a self-directed and self-reflective processes.

Informal learning is important to be considered to be complementary to formal learning and nonformal learning. Landini [42] recommends that institution can develop a strategy to facilitate the informal learning process. The other recommendation to support the informal learning process is to facilitate peer interactions in a group. The provision of digital infrastructure, such as internet connection, is also needed to support the informal learning process. Informal learning process gives freedom for a learner to use their cognitive resources, and they can use tools such as email, reading some information from the internet, fingertip knowledge (Google), and unplanned meet [43]. Digital technology in rural areas can be utilized by farmers to support the informal learning process.

3. Methodology

This research used a qualitative method with a multiple case studies approach. The case study approach is a description and intensive analysis of a phenomenon or social unit, namely individual, group, institution, or community [44]. A multiple case study was used to extract a lesson from a good case which showed the success of digital technology utilization to be replicated towards other cases. The chosen case represented the use of digital technology in the agricultural sector. By choosing the cases, the researcher replicated the digital technology utilization mechanism in Kintamani Rural Area to implement in Pangalengan Agropolitan.

A semi-structured interview was conducted to obtain information. A semi-structured interview is an interview using the questions list, but it is more flexible because it tries to adjust to the issues raised by the informant [45]. In Kintamani Rural Area, the researchers interviewed some entrepreneurs, which have been already predefined. By interviewing them, the researchers got recommendations to interview other informants. All informants in Kintamani Rural Area are nine people.

In Pangalengan Agropolitan case, the researchers reviewed the previous studies and interviewed the Regional Development Planning Agency of Bandung Regency to choose some villages as case studies. The selected villages are Pangalengan Village, Margamukti Village, Margamulya Village, Banjarsari Village, and Margamekar Village. These five villages represent the Pangalengan Agropolitan Area which show a decent condition in developing agriculture and agribusiness subsystems compared to the other eight villages. To determine informants in the Pangalengan Agropolitan Area, the researchers conducted interviews with the Village Head, then asked for recommendations from informants of farmers and business actors in each village. Total respondents in the Pangalengan Agropolitan Area consists of 12 people.

In qualitative research, there is no minimum sample to ensure the data validity. The researchers chose to finish the collection data when the collected information has shown the same tendency. There was no more new information because it already achieved the redundancy level [46,47]. When it came to the redundancy level, the researchers did not get a new name, which indicated the network was closed, both in Kintamani Rural Area and Pangalengan Agropolitan. Qualitative research is often considered subjective because there is no standardized size. Therefore, the researchers need to verify to ensure the research is valid. Analysis unit in this research is individual. In order to build an internal validity, the researchers concluded each case aggregately. There are two steps to conclude the analysis in each case, as shown in figure 1.
4. Case overview

Both cases have the same economic characteristics. They develop the same commodities, namely horticulture commodity and coffee commodity. Both cases have different dominance of commodity and the intensity of developing the commodity. Regarding the Kintamani Rural Area, the coffee plantation dominates, although there is a development of horticulture commodity such as orange. As for the Pangalengan Agropolitan case, while the horticulture commodity dominates the economy, they start to prioritize the development of coffee commodity. This paper shows the replication of Kintamani Rural Area, the success of agricultural development in agribusiness systems assisted by digital technology, towards the Pangalengan Agropolitan. The farmers in Kintamani Rural Area are able to develop the integrated coffee development from the upstream to the downstream. The integrated coffee development associates with a slogan “we grow, we farm, we process, we roast, and we deliver”. By developing integrated coffee development, we can call the farmers there as an entrepreneur. On the other hand, the farmers in Pangalengan Agropolitan only focus on plantation process. Selling raw products which are perishable becomes one of their reasons to sell the products directly to the market. The businessmen who made the processing products prefer to sell their products in tourism destinations rather than the online platform. Since both cases have the same characteristics, the usage of digital technology in the agribusiness system can be the same too so that we can replicate the success of Kintamani Rural Area towards the Pangalengan Agropolitan.

Both cases have the same characteristics in social and institutional aspects. Socially, both cases show the existence of group settings which manage the development of the agricultural sector in each area, namely Subak Abian in Kintamani Rural Area and farmers group in Pangalengan Agropolitan. Institutionally, there is no specific institution responsible for managing the development of the agricultural sector, besides the farmers in belonging to the group itself.

Geographically, Kintamani Rural Area is located at 1500 m above the sea. The development of coffee commodity tended to stagnant since the 1960s and had a very drastic decrease during 2010-2011. At the same time, the farmers shift from the coffee commodity into horticulture commodity such as vegetables because it’s more profitable to them. One of the main horticulture commodities in Kintamani Rural Area is orange. In the long term, the coffee plantation will provide more benefits compared to vegetable or fruit crops. This led some young farmers initiatively to develop the coffee commodity so that they can improve the welfare of the community. A strategy that they use is digital technology in developing coffee commodity.

Regarding the Pangalengan Agropolitan, it is located at 750 m above the sea. The agricultural sector, specifically the horticulture commodity such as potato and the livestock commodity such as dairy cow, dominates the economics of Pangalengan Agropolitan. In 2009, the cultivation of coffee in Agropolitan Pangalengan began to emerge as a response to the earthquake that destroyed the economy of Agropolitan Pangalengan. Horticultural commodity planting, agricultural commodity development, and coffee plantation commodities continue to this day. The Pangalengan Regency and Bandung Regency government are trying to intensify the development of coffee commodities because they have a high selling value and contribute to a positive impact on environmental sustainability.
Table 1. Characteristics of Case Study

|                             | Kintamani Rural Area                                                                 | Pangalengan Agropolitan                                                                 |
|-----------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| **Agribusiness characteristics** | The farmers develop an integrated agricultural sector                               | The farmers and the businessman develop an agricultural sector partially                |
| **The use of digital technology** | E-business (It means they use digital technology for all whole business process): looking for information through Google, Pinterest, and YouTube; networking with other entrepreneurs by using Instagram | E-business (It means they use digital technology for all whole business process): looking for information through Google and YouTube, unfortunately only few farmers did it and it was only done once |
|                             | E-commerce (It means they use digital technology to support transactions): they did online marketing by using Instagram & Tokopedia | E-commerce (It means they use digital technology to support transactions): they did online marketing by using Tokopedia, but did not do it massively |
|                             | Technology automation: they use an advanced engine connected to handphone and internet connection to support production process |                                                                                                                                 |
| **Digital literacy**        | Digital literacy is high, indicated by two conditions: the awareness and the desire of rural the community to learn digital technology; the intensity of using the digital technology in developing agricultural sector is massive | Digital literacy is low, indicated by two conditions, namely: the awareness and the desire of rural community to learn digital technology is still low; the intensity of using digital technology in developing the agricultural sector is not massive |
| **Social relationship**     | Harmonious social relationship makes the informal learning process easier             | The farmers and the businessman tend to work individually                               |

Digital literacy in Pangalengan Agropolitan is still low, although the internet connection is available in every village. The rural community only uses digital technology to communicate through social media, such as WhatsApp and Facebook. They still do not show the desire to learn about digital technology together; it might be because they tend to work individually rather than collectively. The collective learning process only exists in one group farmer and one cooperation. The learning material is about plantation strategy; they do not learn about the use of digital technology. The low interest of the community also affects the ability to use digital technology in Pangalengan Agropolitan. For instance, there was a businessman who tried to sell the product by using an online platform, but he thought offline marketing is easier than online marketing.

The farmers in Kintamani Rural Area have realized that digital technology is needed for developing their business. Despite of their ages, they are highly motivated to learn how to use digital technology. They think that digital technology is useful in achieving a broader market. Moreover, the university helps the old farmers learn about digital technology. They learn collectively in their group, which called Subak Abian. The harmonious social relationship is well-maintained because they are involved in that group. Because of the harmonious social relationship, collectively, they can learn something new in developing the agricultural sector supported by digital technology use. By comparing both cases, the researcher was able to learn something that Agropolitan did not have. These differences will affect how to develop a proposed model.
5. Extracting lessons from the cases

5.1. Digital literacy

The rural community in Kintamani Rural Area has good digital literacy, as shown by the massiveness of digital technology usage. The harmonious social relationship in Kintamani Rural Area triggers the growth of digital literacy. The government also has a role in fostering digital literacy; for example, they carried out digital-based entrepreneurs training. The entrepreneurs in Kintamani Rural Area can explore and utilize the information they get from the internet. Besides, they are capable of expanding their market product. For that reason, the form of digital technology usage in Kintamani Rural Area can be classified into three categories: e-business, e-commerce, and technology automation.

All informants in Rural Kintamani Area can do e-business and e-commerce, while automation technology was only done by one entrepreneur; it shows that there is a different level of digital technology adoption. By using digital technology, the entrepreneurs in Kintamani Rural Area can recognize the new opportunity and utilize it for their business, for example, looking for information about the coffee market development in several countries, sounding product, and understanding consumer’s behavior, and collaborating with other entrepreneurs. The information about coffee industry development helps the entrepreneur create new products and carry new methods, for example, conducting new fermentation and roasting technique. Using digital technology, they know the situation in other countries; thus, they can learn it to implement it in their area. One of the informants mentioned that he could understand consumers’ behavior by using social media to arrange the marketing strategy. The new strategy to sell the product is a sounding product through digital technology, in which the entrepreneurs could inform their consumers that they will launch new products soon. A sounding product is a strategy to increase the attractiveness of consumers on the new products. The networking process with other entrepreneurs also becomes easier because the use of digital technology.

The entrepreneurs are not only able to recognize new opportunity, but also be able to take a risk. The entrepreneurs sacrifice their resources, such as time and resigning from their jobs. In developing the coffee business, they sacrifice their time to do some experiments. The experiment becomes easier because they already get information from the internet. This information helps the entrepreneurs reduce the margin error. Some entrepreneurs resigned from their jobs and started running a coffee business. This is caused by the information from the internet that have made them feel confident to run a new business.

There are some differences between both cases. First, both case studies show the different agribusiness characteristics. The farmers in Pangalengan Agropolitan were not able yet to processing products based on the commodities they grow. They only focus on planting commodities, while the businessman is processing the agricultural-based products; it shows that they have not yet developed agriculture in the agribusiness system. The explanation about digital literacy in Pangalengan Agropolitan will be divided into a farmer unit and a businessman unit.

The digital literacy in Pangalengan Agropolitan is lower than digital literacy in Kintamani Rural Area. The form of digital technology utilization carried out in the Pangalengan Agropolitan consists of e-business and e-commerce, but it is very limited to farmers and certain business actors. The farmers and the businessman are not able to explore and utilize the information by using digital technology. Some farmers and businessmen find inspiration to create new products from the internet. However, they only did it once, and they decide to stop using digital technology to search for broader information. The farmers and the businessmen are not trying to explore the information either to build a marketing strategy or understanding consumer’s preferences. This condition is quite different from the conditions in the Kintamani Rural Area. They continue to follow the development of the coffee industry that occurs in various countries by utilizing digital technology.

Other conditions that indicate the relatively low usage of digital literacy in the Pangalengan community is that digital technology has not been utilized to help exchange information and network processes by farmers and entrepreneurs. They tend to exchange information between businessmen or through technical guidance organized by the government. There is only one informant who has used...
Tokopedia to sell their products; the rest only did marketing at home and left the goods to the center of souvenirs in Pangalengan and surrounding areas. This is quite different from Kintamani’s conditions, where entrepreneurs in Kintamani have been using social media such as WhatsApp and Instagram, to communicate with other entrepreneurs both inside and outside Bali and trainers from various countries. The use of digital technology as a communication medium facilitates the exchange of information and facilitates the collaboration process.

Although the availability of the Internet networks in the Pangalengan Agropolitan is quite good, it is not utilized by farmers and businesses to support economic activities. The use of digital technology in agriculture-based entrepreneurial activities in Pangalengan Agropolitan is only carried out by some people. This condition shows the low digital literacy in Pangalengan Agropolitan. There was no intervention from external parties such as the government to foster digital literacy in Pangalengan Agropolitan. In addition to the lack of digital literacy, farmers and businesses also have limited capacity to develop a more entrepreneurial agricultural sector.

5.2. Collective capacity and informal learning
Collective capacity in Kintamani Rural Area helps the community learn digital technology. Good collective capacity is shown in farmer groups, one of which is the Paramitha Catur Productive Unit. The old farmers have the desire to utilize digital technology in business development, but they have limited capability. The university helped them learn about the use of digital technology. When the training was held, the leader of the unit engaged the young farmers to participate in the training. There is a division of roles between young farmers and old farmers, namely young farmers focus on developing the coffee business by using digital technology and older farmers focus on coffee production. Together with a leader of the Productive Unit, the young farmers, who are over 40 years old, learn to use digital technology together. The information they get from the internet, such as coffee product innovations, will be distributed to the old farmers. The young farmers will also help the marketing of coffee through social media, like Instagram. The division of roles is suitable for their groups because each group of farmers can focus on their duty.

Almost all informants in Kintamani Rural Area are members of Subak Abian, a farmer group in Bali. In Subak Abian, several values are adhered to, and traditions must be maintained, following the Tri Hita Karana Principle; one of three principles is to maintain human relations. Therefore, they always help and trust each other. The rituals performed by Subak Abian increase the cohesiveness of the farmers because they have to meet regularly to prepare the rituals. The harmonious social relationship in Subak Abian helps the farmers trust each other. Subak Abian’s members tend to be easier to receive new information. Informal learning, such as information exchange among farmers, is easier to occur, including learning through digital technology. Information exchange takes place face-to-face and online via WhatsApp group, as did one of the informants in this study. Some entrepreneurs in Kintamani also have coffee shops located in Seminyak, Badung, and Denpasar. To supply the coffee, they have collaborated with several other local farmers. To guarantee the quality of coffee produced, entrepreneurs often share information to farmers about the procedures for planting and producing quality coffee.

Some entrepreneurs in Kintamani received non-formal education, such as training of the use of digital technology from the government. The rest independently explored new things about the use of digital technology in informal business development. Educational background of all informants in the Kintamani Rural Area is not associated with either digital technology or digital marketing. Entrepreneurs who have never been involved in the coffee business use digital technology to find information about coffee development and communicate with their coffee entrepreneur colleagues to discuss their business. The variety of requests from customers also encourages entrepreneurs to learn new things by utilizing digital technology. Learning from experience, collectively, is the most common learning form in Kintamani Rural Area.

In Pangalengan, the condition is quite different from Kintamani case, in which farmers and businessmen tend to work independently. Only one farmer group and one coffee cooperative are known to hold regular meetings to exchange information on planting and production procedures. This condition
indicates that the rural community in Pangalengan Agropolitan does not have a good collective capacity. Farmers and businessmen also do not show a desire to study the use of digital technology for business development. Digital technology in Pangalengan is more widely used to adjust the lifestyle of urban communities. The low collective capacity of the Pangalengan community is indicated to inhibit the growth of digital literacy there. Reflected on the Kintamani case, the community has a good collective capacity, shown by the social relationships that are very well-maintained so that it is very easy to build trust to receive and exchange new information. They are not reluctant to teach each other to learn new things, including using digital technology. Good social relationships also help build an atmosphere conducive to learning. There is no competition between entrepreneurs in Kintamani Rural Area; they are happy when farmers compete to produce quality coffee because it will help their businesses. When there are entrepreneurs who duplicate other entrepreneurs’ product, it makes them proud and motivates them to create a better product. Continuously, the informal learning and accumulation of digital technology knowledge are carried out. The Kintamani case shows that informal learning plays an important role in fostering digital literacy in society and is supported by good social relations and collective capacity.

A conducive learning environment like in Kintamani is not found in Pangalengan. The rural community in Pangalengan Agropolitan does not desire to learn about digital technology, either individually or collectively. They also tend to develop their business to fulfill their needs only rather than develop their business to become more profit-oriented. Referring to the Kintamani case and the previous studies, there needs to be an intervention to establish a conducive and constructive learning atmosphere in growing collective capacity and digital literacy. The model proposed in this paper is to facilitate the informal learning process among farmers.

5.3. The proposed model

To propose a model, we would like to identify the factors influencing the utilization of digital technology in the Kintamani Rural Area. This allowed us to know the right intervention so that digital literacy could be built in Pangalengan Agropolitan. Since digital literacy is growing, it can help the farmers and the businessman have the entrepreneurial capacity.

Based on the interview results, it is known there are several factors influencing utilization of digital technology, namely personal factor, social factor, and environmental factor.

- Personal factors
  Personal factors include educational background, age, experience, physical condition, and other personal characteristics owned by every person and might influence the physical and psychological conditions [48, 49, 50]. According to interview results, several factors are influencing the utilization of digital technology in the Kintamani Rural Area, namely age, educational background, and experience.

  The younger entrepreneurs (less than 40-years-old) tend to use digital technology easier because they have experience in using digital technology in daily life, for example, communicating using social media WhatsApp and Instagram. The development of digital technology occurs when they take formal education; this is quite different from the older farmers. The older farmers tend to harder in using digital technology because they lack experience. When the older farmers took a formal education, the development of digital technology has not occurred yet. Personal capability entrepreneurs also influenced by training.

- Social factors
  Social factors include norm, policy, rule, community relation, social capital, and education structure [48, 49, 50]. This research showed that social relationships, namely internal and external relationships, can influence the utilization of digital technology. Some entrepreneurs use digital technology because they were motivated by the younger family member, such as their child and cousin. The entrepreneurs were also motivated by the government and the consumers. The training which was carried by the government has built their personal capacity’s entrepreneur.
Environmental factors

Environmental factors include the availability of infrastructure and geographic conditions [48, 49, 50]. This research showed that a good internet connection has an impact on the utilization of digital technology in the Kintamani Rural Area. This finding has important implications for replicating a mechanism of digital literacy. We have to intervene in things that will affect personal capacity’s entrepreneurs to use digital technology and to create a conducive digital entrepreneurship ecosystem. The conducive digital entrepreneurship ecosystem includes a conducive learning atmosphere and the provision of digital infrastructure. This ecosystem is needed to develop digital literacy in Pangalengan Agropolitan rural community. Digital literacy is needed to increase awareness of the rural community. The utilization of digital technology is important in developing their business. Thus, it will help build entrepreneurial capacity.

Previous studies showed that the adoption of technology in the rural area may be affected by several factors, namely personal characteristics (i.e. gender, age, educational background, the ability to use the internet and computer) and the availability of infrastructures [51, 17, 52]. The unequal of infrastructures availability in the rural area might hamper the ICT adoption in the rural area. On the other hand, the availability of infrastructure might increase the digital divide because the rural community cannot afford the internet [36, 53]. In Pangalengan Agropolitan, both farmers and businessmen do not utilize digital technology because they have had enough with offline marketing, through the spread of mouth and souvenir shops in tourism destinations. They thought the usage of the marketplace such as Bukalapak and Tokopedia did not help as much as offline marketing sell the processed products. While the farmers who sell the raw products, which is perishable, thought that it would be more profitable if they sell the products directly to the market rather than online marketing. This is contrary to the Kintamani Rural Area condition, which does the marketing integration both online and offline. The entrepreneurs in Kintamani Rural Area did not worry that their products will get rotten because they are already able to make the processed products, which shows the agribusiness characteristic. This is an extracting lesson from Kintamani Rural Area.

The institution has to develop its strategy to facilitate informal learning. We can learn from the regional planning concept, namely the learning region, that several components are needed to create interactive learning continuously consisting of institution support, the thickness and quality of network in a productive environment, and institutional thickness. Therefore, institutional support is needed to support the informal learning model offered in this paper. In the end, the conducive learning atmosphere will affect the personal capacity of farmers and businessmen. The following models are proposed to encourage the use of digital technology in the development of rural agricultural businesses in Pangalengan.
A prerequisite for this model to work is institutional support [see 42; 54]. The proposed model highlights mentoring as an effective informal learning method to build digital literacy and collective capacity in Pangalengan Agropolitan rural community. The qualified mentors include the trained farmers and the trainer businessmen are needed to implement the mentoring system. Coordination between the government, private sector, researcher, and NGO is needed to train the mentors. These parties are also responsible for preparing the basic module of digital entrepreneurship development. The farmers and the businessmen in every village can give their opinion regarding the development of digital entrepreneurship to the mentors. Then, the mentors will deliver it to the government and the other parties. The coordination between many parties is needed because they have different roles in supporting the knowledge accumulation process about digital technology in rural entrepreneurship. The knowledge has to be delivered inclusively to the community because it might help to build curiosity to learn digital technology and utilize digital technology to develop their business. As the community’s curiosity develops, a learning atmosphere will be formed that supports the learning process of new things, i.e. the use of digital technology in entrepreneurial activities.

Informal learning needs to be encouraged because knowledge transfer can occur quickly, and farmers can adapt quickly in the process that occurs [43,54]. An adaptation that occurs quickly in informal learning can stimulate social learning [54]. Some strategies to foster digital literacy and the collective capacity of the Pangalengan Agropolitan community through informal learning, namely:

- Basic module of digital entrepreneurship development
  
The basic module as a guideline for developing digital entrepreneurship is important to support the informal learning process.

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**Figure 2.** The proposed model
Scheduled mentoring

The qualified mentors will divide the group and arrange a schedule of mentoring. They already utilize digital technology in their business so that the mentoring’s participants can learn from their mentors. This situation needs to be built because it can provide a supportive environment for informal learning. When there is a role model to use digital technology, it will trigger the desire of farmers and businessmen to utilize digital technology in developing their business.

Scheduled mentoring is an activity to educate the farmers and businessmen about the strategy of developing digital entrepreneurship. Mentoring activities are carried out in groups to build the collective capacity of farmers and businesses. By mentoring in a group, it is expected to build a sense of belonging and trust among each other. Mentoring activities need to be done in the long run so that mentoring participants feel more comfortable to know each other [43]. The existence of the trust and a sense of belonging to each other facilitates the exchange of ideas and knowledge within the group [42]. When members in the group find the difficulties in using digital technology or need advice, they can tell the mentoring group and get input from other group members. In addition to recounting problems or obstacles encountered, each participant will also be given the opportunity to tell their progress in developing a digital-based business; this is expected to motivate each other. Each participant can also take important points from other participants’ stories relevant and useful to be applied in the business he is running. Interactions that occur in mentoring groups exchange information, ideas, and knowledge and reflect with one another.

Mentoring is an important activity to build knowledge of farmers and businessmen. The farmers and the businessmen will place their mentor as a trusted learning resource that has more knowledge than them. The people that they trust will give valuable support and feedback to their business [43]. Previous studies reported that having a mentor will positively related to the career development of mentoring’s participants [42]. Previous studies showed that mentoring is a proper system to build digital literacy and collective capacity in Pangalengan Agropolitan.

Informal mentoring

Informal mentoring occurs spontaneously and can be done in a group or private. Informal mentoring can be a consultation session for a farmer and a businessman when necessary without waiting for the next mentoring schedule.

Visiting the good practice

Visiting another location which has carried digital entrepreneurship is important to give an experience for farmers and businessmen. It is expected that they can extract a lesson from the location they visit.

By developing an informal learning system as described, it is expected to create a supportive work environment as in the following scheme:
Informal learning is expected to build a collective capacity in a group. The cohesivity inter farmers and businessmen will be built through routine mentoring. The learning process carried out collectively will help build the collective capacity of a group. A conducive learning atmosphere in a group will help group members learn from experience and learn from their peers.

To support the learning process in Pangalengan Agropolitan, there are several digital infrastructures prepared by the government, namely:

- **Village Wi-Fi**
  Village Wi-Fi is provided to be utilized by the community in developing their business.

- **Coordination Platform**
  A coordination platform is provided to facilitate interaction between farmers, business actors, government, private sector, academics, and NGOs. The coordination platform can be used to make announcements regarding entrepreneurship development in Pangalengan and give aspirations.

- **Learning Platform**
  A learning platform is provided to facilitate valuable information and knowledge exchange in developing rural entrepreneurship. Every farmer and businessman can give their opinion and idea freely on the platform. If they find the difficulties when running the business, they can ask for a solution and opinion in the platform.

- **Marketing Platform**
  A marketing platform is provided to facilitate the marketing of local products. Every farmer and business actor will be accompanied by a mentor to be able to register their business in the marketing platform. In mentoring sessions, the mentors will teach about online marketing strategies.

These platforms are applications that can be downloaded by the Pangalengan Agropolitan community. The marketing platform is also integrated with the marketplace in collaboration with the government to encourage the acceleration of the growth of UMKM (Micro Small and Medium Enterprises) Digital.

Furthermore, if there are farmers and business actors in each village committed to developing their businesses further, they can be included in entrepreneurial incubation. Incubation participants will be accompanied in stages until finally they can become independent and develop entrepreneurship. During the incubation period, participants will receive assistance, market access, and financing facilities. After the incubation process, there are no more differences between farmers and businessmen because they have been encouraged to develop businesses in the agribusiness system, namely integrated agriculture.

The proposed model can be replicated in every case with the same characteristics as the cases in this research, namely:

- The agricultural sector dominates the rural economy
- There is a potential in developing agribusiness system
- There is an internet connection

The model replication in the case which has the same characteristics show the quality of the research, i.e. external validity and reliability. In this research, the researchers replicated multiple case study and explained the finding survey with the thick descriptions so that the readers can examine its transferability potential. These things are essential to ensure external validity. The researchers have already applied the protocols of case study to ensure the reliability of this research that the research can be replicated with the same result.

6. Conclusion
This paper aims to propose a model that focuses on a mechanism in developing digital literacy and collective capacity so that the farmers can utilize digital technology in developing the agricultural sector. The goal of this paper is to propose a model of the informal learning process to build literacy digital and collective capacity in Pangalengan Agropolitan. This paper highlights the importance of informal learning in developing the digital literacy of rural community. In this paper, informal learning is positioned as a designed key to accelerate the learning process of digital technology usage in developing the business. The informal learning process plays a crucial role in increasing entrepreneurial capacity in farmer groups and businessmen groups. Informal learning in a supportive group will help the formation of a personal capacity’s entrepreneur. The entrepreneurial capacity will be built in line with the growth of digital literacy and collective capacity; this can be realized by institutionalizing informal learning systems. There are several strategies to facilitate informal learning in Pangalengan Agropolitan: compiling digital entrepreneurship development modules, educating qualified mentors for farmers and businesses in each village, conducting scheduled mentoring, conducting informal mentoring, and conducting visits precedent location. Digital infrastructure also needs to be provided to support the exchange of ideas, information, and knowledge online. The digital infrastructure needs to be provided includes Village Wi-Fi, coordination platforms, learning platforms, and marketing platforms. The platform is an application that can be downloaded on smartphones by the Pangalengan Agropolitan community. To support the successful implementation of the strategy, coordination between actors, namely the government, private sector, academics, and NGOs needs to be supported. The proposed model is expected to foster a conducive entrepreneurial ecosystem in Pangalengan Agropolitan. Further interventions can also be given to entrepreneurs who are ready to commit themselves through the entrepreneurial incubation process.

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