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Innovation in Building Digital Literacy: Stakeholder Challenges in Growing Suburban Communities

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ABSTRACT

Objective: This study examines (a) the role of stakeholders in realizing innovation in building digital literacy programs in Gresik Regency, (b) stakeholder efforts in fostering digital literacy awareness, and (c) stakeholder challenges to realizing innovation in building digital literacy programs for suburban communities. **Method:** The research uses a qualitative approach with grounded theoretical research. The research was conducted in five villages in Gresik Regency, and the research subjects amounted to 40 informants. Data collection uses in-depth interviews, participant observations, and document studies. The analysis of lepangan data uses two methods: (a) an interactive data analysis model and (b) an analysis of the coding process and conclusion. **Results:** 1) The role of stakeholders in realizing innovation in building digital literacy programs in Gresik Regency starts from village elements and community leaders to become initiators and active participants to villagers in carrying out digital literacy program implementation activities; 2) Stakeholder participation is quite diverse, which is influenced by care, funds, and responsible persons, while the implementation of E-commerce platforms in the local community is very effective and the competition is open; 3) Facing several challenges, especially in terms of digital literacy, limited facilities and concern of the local community. **Novelty:** This research combines strategies to generate innovations in various aspects of digital literacy awareness. The critical role of an effective leader is to promote and implement digital education, as well as stakeholders to strengthen literacy education in the current digital era.

INTRODUCTION

The economic development of Gresik Regency as an industrial city offers diverse job opportunities. However, the high unemployment rate is an ongoing central issue. Data from the Central Statistics Agency of Gresik Regency noted that the working-age population (15 years and above) is grouped into three employment groups, namely: (a) the primary sector (agricultural sector and mining sector) reached 13.93%; (b) the secondary/manufacturing sector (industrial, gas, electricity, water, and construction sectors) reached 35.55%; and (c) tertiary/service sectors (trade, food and beverage, transportation providers, finance, transportation services, and government) reached 50.53% (BPS Gresik Regency 2022, 2023).

Various employment sectors in Gresik Regency gives the idea that the jobs that occupy the most positions are in the tertiary/service sector, followed by the secondary/manufacturing sector, and those that occupy the least position in the employment group in the primary sector. This condition has an impact on people's economic activities that look more at the tertiary/service sector. The participation of stakeholders in growing the local economy is a diverse challenge.

Gresik Regency is an industrial city; most workers are from sub-urban communities supporting the economy in Gresik Regency. The rapid development of industry has an impact on people's economic activities, ranging from increasing national income, regional economic growth, meeting community needs, creating diverse jobs, and absorbing basic sector labor (export activities of goods and services outside the regional economic boundaries) and non-basic (activities of providing goods and services to meet the needs of the community within regional boundaries) (Chomariah et al., 2023; Amalia et al., 2020).

Village innovation to build digital literacy in the suburban community is a basic need in line with the development of technology and information. Challenges that arise along with digital literacy in society range from the gap in access to technology, the need for new skills, and hoax news (Pipit et al., 2023). Suburban communities, as city supporters, also have a vital role in economic activities in Gresik Regency. Sub-urban communities are the fastest to adopt the internet, the development of technology as a lifestyle, new skills that support work, and digital literacy skills due to the development of an increasingly digital era.

Various village efforts to innovate by increasing micro, small, and medium enterprises (MSMEs) through the use of Google Business, Google Maps, websites, e-commerce, online platforms, social media, partnerships, marquee ting mix, central and regional stakeholder collaboration, preservation culture, the creation of local superior products, and the development of ecotourism as tourism promotion through cyberspace. Various village innovations to grow the local economy by building digital literacy in sub-urban communities take work. Suburban people who are used to live in the city are quicker to adopt innovations related to work and technology. Several scholars have reported that the integration of digital tools and resources into teaching methodologies has become essential to meet the evolving needs of 21st-century learners and innovations in digital literacy education (Dewanto et al., 2024; Shuhidan et al., 2020; Bondarenko et al., 2023; Nikolova et al., 2022; Ng et al., 2022).

In addition, the importance of character education to the community in strengthening the characteristics of Gresik residents, taken through the formal education path, as well as the role of policymakers and local governments, school principals, and teachers in educational institutions in promoting ethical digital practices, the use of Androids in learning, and effective leadership can strengthen character education in the digital era. (Abella et al., 2023; Karimah et al., 2023; Lukmantoro et al., 2024). On the other hand, the dominant individualist spirit in suburban communities impacts the lack of sensitivity to socialize in society. Digital literacy is not only the ability to use digital technology but also the ability to filter information, think critically and creatively, and communicate skills. This condition results in the non-development of the local economy of suburban communities in line with the city's rapid development. The local economy is local wisdom in society that develops along with customs, culture, community habits, and community interactions. Based on the above background, the researcher formulated the problems of this research, namely: (a) what is the role of stakeholders in realizing innovation in building digital literacy programs in Gresik Regency?; (b) stakeholder efforts in fostering digital literacy awareness in Gresik Regency?; and (c) stakeholder challenges to realize innovations in building digital literacy programs for suburban communities in Gresik Regency?

The urgency of this research is in line with the development of Gresik Regency as an Industrial City; there are several urgent things to be researched, namely: (a) suburban communities have little potential to obtain jobs in line with the number of immigrant communities who have the digital qualifications and competencies needed by the industry; (b) Village Innovation to build digital literacy programs in suburban communities aims to grow the local economy based on local wisdom, thereby reducing the unemployment rate in Gresik Regency; and (c) stakeholders at the village level are pioneers in building villages based on local wisdom so that suburban communities do not focus on pursuing the tertiary/service sector, but the primary sector is also a priority for villages to develop villages into economic centers of suburban communities.

RESEARCH METHOD

The research method explores field data on village innovation, building digital literacy programs, and stakeholder challenges in growing the local economy of sub-urban communities. This study uses a qualitative approach with a grounded theory type of research (Corbin et al., 1990). This type of grounded theory research is an innovative research that finds new theories from the field This research produces village innovation theory in building digital literacy programs for suburban communities, theories on the role of stakeholders in growing the local economy, sub-urban community theory, and produces local economic innovation models based on local village wisdom. The presence of researchers in the field will start from May-September 2024. Researchers live in the research location to facilitate the identification of digital literacy programs in the community and village innovations in developing digital literacy, and researchers have access to observe the environmental conditions of the target villages. The presence of researchers in the field to photograph digital literacy in the village and the challenges of stakeholders to realize the local economy of sub-urban communities. The location of this research is in Gresik Regency; five villages are the target of this research because suburban communities inhabit them, namely: (a) Gapurasukolilo Village, (b) Sidorukun Village, (c) Pulopancikan Village, (d) Kramatinggil Village, and (e) Tlogobendung Village. Data sources and research subjects: Researchers use primary data sources (field observations and direct interviews) and secondary researcher data (document study data from each village). The research subjects used by the researcher are sub-urban communities directly involved with villages, especially those related to village digital literacy and local economies based on village wisdom. This study's research subjects were 25 informants from five villages, ten village stakeholders, and five general public. So, the total research subjects are 40 informants (Khan, 2014) stakeholders of Gapurosukolilo Village, as shown in Figure 1.

Figure 1. Deliberation of community elements, figures, and stakeholders.

Field data analysis, the researcher used two data analyses including:

(a) analisis data interaktive model; dan (b) analysis coding process. The first interactive model analysis uses three components: data condensation, data display, and conclusion drawing/verifying. An overview of the interactive model is shown in Figure 2.

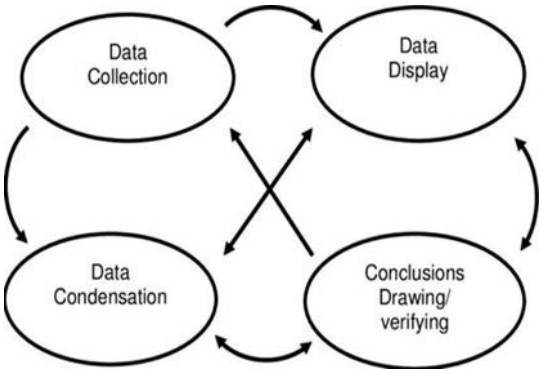

Figure 2. Flowchart of research procedure.

The analysis of the two researchers uses a coding process that consists of three stages, namely: (a) open coding, which presents the role of stakeholders to realize village innovations to build digital literacy programs, stakeholder efforts in growing the local economy of sub-urban communities, and stakeholder challenges to realize village innovation, build a digital literacy program in growing the local economy of sub-urban communities (b) axial coding (axial coding l), and (c) selective coding. The entire coding process uses the Atlas.ti qualitative analysis software version 9. Schematic representation of the core elements of grounded theory in Figure 3.

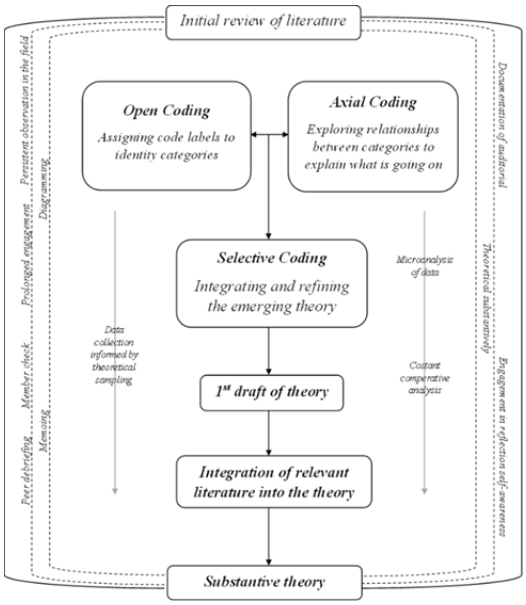

Figure 3. Schematic representation of the core elements of grounded theory.

RESULTS AND DISCUSSION

Results

Stakeholder Efforts

Stakeholders in building digital literacy Village governments have a strategic role in building digital literacy, especially in supporting village communities in utilizing information technology efficiently. Table 1 lists some of the roles that village governments can play in building digital literacy**.**

Table 1. Stakeholder effort.

Attempt	Detail
Provision of technological infrastructure	- Every citizen can access the internet (build a Wi-Fi network, - Designing the use of technology wisely and efficiently
Digital Education and Training	- Digital training, - Teaching villagers Digital Literacy - teaching certain community groups (students, farmers, fishermen, traders, and MSMEs) about using technology daily.
Awareness of digital security	- Educating the public about digital security, such as Online scams, hoax news, and personal data security - Conducting campaigns and socialization on the ethics of using digital platforms
Facilitating digital services and access	- They are helping the community access their needs digitally, such as ID cards, health insurance, and social assistance. - Developing a village digital platform (village website and similar applications for community information needs)
Local Community Empowerment	- Forming digital communities such as technology learning groups and digital MSMEs - Supporting citizens in the use of technology such as e-commerce or digital marketing
Encouraging the use of	- Integrating digital technology in school activities, such

Attempt	Detail
technology in Education and Administration	as online-based learning. - We are utilizing technology for village administration, such as digital data recording or transparent reporting to residents.

The village government has made some of the above efforts to increase people's understanding of digital technology, helping them compete in the era of globalization. This will also help the village's overall development.

Stakeholders Roles

The role of stakeholders in realizing village innovation in building digital literacy programs in Gresik Regency starts from the Village Head and Village Apparatus as well as Community Leaders to be the drivers or initiators and often active participants to villagers in carrying out digital literacy program implementation activities. The village budget funds the digital literacy program in each village. Digital literacy training and development is carried out routinely every year and is related to information. Village development is often carried out through social media with adequate internet access. Then, stakeholders also help grow the local economy and the welfare of the village community through cooperation with industrial partners around the village.

Stakeholder Efforts in Growing the Local Economy Stakeholder Involvement in Micro, Small, and Medium Enterprises (MSMEs) has a relatively diverse level of stakeholder participation; the level of participation is influenced by care, funds owned, and the person in charge, while the implementation of e-commerce platforms in marketing local products is very effective and the competition is open. Stakeholders are involved in creating jobs. The obstacles are the lack of land availability and inadequate infrastructure in local economic development. Meanwhile, efforts to innovate improve the image of the village by strengthening the understanding of technology applications and encouraging local product innovation through marketing assistance. Then, the welfare of sub-urban communities through digital literacy is realized by helping disseminate information quickly and massively and implementing public health programs properly. In addition, efforts are also made by empowerment through the procurement of TBM (Community et al.) (Diana et al., 2024). Where to foster this interest.

Stakeholder challenges to realize village innovation include several challenges, especially in digital literacy and local community involvement. Data shows that the leading role in digital literacy in five villages still needs to be improved, which has an impact on the low level of discussion and understanding of residents towards the IT-based innovative village program; besides that, the interest in community literacy is also very enthusiastic. Although village policies and regulations already exist, the level of community concern still needs to be higher. This shows the need for a more practical approach to socializing innovative village programs' benefits. On the other hand, physical access has not been an obstacle, but digital infrastructure quality needs improvement. This includes the need to upgrade infrastructure and provide adequate technical resources. Culturally and socially, the village community supports this initiative and does not show significant obstacles. However, another major challenge is the need for partnerships from the private sector and other stakeholders that can help drive and support the implementation of village innovation. Therefore, a collaborative strategy is needed between the government, the private sector, and the community to

improve digital literacy, infrastructure, and partnerships in realizing practical village innovation. Thus empowering the younger generation in digital literacy, digital transformation, and social media ethics.

In addition, the cultivation of local wisdom values is also needed in building this literacy culture in the context of 1) moderation, 2) tolerance, 3) prevention of hoaxes (fake news), 4) hate speech, 5) SARA issues; and 6) prevention of religious radicalism doctrine (Wibowo et al., 2020). This is because of the importance of digital literacy for yourself and your family.

Table 2. Analysis results.

Question	Score
Understanding Digital Literacy	87
Understanding the Benefits of Digital Literacy	90
Understanding the Digital Transformation Era	76
Understanding social media	90
Understanding the impact of social media	93
Understanding Social Media Ethics	88
Understanding the ethics of using social media	93

Table 2 explains that efforts to improve digital literacy by holding socialization of digital literacy understanding with a score of 87%, benefits 90%, understanding of the digital transformation era 76%, understanding of social media 90%, understanding the impact of social media use 93%, ethics in social media 88%, and understanding related to ethics in social media with a score of 93%, this means that the community has understood what is called digital literacy and the use of digital literacy.

Challenges in Building Digital Literacy

The challenges faced in building digital literacy in the study are: 1) Limited internet access technology infrastructure: Not all villages have adequate or stable internet access. Many rural areas are still experiencing network or connectivity issues. Lack of technology facilities: Limited computer devices, smartphones, or other devices are significant obstacles to utilizing digital literacy; 2) Low level of education and understanding of technology and lack of basic knowledge of technology: Many people in villages, especially the elderly, do not know how to use digital devices or the internet. Digital divide: People who are tech-savvy (known as digital newcomers) are different from people who are not so proficient; 3) Low awareness of the importance of digital literacy and lack of understanding of benefits: Some people do not understand the importance of digital literacy for education, work, and daily life. Fear of new technology: There is a fear or discomfort when using contemporary technology; 4) Limited resources for training: Not all villages have teachers or experts who can teach digital literacy. There are rarely any specialized training programs focused on digital literacy at the village level.

Discussion

Stakeholder Effort

However, leaders and policymakers have a very important role in an institution or society, where every policy issued must be wise and on target. This digital literacy requires understanding from all parties, including the government. In the Gresik district, according to the research findings, a leader and stakeholders have made many efforts to develop and grow public awareness in building digital literacy, such as

providing digital infrastructure, digital education, and training, awareness of digital security, facilitating digital access and services, empowering local communities, and encouraging the use of technology in education and administration.

In addition to the efforts mentioned above, as a leader, he should also pay attention to and evaluate all programs that have been made, continuous evaluation, and the inclusion of various perspectives to maintain and develop effective character education programs and establish harmony in communication in the digital era (Lukmantoro et al., 2024; Dewanto et al., 2024)

Stakeholder Roles

The role of the government as a facilitator is vital in developing digital literacy. Thus, it is an effort to involve the Village Apparatus Organization in planning and building digitalization in the community. Stakeholders play the role of facilitators by creating conducive conditions in implementation; they also act as companions to the government apparatus as beneficiaries and cooperate with parties through development efforts. The results of interviews with village heads:

> "*The results of the deliberations went smoothly; from our office, we always hold coordination meetings involving elements of education practitioners, inspectorates, and from elements of community leaders. Our sub-district will be in direct contact to create synergistic work. In this digitization program, we coordinate social data with social services. We are also involved in monitoring and helping socialization to the community and technical guidance for village officials*" (interview results on July 10, 2024, at the village head's office).

The relationship between village officials and the apparatus to implement a policy is very important and impacts the success of a policy itself. Within the scope of this research, synergy between social services and government apparatus is needed to implement the program to create an intelligent village through this digital literacy skill. In addition, cooperation between the village head and all elements of the village government is needed to implement these programs correctly.

Education and Training

The low competence of human resources in village apparatus is an obstacle to digital literacy efforts because human resources are the end of the program's implementation in building villages that are aware of digital literacy. The problems faced by most villages are that the use of the website needs to run optimally, starting from the poor website governance, and the lack of village information and data that can be accessed by the wider community as needed for transparency and public accountability. This is due to the observation that only three villages have a website out of the five villages. Therefore, an effort is needed to develop human resources and innovation in building digital literacy through education and training.

Education and training are organized by particular institutions authorized to develop human resources in the village. This training is indispensable for all village apparatus, including new village officials and those who have been working in the government for a long time, to improve the knowledge and skills of human resources per the specifications of their duties and work. The results of the interview with the village head are as follows:

> "*There is already training for village officials, sir, but it is different from me as the village head training on leadership, village development, finance, etc. It is carried out annually from the district*" (interview July 08, 2024, at the village office).

They explained that partially formal education greatly influences the performance of village apparatus; simultaneously, it is a unity of competency concepts. In addition, implementing mature planning procedures and sustainable development will impact easy access to all elements of digital learning (Chan et al., 2023; Akour et al., 2022; Kazakova et al., 2020; Koh et al., 2021).

In addition to the need for training, awareness of a change is the main thing, including digital recognition, which must be instilled at an early age, covering all elements and lines of life. These actions should begin early when teachers are still in the pre-service period so that their positive affective reactions to technology in the classroom can inspire positive actions toward their commitment to include digital tools in teaching (McGrath et al., 2019). Responses from relevant parties about the availability of fast and valuable facilities and infrastructure contribute to a positive learning environment. This highlights the importance of investing in skilled facilitators to ensure the success of future training initiatives (Kim et al., 2023; Tistad et al., 2023; Provvidenza et al., 2020; Ritchie et al., 2020).

Supporting and Inhibiting Factors

The main concerns in building digital literacy are facilities and infrastructure and the existence of training programs. In organizing village government, facilities and infrastructure include physical buildings, village offices, and inventory such as internet and computer programs to support government activities. Adequate facilities and infrastructure will support the implementation of tasks, especially those related to the technical and general administration fields. According to the village head's interview:

> "*Facilities and infrastructure must be complete to facilitate government administration work. Adequate facilities and infrastructure can support the task, especially related to general administration techniques*" (interview June 17, 2024, at the village head's office).

It is known that facilities and pjrasarana are urgently supporting the village government process by law number 6 of 2014 concerning villages pasal 80 paragraph. Explaining that priorities, programs, activities, and needs for village development are formulated based on an assessment of the needs of the community, including (a) improving the quality and access to basic services, (b) development and maintenance of infrastructure and the environment based on the ability technical and local resources available. The essential services in it are administrative services needed by the community and are the obligation of the village government to provide these services.

In addition to facilities and infrastructure, the age factor of human resources also affects the level of mastery of technology, where the age limit of human beings will impact the level of activeness in understanding a story itself. Research conducted by Zakharov et al. (2021) where found that age has an impact on teachers' digital competence; this is more significant for teachers between the ages of 35 and 49, while the findings of Romero et al. (2020) argue that the ages between the ages of 20 and 50

indicate the most outstanding digital competence. Collaboration between different generation groups can improve learning (Romanes et al., 2018), skills, and competency development because today's young generation will be more adaptable to digital technology in any situation. In addition, effective facilitation is the cornerstone of successful professional development. This is also by recent studies (Corlu et al., 2023; Karsenty et al., 2021; Reznitskaya et al., 2019) which argue that good facilitation is essential for any training and professional development program.

To develop capacity in village government, there are three dimensions of capacity building according to (Grindle, 1997), including human resource development, organizational strengthening, and institutional reform. In this case, human resource development has been carried out; several efforts have been made, such as training, courses, socialization, and others. This is done to support the quality of human resources and digital literacy in intelligent villages. Village officials, as the main vanguard of change, so those who have to adapt to the new language of technology can benefit from the digital intelligence of the younger generation of teachers by learning, embracing technology, and developing their digital literacy and competence (Audrin et al., 2022; Alakrash et al., 2021; Pratolo et al., 2020; Statti et al., 2020).

The advantage of this research is the mixed method approach, combining quantitative and qualitative data to understand digital literacy skills comprehensively. However, it is limited to data that can provide a basis for comparison. In addition, the self-reported nature of the data introduces the possibility of bias, as participants may have provided a socially desirable response. Long-term follow-up studies can overcome these limitations by assessing the sustainability of the observed impacts.

CONCLUSION

Fundamental finding: This study finds that the role of stakeholders in the digital literacy program in Gresik Regency starts from the village head and village apparatus as well as community leaders to be the drivers or initiators as well as often active participants to villagers in carrying out digital literacy program implementation activities. The level of stakeholder participation is quite diverse; the level of participation is influenced by care, funds owned, and the person in charge, while the implementation of e-commerce platforms in marketing local products is very effective, and the competition is open. The challenge faced is the limited competence of human resources and facilities in supporting digital literacy programs; age also dramatically affects the understanding of digitalization. **Implication:** This research provides suggestions as a follow-up that in realizing digital literacy innovation, there needs to be cooperation between all related parties, ranging from stakeholders, government officials, education elements, and all community leaders comprehensively. The availability of facilities and infrastructure will also support the realization of a program. Policymakers should pay more attention to the capacity of human resources related to the changes in these eras of globalization. **Limitation:** This study is limited to the research subjects' data, which is only on the role of stakeholders in society. **Future Rese**arch: The self-reported nature of the data introduces the possibility of bias, as participants may have provided a socially desirable response. Long-term follow-up studies can overcome these limitations by assessing the sustainability of the observed impacts.

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