# Mapping Actors in the Digital Innovation Ecosystem to Support Innovation in Digital Startup

Review of Integrative Business & Economics Research

Ratih Purbasari*
Department of Business Administration, Universitas Padjadjaran

Enjat Munajat
Department of Public Administration, Universitas Padjadjaran mdenjatm@unpad.ac.id

Farisadri Fauzan
Department of Business Administration, Universitas Padjadjaran

Nenden Kostini
Department of Business Administration, Universitas Padjadjaran

Rani Sukmadewi
Department of Business Administration, Universitas Padjadjaran

**ABSTRACT**

This research aimed to map the actors involved in the digital innovation ecosystem to improve the entrepreneurial quality of startup competitiveness in West Java. It used a mixed method. Furthermore, data were obtained using questionnaires and interview guides, tabulated, reduced, triangulated, verified, and analyzed descriptively. The results showed that within the innovation ecosystem in West Java, other startups and customer actors have a significant influence on digital innovation. Meanwhile, the actors with limited involvement in digital innovation are suppliers, investors, and information media.

Keywords: Digital Innovation, Digital Innovation Ecosystem, Digital Entrepreneur, Digital Startup.

## 1. INTRODUCTION

Indonesia has made efforts to increase the growth of digital entrepreneurs, one of which is through the 1000 startup movement policy under the Ministry of Communication and Information Technology to face the era of the industry. According to Startup Ranking, startup growth continues to increase, reaching 2,219 in early 2021 (Barus, 2021). This shows that participation in the development and creation is quite good (Hardiansyah & Tricahyono, 2019). West Java is one of the provinces with digital startup growth that continues to show a positive trend. According to data from the Bandung Startup Community, the growth of digital startup in 2019 reached 250. The 2021 East Ventures - Digital Competitiveness Index (EV-DCI) reported that West Java is the province with the most excellent availability of digital human resources, with a score of 57.14. Furthermore, the province hopes to serve as a reference for other regions in pushing for the achievement of a Digital Indonesia (Mathilda Gian Ayu, 2022).

Copyright © 2023 GMP Press and Printing
ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

However, digital startup faces various problems related to innovation and the national startup ecosystem, such as funding, infrastructure, mentor network, and markets. Information technology expertise increasingly requires actors to act as innovators (Nugraha & Wahyuhastuti, 2017). In line with the development of the literature on value creation, more companies, including digital startup, have used technology to create innovations in terms of offering new products and services providing significant benefits to the economy (Yoo et al., 2010; Wang, 2021)

Digital startup needs to develop innovation because the process is complex and non-linear (Walrave et al., 2018). As a nascent technology venture, startup relies heavily on external actors to enhance innovation capabilities (Fukugawa, 2018; Wang, 2021). The size and resource limitations make it more prone to form strong bonds with different actors to overcome internal deficiencies and create shared value (Marcon & Ribeiro, 2021). This indicates that innovation has progressed beyond the boundaries of a single company towards a more network-based approach (Ramadani et al., 2013; Iovanella et al., 2019), which consists of many actors with diverse categories as a stakeholder (Reypens et al., 2019; Bittencourt et al., 2021). The main challenge is adapting to the right actor and moment in its growth stage (Passaro et al., 2020). In digital innovation, value is created from startup activities and interactions with stakeholders in interdependent relationships within the ecosystem (Adner, 2006; Suseno et al., 2018; Wang, 2021). The success of every actor involved in the digital innovation ecosystem is supported by collaborative arrangements to combine the various available offerings into coherent solutions (Adner, 2006; Wang, 2021).

A digital innovation ecosystem uses complex networks (Holland, 2014) and heterogeneous elements, which change over time through evolutionary mechanisms such as variation and selective retentizon (Yoo, 2015). Understanding the ecosystem can enable startup actors to make timely decisions regarding resource allocation for developing new services (Chae, 2019). Furthermore, startup requires strengthening the foundations in the digital innovation ecosystem by balancing services through technology capable of integrating cyberspace and physical space (Pristy, 2022).

Even though research interest in digital entrepreneurship and innovation issues is increasing, research on the ecosystem needs improvement. Despite the implicit assumption about the importance of stakeholders in the digital innovation ecosystem, the role of interaction for value creation has not been widely discussed in entrepreneurship and literature (Grönroos & Voima, 2012; Wang, 2021). The digital innovation ecosystem refers to a network of heterogeneous elements continuously evolving. Therefore, it becomes essential to identify the various actor elements and explain the emergence and evolution of the ecosystem or network of elements (Chae, 2019).

Based on this description, there is a need for research with an integrative and holistic approach to understanding entrepreneurship and innovation ecosystems. This represents relevant concepts for broadening the horizons of digital entrepreneurs, considering the complex relationships formed between actors involved in their ecosystems (Adner & Kapoor, 2010; Fukuda & Watanabe, 2012; Beliaeva et al., 2020). This research aims to map the actors involved in the digital innovation ecosystem to improve the entrepreneurial quality and competitiveness of digital startup in West Java.

## 2. LITERATURE REVIEW

### 2.1 Digital Startup

Several definitions of startup have emerged from experts. Clayton Christensen, a professor

Copyright © 2023 GMP Press and Printing
ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

at Harvard Business School and one of the visionaries of innovative entrepreneurship, defined it as an organization that creates breakthrough innovations to change market paradigms (Christensen & Overdorf, 2000; Dyer et al., 2011; (Skala, 2019)). According to the Global Entrepreneurship Monitor (2016), startup is company in the preparation stage that the founders manage. The OECD defined a startup as an innovative technology company that seeks to face the most difficult challenges of civilization, such as new energy sources, social exclusion, and sustainable development (Breschi et al., 2018). Innovation and creativity are needed in terms of developmental ideas in digital startup. Skills, innovation, and creativity support digital startup to develop ideas and create opportunities, marked by the emergence of new variables (Nugraha & Wahyuhastuti, 2017).

### 2.2 Digital Innovation

Digital innovation is the use of digital technology during the innovation process and has radically changed the nature and structure of new products and services. Furthermore, it has spawned new value creation and value appropriation pathways, enabled collective innovation involving a dynamic set of actors with diverse goals and capabilities, generated new processes, and transformed industries (Boudreau & Lakhani, 2013; Iansiti & Lakhani, 2014; Michael & James, 2015). Digital innovation includes initiating, developing, and implementing new ideas (Kohli & Melville, 2019).

Digital innovation rarely follows the logic of traditional governance and coordination but instead emerges from the opportunities available in digital ecosystems (Um et al., 2013). Digital startup is born into flexible networks, meaning it can develop and grow at scale and in unusual ways (Tumbas et al., 2015) in the ecosystem (Selander et al., 2013). The networked character of digital innovation means that organization can be seen as connected networks of people, practices, tools, and other resources working to create digital solutions (Ciriello et al., 2018).

### 2.3 Digital Innovation Ecosystem

A digital innovation ecosystem uses complex networks (Holland, 2014) and heterogeneous elements, which change over time through evolutionary mechanisms such as variation and selective retention (Yoo, 2015). It adopts digital and computing research traditions as its method, using data as the source and borrowing network science techniques (Yoo, 2012). A conceptual lens and computational method can be used to describe a digital innovation ecosystem by (1) identifying the various elements and their network positions and (2) understanding the various elements' interaction (Chae, 2019). Furthermore, the digital innovation ecosystem consists of components of industry players, customers, suppliers, and complements who work and compete to seek survival and dominance (Chae, 2019; Beltagui et al., 2020; Beliaeva et al., 2020).

Based on the literature discussion above, the relationship between each variable studied in this study is shown by the following research conceptual framework in Figure 1.

## 3. RESEARCH METHOD

This research used a mixed method with an exploratory sequential strategy (Creswell, 2014), involving 32 respondents and 15 informants who are digital startup actors in West Java. Data were obtained using a questionnaire instrument and an interview guide. Digital startup actors will then confirm their relationships with others involved in the innovation ecosystem, including customers, suppliers, and complements based on a concept developed by Chae (2019), Beltagui et al., (2020), and Beliaeva et al., (2020). The data obtained from

Copyright © 2023 GMP Press and Printing
ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

the questionnaire is then tabulated and processed using the linear regression method to measure the relationship between dimensions of each variable so that it can be known which actor most influences digital innovation carried out by business startup actors in West Java. As for the data from interviews were reduced, triangulated, verified, then analyzed descriptively to explain the role of the actors involved in the digital innovation ecosystem.

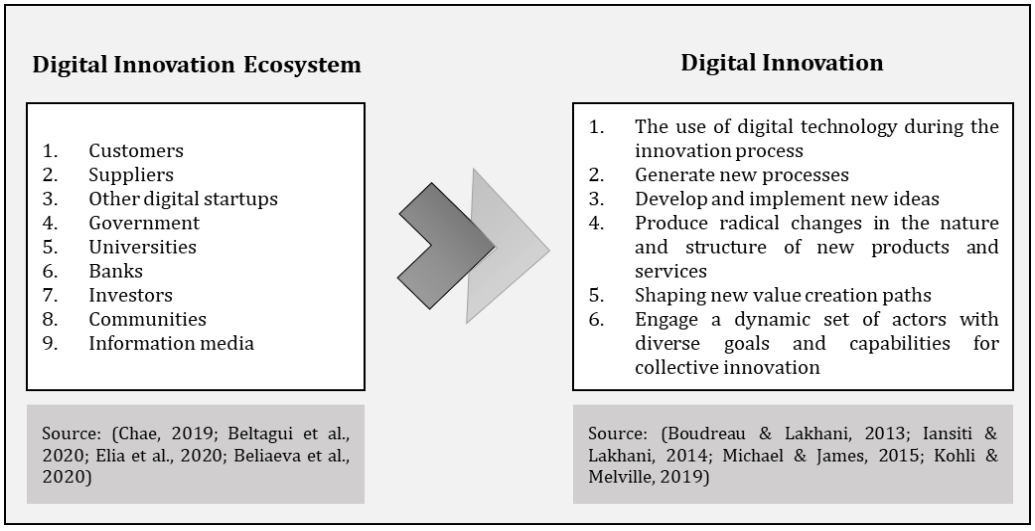


**Figure 1. Research Conceptual Framework**

Source: Authors (2023)

## 4. RESULTS AND DISCUSSION

Data and analysis descriptions of the actors involved in the digital innovation ecosystem will be presented.

**Table 1. Regression Test Output (Model Summary)**

| | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| | .630 | .396 | .355 | .53926 |

Predictors: (Constant, Digital Innovation Ecosystem)

The regression test output table above shows the correlation or relationship (R) value of 0.630 and the coefficient of determination (R2) of 0.396, which means that the influence of Digital Innovation Ecosystem on Digital Innovation is 39.6%. The remaining 60.1% is influenced by other variables.

**Table 2. Regression Test Output (ANOVA)**

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Regression | 5.562 | 3 | 1.854 | 6.176 | .002[b] |
| Residual | 8.406 | 28 | .300 | | |
| Total | 13.969 | 31 | | | |

Dependent Variable: Digital Innovation

Predictors: (Constant), Digital Innovation Ecosystem

Copyright © 2023 GMP Press and Printing
ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

Other outputs also show F = 6.176 with a significance level of 0.000 <0.05, which means that the regression model can be used to predict the Digital Innovation of Digital Innovation Ecosystem.

**Table 3. Regression Test Output**

| | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|
| | B | Std. Error | Beta | | |
| (Constant) | 4.543 | .269 | | 16.867 | 0.00 |
| Startup & Customer | .570 | .200 | .417 | 2.847 | 0.10 |
| Startup & Other Startup | .797 | .288 | .406 | 2.769 | .008 |
| Startup & Supplier | -.130 | .389 | -.073 | -.333 | .742 |
| Startup & Government | -.265 | .278 | -.182 | -.954 | .350 |
| Startup & University | -.105 | .262 | -.077 | -.402 | .692 |
| Startup & Banking | .071 | .295 | .046 | .242 | .811 |
| Startup & Investors | .092 | .137 | .130 | .670 | .510 |
| Startup & Community | .237 | .265 | .170 | .894 | .381 |
| Startup & Information | .623 | .244 | .455 | 2.551 | .084 |
| media | .046 | .667 | .012 | .068 | .946 |

Dependent Variable: Digital Innovation

The table above shows the test of the influence of each dimension of the Digital Innovation Ecosystem variable on the Digital Innovation variable. On the basis of a significance assessment of less than 0.05, it is shown that the relationship between startup and customer and the relationship between startup and other startup dimensions have a significant influence on Digital Innovation. Startup and Other Startups has the greatest significance compared to other dimensions.

The results of the linear regression analysis above are reinforced by findings based on the results of questionnaires and interviews from each dimension in the digital innovation ecosystem, which will be described in the next section.

### 4.1 Dimensions of Relationship between Digital Startup Actors and Others

This dimension is measured by 2 statement items. The results of the percentage score in table 3 showed that most digital startup actors are related to others in carrying out digital innovations in their businesses. This action identified that the collaborative activities of the actors were going well. These results showed that most digital startup actors are connected to others in digital innovations to support their current businesses.

Digital startup actors who assist others in digital innovation include Rik Studio, Red Monsta, Animation Yogyakarta, Belajarbareng.id, schoolofparenting.id, Kirinaja.com, Motiolab, One Brick, PT. Ayo Indonesia Management Group, Startup Academy, Evermoss, Buildme.id, Nujek.id, Datangan.com, Grabkitchen.com, Deliveree.com, Hilog.com, Foodizz, Rumahweb, Nusaedu, Cimahi creative Association, Nodeflux, Zepay, listen.id, PT. Sharing Indonesia, bimindonesia.id, and Simple Mart Online.

Copyright © 2023 GMP Press and Printing
ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

**Table 3. The Relationship Between Digital Startup Actors With Other Startups**

| | Relationship with OtherStart up Actors | Frequency of Respondents' Answers | | Score |
|---|---|---|---|---|
| | Statement Items | YES | NO | |
| | | 1 | 0 | |
| 1 | Startups have relationships with other Startup business actors in carrying out digital innovations to support current businesses | 28 | 4 | 32 |
| 2 | Other Startup business actors help (exchange of knowledge and business resources) in carrying out digital innovations to support current businesses | 27 | 5 | 32 |
| **Total Score** | | 55 | 9 | 64 |

YES : 55/64 x 100% = 86%

NO : 100% - 86% = 14%

These other digital startup actors assist in carrying out digital innovations in the form of providing references graphics, experiment campaigns, hardware devices, system technology updates, knowledge about business strategies and digital marketing processes, working on joint projects, infrastructure collaboration, business consulting, supply logistics, knowledge related to creating advertisements about specific applications and programs, product development ideas, and supplier network expansion. The ecosystem involves several startup units, hence, digital startup actors need to establish unlimited relationships to survive during business competition. By utilizing various aspects of an ecosystem, startup can develop and grow massively (Ciriello et al., 2018).

### 4.2 Dimensions of Relationship between Digital Startup Actors and Customer

This dimension is measured by 2 statement items. A percentage score is obtained from the calculation results, indicating that most actors are related to customer in carrying out innovations. These results illustrated that the collaborative activities of digital startup actors have been going well. Therefore, in the digital innovation ecosystem in West Java, most startup actors are connected with customer in digital innovation.

**Table 4. The Relationship between Digital Startup Actors with Customers**

| | Customer Relationships | Frequency of Respondents' Answers | | Score |
|---|---|---|---|---|
| | Statement Items | YES | NO | |
| | | 1 | 0 | |
| 1 | Startups have a relationship with customers in carrying out digital innovations to support today's business | 25 | 7 | 32 |
| 2 | Customers help you in digital innovation to support your current business | 25 | 7 | 32 |
| **Total Score** | | 50 | 14 | 64 |

YES: 50/64 x 100% = 78%

Copyright © 2023 GMP Press and Printing
ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

NO: 100% - 78% = 22%

Customers who assist digital startup actors in digital innovations come from various business fields, including companies, banking institutions, government agencies, business communities, and academics. The assistance from customers received by digital startup actors includes sharing ideas and suggestions for product development according to market needs and improving service quality, experiment campaigns on digital platforms, provision of hardware materials, feedback on experience using features in application products, product reviews, bug discoveries, and feature requests.

In many service settings, customers make substantial contributions to the service process (Inuzuka & Chang, 2023). Customers can act as a source of feedback, as a basis for digital startup actors to constantly innovate in making features. Desouza et al., (2008) argued that innovation is a form of final product and services following the implementation of knowledge in the form of insights, ideas, thoughts, and information obtained from users. Successful digital innovation should be distinct from the role of users.

### 4.3 Dimensions of the Relationship between Digital Startup Actors and Suppliers

This dimension is measured by 2 statement items. The percentage score showed that only a small number of digital startup actors have relationships with suppliers in carrying out digital innovation in their businesses. In West Java's digital startup ecosystem, most actors have not connected with suppliers in digital innovation.

**Table 5. The Relationship between Digital Startup Actors With Suppliers**

| | **Relationship with Suppliers** | **Frequency of Respondents' Answers** | | **Score** |
|---|---|---|---|---|
| | **Item Pernyataan** | **YES** | **NO** | |
| | | **1** | **0** | |
| 1 | *Startups* have relationships with suppliers in carrying out digital innovations to support current businesses | 12 | 20 | 32 |
| 2 | Suppliers assist you in digital innovation to support your current business | 11 | 21 | 32 |
| **Total Score** | | 23 | 41 | 64 |

YES: 23/64 x 100% = 36%

NO: 100% - 36% = 64%

Several suppliers include Envato, Unicom, Rumah Hosting, Intercom, PT ID Cloud Host, and Expert Academy Server. Assistance from these suppliers related to digital innovation activities can be in 3D Modeling Objects, hosting services and features to help applications run well, free local servers, software, and product service development. Only a few digital startup actors have facilitated suppliers with specific applications that make it easier to carry out ecosystem operational activities. The application is recognized as effective in bridging communication, specifically regarding the fulfillment of inventory items.

Innovation has become a competitive factor in various industries. The creation process is limited to the companies and external partners involved. Patrucco et al., (2017) explained the importance of involving these external actors. Henke & Zhang, (2010) and

Copyright © 2023 GMP Press and Printing
ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

Patrucco et al., (2017) agreed that suppliers could be an external factor driving innovation. However, the results showed that most of West Java's digital startup do not feel suppliers are helping digital innovations in their businesses.

### 4.4 Dimensions of Relationship between Digital Startup Actors and Government

This dimension is measured by 2 statement items with a total percentage score as follows:

**Table 6. The Relationship between Digital Startup Actors With Government**

| | Relationship with Government | Frequency of Respondents' Answers | | Score |
|---|---|---|---|---|
| | Statement Items | YES | NO | |
| | | 1 | 0 | |
| 1 | *Startups* have a relationship with the Government in carrying out digital innovations to support their current business | 18 | 14 | 32 |
| 2 | The government helps you in digital innovation to support your current business | 16 | 16 | 32 |
| **Total Score** | | 34 | 30 | 64 |

YES: 34/64 x 100% = 53%

NO: 100% - 53% = 47%

Based on the questionnaire calculations, a percentage score was obtained indicating that most digital startup actors have relationships with the government in digital innovation. Therefore, collaborative activities within the digital innovation ecosystem in West Java between digital startup actors and government related to digital innovation activities are going well.

Government actors who assist digital startup in digital innovations consist of the Ministry of Industry, the Ministry of Trade, the Ministry of Research, Technology, and Culture (Independence Campus), the Ministry of Rural Affairs, BRIN, West Java KREASI, Creative Economy Agency (Bekraf), West Java Communication and Information Service and West Java Education Office. The forms of assistance provided include training partnerships, sharing methodologies related to creative content, education information updates, research, and development, subject development experts, business connect, joint exhibitions abroad, Focus Group Discussions to formulate blueprints, regulations, promotions, financial assistance, certification, business pitching, and access to the People's Credit capital program,

For digital startup actors, the government has a strategic role in removing several obstacles and providing various variables for the development of the industry, such as tax regulation, shareholder protection from creditors, creation of capital markets, and simplification of employment contracts (Purbasari et al., 2020).

### 4.5 Dimensions of Relationship between Digital Startup Actors and University

This dimension is measured by 4 statement items with a total percentage score as follows:

Copyright © 2023 GMP Press and Printing
ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

**Table 7. The Relationship Between Digital Startup Actors With University**

| | Relationship with University | Frequency of Respondents' Answers | | Score |
|---|---|---|---|---|
| | Statement Items | YES | NO | |
| | | 1 | 0 | |
| 1 | Startups have a relationship with colleges (universities) in carrying out digital innovations to support current businesses | 16 | 16 | 32 |
| 2 | Universities provide knowledge to you in making digital innovations to support current businesses | 16 | 16 | 32 |
| 3 | Universities help you as a startup business actor to expand their network in carrying out digital innovations to support your current business | 13 | 19 | 32 |
| 4 | Universities conduct research and capacity building for you in conducting digital innovations to support your current business | 11 | 21 | 32 |
| **Total Score** | | 56 | 72 | 128 |

YES: 56/128 x 100% = 44%
NO:100% - 44% = 56%

Table 7 shows the percentage scores, indicating that most digital startup actors do not have a relationship with university in digital innovation. This result indicated that collaborative activities within the ecosystem in West Java could have gone better.

The university actors include the Yogyakarta Art Institute, Telkom University, SBM Bandung Institute of Technology, Padjadjaran University, Bandung Islamic University, Jenderal Soedirman University, Jakarta State University, Islamic University, Bakrie University, and the Indonesian Postal Polytechnic.

Some types of knowledge related to digital innovation include applied research partnerships, cloud computing, business incubation activities through incubators such as LPIK-IT and The Greater Hub by holding free training for digital startup, internships, Field Work Practices, UKM empowerment, and knowledge of technology to build websites and applications. These information systems utilize technology to manage inventory, training on Digital Innovation and Marketing, Learning Modules, and development of food technology, products, and services. Besides knowledge, university actors also assist digital startup in expanding their networks to conduct innovations, such as holding business pitching. Furthermore, they help digital startup conduct research and increase their capacity to perform innovations. Product innovation can be achieved through collaboration with other actors such as other companies, universities, and public research institutes (Oshima & Toma, 2023). Universities are information centers and assist in applying ideas and concepts in digital innovation (Purbasari et al., 2020).

### 4.6 Dimensions of Relationship between Digital Startup Actors and Banking

This dimension is measured by 2 statement items. The results of the percentage score showed that most digital startups have no relationship with banking actors in conducting digital innovations. This explanation illustrated that the collaborative activities within the digital innovation ecosystem in West Java could have gone better.

Copyright © 2023 GMP Press and Printing
ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

**Table 8. The Relationship Between Digital Startup Actors With Banking**

| | Relationship with Banking | Frequency of Respondents' Answers | | Score |
|---|---|---|---|---|
| | Statement Items | YES | NO | |
| | | 1 | 0 | |
| 1 | Startups have a relationship with banks in carrying out digital innovations to support your current business | 14 | 18 | 32 |
| 2 | Banking helps you to access financial support in conducting digital innovations to support your current business | 12 | 20 | 32 |
| **Total Score** | | 26 | 38 | 64 |

YES: 26/64 x 100% = 41%

NO:100% - 41% = 59%

A small number of banking actors include Bang Rakyat Indonesia, Bank Nasional Indonesia, Bank Syariah Indonesia, Bank Mandiri, Bang Central Asia, Bank CIMB Niaga, and Bank Muamalat. The collaboration was not in terms of lending funds but banking actors providing a network to partners. Startup has access to partner account data in terms of transparency rotation, sales, and purchase transactions which are agreements made with partners to avoid fraud. Meanwhile, collaboration with banking actors can also minimize the capital of digital startup actors with a referral system for every product purchased.

### 4.7 Dimensions of Relationship between Digital Startup Actors and Investors

This dimension is measured by 2 statement items. Calculating the percentage score in table 9 showed that most digital startup actors have no relationship with investors in conducting digital innovation. Therefore, the collaborative activities of digital startup actors with investors within the innovation ecosystem in West Java could have gone better.

**Table 9. The Relationship Between Digital Startup Actors With Investors**

| | Relationship with Investor | Frequency of Respondents' Answers | | Score |
|---|---|---|---|---|
| | Statement Items | YES | NO | |
| | | 1 | 0 | |
| 1 | Startups have relationships with investors in making digital innovations to support your current business | 11 | 21 | 32 |
| 2 | Investors help you to access financial support in making digital innovations to support your current business | 11 | 21 | 32 |
| **Total Score** | | 22 | 42 | 64 |

YES: 22/64 x 100% = 34%

NO: 100% - 34% = 66%

Investors who assist digital startup actors in accessing financial support can be in

Copyright © 2023 GMP Press and Printing
ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

the form of corporate and individual investors, consisting of Jakarta-based Venture Capital USA, Angel Investors, Family and Friend Investors, Vertex Investment, and PT. Astra. According to Nito (2021), Angel Investors and Venture Capital are ways to obtain funding for a Startup. Peneder (2010) stated that companies funded by venture capital are more innovative and grow faster in employment and revenue from sales.

### 4.8 Dimensions of Relationship between Digital Startup Actors and Social Community

This dimension is measured by 2 statement items. Based on the results shown in table 10, most digital startups are related to social community in carrying out digital innovation. These results illustrated the collaborative digital innovation activities within the West Java startup ecosystem.

Social community actors who assist digital startup in carrying out digital innovations consist of various forms. They are mostly business communities, including Bogor Graphic Designers, Digital Cinematographers Indonesia, TDA Bandung, Bandung Startup Community, Business Community Initiative Movement, KVR Audio Community, Internet Marketer Indonesia, Kompepar, Gayatri Mahardika, Indigospace Bogor, Content Creator Community, and Education Community.

**Table 10. The Relationship Between Digital Startup Actors With Social Community Communities**

| | **Relationship with Social Community** | **Frequency of Respondents' Answers** | | **Score** |
|---|---|---|---|---|
| | **Statement Items** | **YES** | **NO** | |
| | | **1** | **0** | |
| 1 | Startups have a relationship with the social community in carrying out digital innovations to support your current business | 18 | 14 | 32 |
| 2 | Social communities participate in assisting you in digital innovation to support your current business | 16 | 16 | 32 |
| **Total Score** | | 34 | 30 | 64 |

YES: 34/64 x 100% = 53%

NO: 100% - 53% = 47%

The form of assistance from the community received by digital startup actors in performing digital innovations is in the form of Technology Information Updates, network development, and motivation, as a forum to discuss market conditions and feedback, marketing by becoming system affiliates, providing a place for activities seminars and training events, content creator ecosystem support, and educational needs ideas. Participating in various community events can be a medium of socialization to attract early consumers, gain exposure to a large audience, and build networking.

### 4.9 Dimensions of Relationship between Digital Startup Actors and Information Media

This dimension is measured by 2 statement items. Based on the results in table 11, most digital startup actors have no relationship with information media actors in conducting

Copyright © 2023 GMP Press and Printing
ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

digital innovations. These results indicated that the collaborative activities within West Java's digital startup innovation ecosystem could have gone better.

A small portion of information media actors assisting startup in digital innovations consists of jabar.tribunnews.com, www.cnnindonesia.com, and daily social.id. Another media well-known among digital startup is Tech In Asia, which originates from Singapore, but has a customer base in Jakarta. The form of assistance received by digital startup actors from information media in carrying out digital innovations is business promotion assistance to expand networks and increase growth by obtaining funding from Venture Capital.

**Table 11. The Relationship between Digital Startup Actors and Information Media**

| | **Relationship with Information Media** | **Frequency of Respondents' Answers** | | **Score** |
|---|---|---|---|---|
| | **Statement Items** | **YES** | **NO** | |
| | | **1** | **0** | |
| 1 | Startups have a relationship with information media in carrying out digital innovations to support your current business | 1 | 31 | 32 |
| 2 | Information media participates in assisting you in digital innovation to support your current business | 1 | 31 | 32 |
| **Total Score** | | 2 | 62 | 64 |

YES : 2: 64 x 100% = 3%

NO: 100%- 3% = 97%

## 5. CONCLUSIONS AND RECOMMENDATIONS

The results showed that within the innovation ecosystem in West Java, other startups & customer actors have a significant influence on digital innovation within digital innovation ecosystem. These two actors have contributed significantly to the digital innovation process carried out by startup by providing the latest system technology information, sharing knowledge about business ideas, processes, and strategies, as well as input and feedback from experience using products and services. Meanwhile, the actors with limited involvement in digital innovation are suppliers, investors, and information media. Further analysis should expand the research of digital innovation ecosystems by involving more actors, especially community and information media actors with social network analysis.

## ACKNOWLEDGEMENTS

The authors are grateful to DRPMI Padjadajaran University for the financial support provided to this research. The authors thank the anonymous reviewers for their helpful comments.

## REFERENCES

[1] Adner, R. (2006). Match Your Innovation Strategy to Your Innovation Ecosystem. *Harvard*

Copyright © 2023 GMP Press and Printing
ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

*Business Review (*, 98–107. www.hbrreprints.org

[2] Adner, R., & Kapoor, R. (2010). Value Creation In Innovation Ecosystems: How The Structure of Technological Interdependence Affects Firm Performance In New Technology Generations. *Strategic Management Journal*, *31*, 306–333. https://doi.org/10.1002/smj

[3] Barus, K. (2021, March 17). Sebanyak 2.219 Perusahaan Startup Masih Mejeng di Pulau Jawa, Saatnya Investor Lirik Startup Daerah. *Https://Www.Industry.Co.Id/*. https://www.industry.co.id/read/82314/sebanyak-2219-perusahaan-startup-masih-mejeng-di-pulau-jawa-saatnya-investor-lirik-startup-daerah

[4] Beliaeva, T., Ferasso, M., Kraus, S., & Damke, E. J. (2020). Dynamics of digital entrepreneurship and the innovation ecosystem: A multilevel perspective. *International Journal of Entrepreneurial Behaviour and Research*, *26*(2), 266–284. https://doi.org/10.1108/IJEBR-06-2019-0397

[5] Beltagui, A., Rosli, A., & Candi, M. (2020). Exaptation in a digital innovation ecosystem: The disruptive impacts of 3D printing. *Research Policy*, *49*(1). https://doi.org/10.1016/j.respol.2019.103833

[6] Bittencourt, B. A., Santos, D. A. G. dos, & Mignoni, J. (2021). Resource orchestration in innovation ecosystems: a comparative study between innovation ecosystems at different stages of development. *International Journal of Innovation*, *9*(1), 108–130. https://doi.org/10.5585/iji.v9i1.18076

[7] Boudreau, K. J., & Lakhani, K. R. (2013, April). Using the Crowd as an Innovation Partner. *Harvard Business Review*, 60–69.

[8] Breschi, S., Lassébie, J., & Menon, C. (2018). A portrait of innovative start-ups across countries. *OECD Science, Technology and Industry Working Papers*, *2018*(2), 1–61. https://doi.org/https://doi.org/10.1787/18151965

[9] Chae, B. (Kevin). (2019). A General framework for studying the evolution of the digital innovation ecosystem: The case of big data. *International Journal of Information Management*, *45*, 83–94. https://doi.org/10.1016/j.ijinfomgt.2018.10.023

[10] Choi, H., Kim, S. H., & Lee, J. (2010). Role of network structure and network effects in diffusion of innovations. *Industrial Marketing Management*, *39*(1), 170–177. https://doi.org/10.1016/j.indmarman.2008.08.006

[11] Christensen, C. M., & Overdorf, M. (2000). Meeting the challenge of disruptive change. *Harvard Business Review*, *78*(2), 66–77.

[12] Ciriello, R. F., Richter, A., & Schwabe, G. (2018). Digital Innovation. *Business and Information Systems Engineering*, *60*(6), 563–569. https://doi.org/10.1007/s12599-018-0559-8

[13] Creswell, J. W. (2014). *RESEARCH DESIGN Qualitative, Quantitative, and Mixed Methods Approaches*. SAGE Publications, Inc. https://www.ptonline.com/articles/how-to-get-better-mfi-results

[14] Desouza, K. C., Awazu, Y., Jha, S., Dombrowski, C., Papagari, S., Baloh, P., & Kim, J. Y. (2008). Costomer-driven innovation. *Research Technology Management*, *51*(3), 35–44. https://doi.org/10.1080/08956308.2008.11657503

[15] Dyer, J., Gregersen, H., & Christensen, C. M. (2011). The innovator's DNA: mastering the five skills of disruptive innovators. In *Harvard Business Review Press*. www.InnovatorsDNA.com

[16] Fukuda, K., & Watanabe, C. (2012). Innovation Ecosystem for Sustainable Development. *Sustainable Development - Policy and Urban Development - Tourism, Life Science, Management and Environment*, 389–404. https://doi.org/10.5772/26626

[17] Fukugawa, N. (2018). Human capital management at incubators successful in new firm creation: Evidence from Japan. *International Journal of Entrepreneurship and Small*

Copyright © 2023 GMP Press and Printing
ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

*Business*, *35*(4), 338–558. https://doi.org/10.1504/IJESB.2018.096175
[18] Grönroos, C., & Voima, P. (2012). Critical service logic: Making sense of value creation and co-creation. *Journal of the Academy of Marketing Science*, *41*(2), 133–150. https://doi.org/10.1007/s11747-012-0308-3
[19] Hardiansyah, R., & Tricahyono, D. (2019). Identifikasi Faktor-Faktor Kesuksesan Start Up Digital di Kota Bandung. *Jurnal Ekonomi*, *27*(2), 134–145.
[20] Henke, J. W., & Zhang, C. (2010). Increasing Supplier- Driven Innovation: When customers collaborate with suppliers they can build trust, reduce relational stress, and increase innovation-related activities. *MIT Sloan Management Review*, *Winter*, 41–46.
[21] Holland, J. H. (2014). Complexity: A Very Short Introduction. In *First Edition, Oxford University Press* (First). Oxford University Press.
[22] Iansiti, M., & Lakhani, K. R. (2014, November). Digital ubiquity: How connections, sensors, and data are revolutionizing business. *Harvard Business Review*, *92:11*, 91–99. https://doi.org/10.2469/dig.v45.n2.8
[23] Inuzuka, A., & Chang, L. (2023). Is Participation in Services a Burden on Customers? Optimizing the Customer's Role of Participation. *Review of Integrative Business and Economics Research*, *12*(1), 111.
[24] Iovanella, A., Cinelli, M., & Ferraro, G. (2019). Network processes for collaborative innovation. In *Int. J. Entrepreneurship and Small Business* (Vol. 36, Issue 4).
[25] Kohli, R., & Melville, N. P. (2019). Digital innovation: A review and synthesis. *Information Systems Journal*, *29*(1), 200–223. https://doi.org/10.1111/isj.12193
[26] Marcon, A., & Ribeiro, J. L. D. (2021). How do startups manage external resources in innovation ecosystems? A resource perspective of startups' lifecycle. *Technological Forecasting and Social Change*, *171*. https://doi.org/10.1016/j.techfore.2021.120965
[27] Mathilda Gian Ayu. (2022, March 22). Dukung Program Dev/Verse 2022, Pemprov Jawa Barat Turut Ambil Bagian Menghadirkan Beragam Program Digital di Masyarakat. *Cloudcomputing.Id*. https://www.cloudcomputing.id/berita/dukung-devverse-pemprov-jabar-hadirkan-kegiatan-digital
[28] Nito, S. (2021). 6 Cara Memperoleh Modal Untuk Startup - 1000 Startup Digital. *1000startupdigital.Id*. https://1000startupdigital.id/6-cara-memperoleh-modal-untuk-startup/
[29] Nugraha, A. E. P., & Wahyuhastuti, N. (2017). Jurnal NUSAMBA Vol2 No.1 2017. *Jurnal Nusamba*, *2*(1), 1–9. https://ojs.unpkediri.ac.id/index.php/manajemen/article/view/701
[30] Oshima, Y., & Toma, T. (2023). The Product Innovation Process with the Use of Mediators for Collaboration : The Case of Japanese Traditional Local Industry. *Review of Integrative Business and Economics Research*, *12*(3), 50–69.
[31] Passaro, R., Quinto, I., Rippa, P., & Thomas, A. (2020). Evolution of collaborative networks supporting startup sustainability: Evidences from digital firms. *Sustainability (Switzerland)*, *12*(22), 1–20. https://doi.org/10.3390/su12229437
[32] Patrucco, A. S., Luzzini, D., & Ronchi, S. (2017). Achieving innovation through supplier collaboration: the role of the purchasing interface. *Business Process Management Journal*, *23*(6), 1270–1289. https://doi.org/10.1108/bpmj-10-2016-0202
[33] Peneder, M. (2010). The impact of venture capital on innovation behaviour and firm growth. *Venture Capital*, *12*(2), 83–107. https://doi.org/10.1080/13691061003643250
[34] Porter, E. M., & Heppelmann, E. J. (2015, October). How smart, connected products are transforming companies. *Harvard Business Review*, *93*(10), 96–114. https://hbr.org/2015/10/how-smart-connected-products-are-transforming-companies
[35] Pristy, K. L. (2022, March 9). Upaya Digitalisasi UMKM Indonesia melalui Ekosistem Digital dan Demokratisasi Ekonomi. *Feb.Ugm.Ac.Id*. https://feb.ugm.ac.id/id/berita/3552-upaya-digitalisasi-umkm-indonesia-melalui-ekosistem-digital-dan-demokratisasi-ekonomi

Copyright © 2023 GMP Press and Printing
ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

[36] Purbasari, R., Wijaya, C., & Rahayu, N. (2020). Most roles actors play in entrepreneurial ecosystem: A network theory perspective. In *Journal of Entrepreneurship Education* (Vol. 23, Issue 2).

[37] Ramadani, V., Dana, L. P., Gërguri-Rashiti, S., & Abazi-Alili, H. (2013). Women entrepreneurs in the Republic of Macedonia: waiting for directions. *Int. J. Entrepreneurship and Small Business*, *19*(1), 95–121. https://doi.org/10.1057/9781137444516.0018

[38] Reypens, C., Lievens, A., & Blazevic, V. (2019). Hybrid Orchestration in Multi-stakeholder Innovation Networks: Practices of mobilizing multiple, diverse stakeholders across organizational boundaries. *Organization Studies*, *42*(1), 1–23. https://doi.org/10.1177/0170840619868268

[39] Selander, L., Henfridsson, O., & Svahn, F. (2013). Capability search and redeem across digital ecosystems. *Journal of Information Technology*, *28*, 183–197. https://doi.org/10.1057/jit.2013.14

[40] Skala, A. (2019). Digital Startups in Transition Economies. In *Digital Startups in Transition Economies*. https://doi.org/10.1007/978-3-030-01500-8

[41] Suseno, Y., Laurell, C., & Sick, N. (2018). Assessing value creation in digital innovation ecosystems: A Social Media Analytics approach. *Journal of Strategic Information Systems*, *27*(4), 335–349. https://doi.org/10.1016/j.jsis.2018.09.004

[42] Tumbas, S., Berente, N., Seidel, S., & Vom Brocke, J. (2015). The "digital Façade" of rapidly growing entrepreneurial organizations. *Thirty Sixth International Conference on Information Systems, Fort Worth 2015, December*.

[43] Walrave, B., Talmar, M., Podoynitsyna, K. S., Romme, A. G. L., & Verbong, G. P. J. (2018). A multi-level perspective on innovation ecosystems for path-breaking innovation. *Technological Forecasting and Social Change*, *136*, 103–113. https://doi.org/10.1016/j.techfore.2017.04.011

[44] Wang, P. (2021). CONNECTING THE PARTS WITH THE WHOLE: TOWARD AN INFORMATION ECOLOGY THEORY OF DIGITAL INNOVATION ECOSYSTEMS. Privacy Policy A/B Testing Terms of Use Copyright Cookie Policy. In *Source: MIS Quarterly. Mar2021* (Vol. 45). https://web.p.ebscohost.com/abstract?direct=true&profile=ehost&scope=site&authtype=crawler&jrnl=02767783&AN=149296198&h=lVHpCI0wVvQLJ

[45] Yoo, Y. (2012). Digital Materiality and the Emergence of an Evolutionary Science of the Artificial. *Materiality and Organizing: Social Interaction in a Technological World, October 2009*, 1–27. https://doi.org/10.1093/acprof:oso/9780199664054.003.0007

[46] Yoo, Y. (2015). It is not about size: A further thought on big data. *Journal of Information Technology*, *30*(1), 63–65. https://doi.org/10.1057/jit.2014.30

[47] Yoo, Y., Henfridsson, O., & Lyytinen, K. (2010). The new organizing logic of digital innovation: An agenda for information systems research. *Information Systems Research*, *21*(4), 724–735. https://doi.org/10.1287/isre.1100.0322

Copyright © 2023 GMP Press and Printing
ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)