

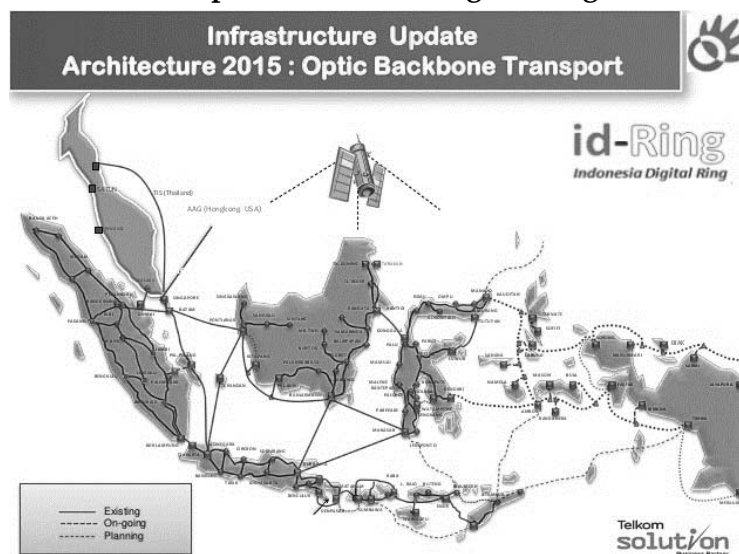
distinguishing the access of ICT between industrialized and developing countries (e.g., Norris, 2001; Chen & Wellman, 2004). Afterwards, the trends on digital divide studies shift to the developing countries (e.g., Singh, 2010; Acilar, 2011). These studies are devoted to identifying the aspects of the digital divide and the bridging ways in India and Turkey. Furthermore, some studies, particularly in less-developed countries, start to comprehend the digital divide in the rural-urban context (e.g., Nair, et al., 2010; Furuholt & Kristiansen, 2007). All these studies advocate a better access and value of ICT in the developing countries.

Studies on the digital divide in Indonesia as a developing country have also been conducted. Some studies highlight the sufferer of digital divide, including the women (e.g., Wahyuningtyas & Adi, 2010) and the villagers (e.g., Subiakto, 2013). The internet access gap of rural-urban and West-East (See Figure 1) remains a great challenge, although Indonesia stays at the top rank of social media users. ICT Indicators (2016) drew the comparison of those with internet access in rural and urban areas as being consecutively 26.3% and

48.5%. Meanwhile, other studies discuss the ways of narrowing the digital divide (Purbo, 2017) as well as the impact of the digital divide in growing digital industries (Azali, 2017). These studies emphasize the needs of Indonesia to address the digital divide beyond infrastructure issues. Education, community, institutional structures and governance, as well as digital skills, should be taken into account.

The digital divide in Indonesia has been studied, including the gap between the rural and the urban as well as the narrowing ways. Yet, those digital divide studies rarely go beyond media and (or) infrastructure issues. Hence, this paper offers material culture perspective to discuss the digital divide further than infrastructure. This paper more focuses on the ways people use internet to define their culture. Besides, the interconnection between rural and urban life for bridging the digital divide has generally been overlooked in most studies. The rural-urban linkages were initially suggested for overcoming the rural-urban divide through five types of rural-urban flows, namely people, production, commodities, capital, and information (Douglass, 1998). In

Figure 1.
Map of Indonesia's Digital Ring



Source: Mashari, 2016, p. 17

the Information Age, the author argues that the rural-urban linkages do not only provide opportunities to deal with the rural-urban divide, but also the digital divide. This paper is, therefore, a modest attempt to fill the gap and to rethink Indonesia's digital divide as well as the rural-urban linkages for bridging it.

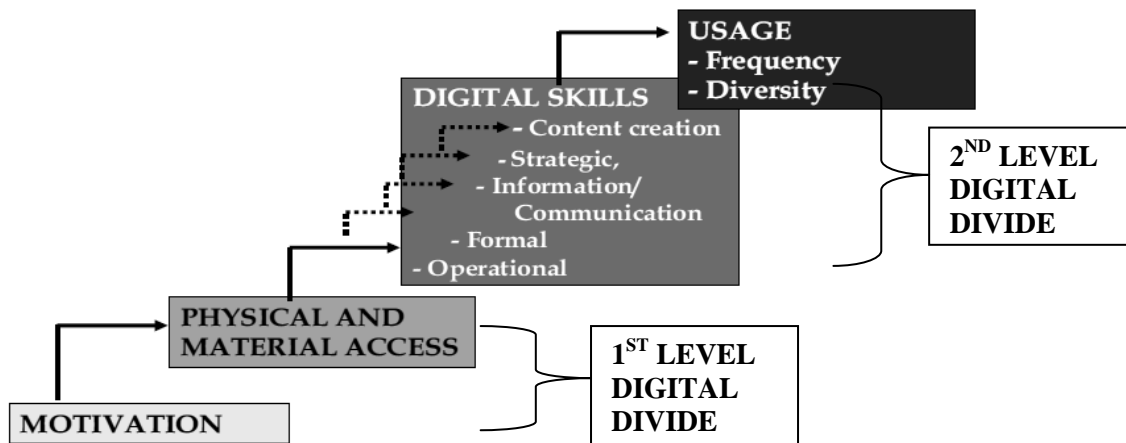
Literature Review

The popularity of the term *digital divide* at the end of 20th century encourages discussion among scholars (e.g., Norris, 2001; Warschauer, 2003; van Dijk, 2005). Norris (2001), defines the term as a multidimensional phenomenon incorporating three aspects, namely (a) the *global divide*, referring to the divergence of internet access between the developed and less-developed societies; (b) the *social divide*, concerning the gap between information rich and poor in each nation; and (c) the *democratic divide*, signifying the difference between those who do, and do not, use the panoply of digital resources to engage, mobilize and participate in public life. Although the original sense of digital divide stressing on the physical availability of computers and connectivity, Warschauer (2003) highlights that the digital

divide also incorporates access to additional resources allowing people to use technology well.

Consequently, discussing the digital divide should go beyond the physical access or beyond simply seeing the internet as a medium. Understanding the digital divide needs to focus on the ways people use the internet to define their culture. In order to comprehend the digital divide beyond the infrastructure, the material culture perspective offers "how apparently inanimate things within the environment act on people, and are acted upon by people, for the purposes of carrying out social functions, regulating social relations and giving symbolic meaning to human activity" (Woodward, 2007, p. 3). Here, van Dijk (2012a) distinguishes four successive kinds of access in the use of digital technology in individual level (See Figure 1). To appropriate a new digital technology, individual firstly needs to gain motivation. After feeling motivated, the individual needs to act on it. This access not only refers to the opportunity to use digital technology at a particular place, but also to access particular channels, programs, or information sources. Then, the individual should develop the

Figure 2.
Four Successive Kinds of Access in the Appropriation of Digital Technology



Source: van Dijk, 2012b, p. 61

acquired digital skills access. The last is usage access concerning the frequency as well as the number and diversity of applications. The lack of those accesses are mostly due to economic (household income), cultural (sufficient time for self-improvement), and social (inspiring networks) resources (van Dijk, 2012a) or so-called economic, cultural, and social capital (Selwyn, 2004). While the preceding two accesses are categorized as the first level of digital divide, the others are classified as the second level of digital divide.

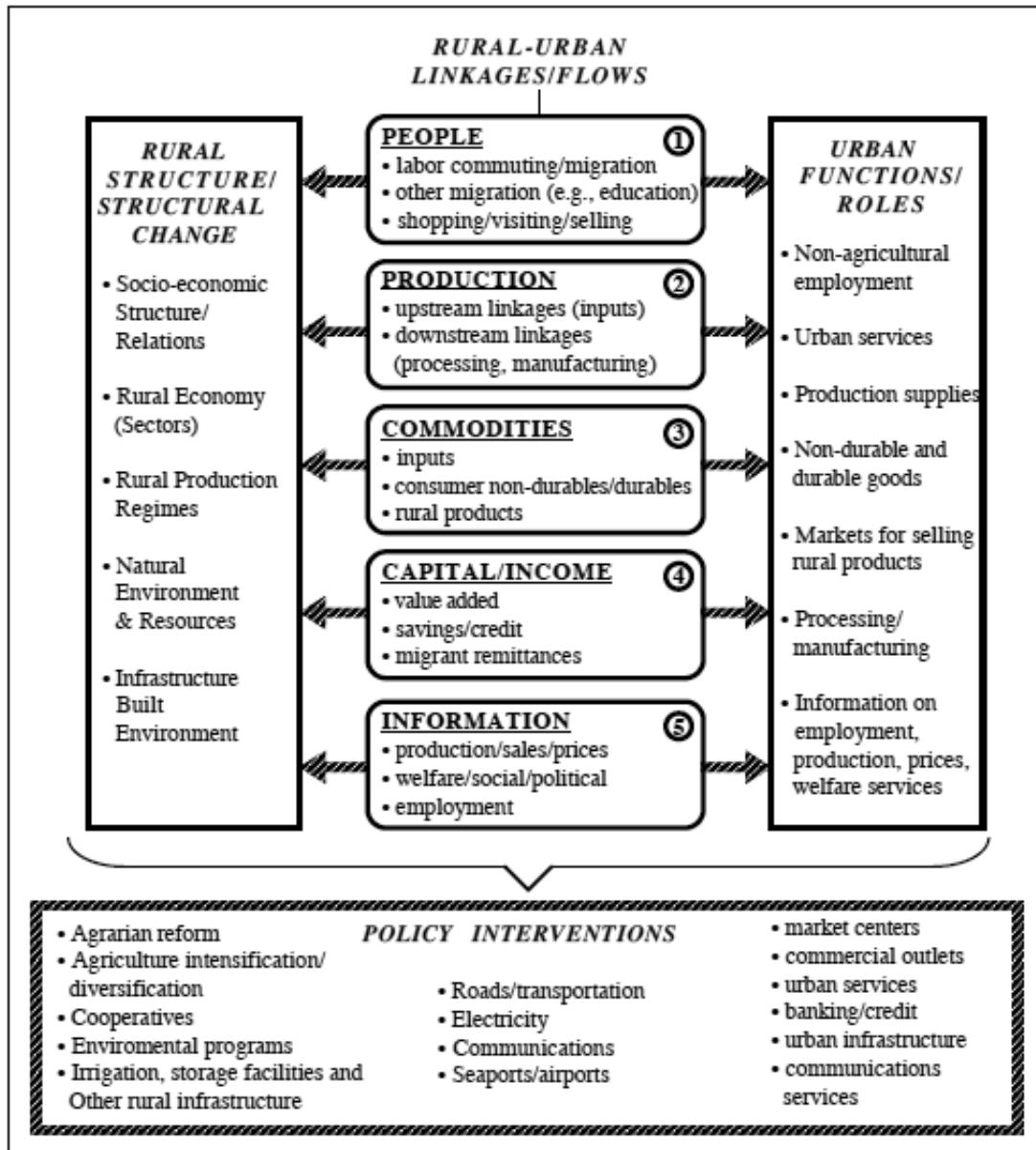
The great challenge in recent days is bridging the digital divide. Studies frequently underline two approaches for bridging the digital divide, namely top-down and bottom-up strategies, consecutively initiated by the government and by the community. In the context of industrialized society, like the United States of America (USA), the top-down strategies are reflected, such as from the Telecommunication Act of 1996 (reducing basic telephone rates in rural markets, reducing rates for low-income consumers, providing rate parity for high-bandwidths urban and rural connection, providing schools and libraries with discounts) as well as State and Local Policy (Public Utility Commission designing the state's technology plan with incorporating public interests) (Servon, 2002). Whereas, the bottom-up can be seen from community-based organizations (CBOs) (increasing technology capacity of CBOs to strengthen the grassroots movement). In Indonesia, the Smart Village Program (or Desa Pintar in Bahasa Indonesia, which stands for Desa Punya Internet, guaranteeing equal internet access, particularly those in rural areas) and Palapa Ring Project (fibre optic internet backbone providing internet access for 34 provinces and over 440 districts) represent top-down strategies (Purbo, 2017). Meanwhile, community-based internet networks, such as Kampoeng Cyber in Yogyakarta and Makassar Nol Kilometer in Makassar, show bottom-up

strategies. The digital gap in the industrialized society has been narrowing, while in fact, the gap in the developing society is still growing (van Dijk, 2012b).

We must not only understand the good side of the digital divide term, but we also need to comprehend the critiques toward it (e.g., Gunkel, 2003; Selwyn, 2004). According to Gunkel (2003), this term is originally equivocal, plural, and flexible. Assisting the digital divide discourse in *comprehending the complexity* is more important than producing a precise definition. Secondly, this term tends to project a binary structure, in which one negates or is the antithesis of the other (e.g., industrialized and developing societies; have and have not access; literate and non-literate) (Gunkel, 2003; Selwyn, 2004). Rather than creating dichotomy, the digital divide needs to be located in *a complex continuum*; therefore, the structure and consequences from its own problems can be comprehended. Lastly, to some extent, technological determinism has coloured this term (Gunkel, 2003). It brings nuance that technological issues can overcome socioeconomic issues. As it is much more complex, *integrating other theories and concepts* will be beneficial to opening the digital divide to critical reflection.

From the above standpoint, bridging the digital divide, particularly in the context of developing countries, demands a new perspective beyond infrastructure or top-down and bottom-up strategies. The digital divide seems to be the extension of the rural-urban divide; therefore, incorporating rural-urban linkages becomes a key concept to gain comprehensive analysis of the digital divide, particularly the ways to bridge it. According to Douglass (1998), the rural-urban linkages include the flow of people, production, commodities, capital, and information between the rural structure and the urban role. The people are often commuting or experiencing circular migration as well as involving in various activities, such as visiting, shopping,

Figure 3.
Rural Regional Development Process: Structures, Flows, and Policy Interventions



Source: Douglass, 1998, p. 27

and selling. While the production in rural areas includes agriculture and fishery, in urban areas, it often involves processing and manufacturing. Moreover, the commodities between the spaces cover rural products, non-durable goods (basic daily needs), and durable goods (e.g., electronics). Capital shows particularly the financial accumulation (e.g., income and remittances). Meanwhile in the digital age,

the flow of information is increasingly fast and multiple along with the emergence of ICT. As illustrated in Figure 3, these flows stream back and forth from the rural system to the urban system and the other way around. Understanding the complexity of rural-urban linkages through the five flows enables us then to propose a genuine and comprehensive digital divide policy intervention.

This part offers an overview as a guideline for investigating the digital divide in Indonesia. Furthermore, it proposes the use of rural-urban linkages, an old concept in the new context of the Information Age, to bridge the digital divide as discussed in the following part.

Methods

Qualitative in nature, data on this paper was gathered from both primary and secondary sources. To collect the primary data, visits were made near the Greater Jakarta area (involving Jakarta, Bogor, Depok, Tangerang, and Bekasi). In June 2016, two villages and one town were visited during research on Social Resilience Building Strategy for the Rural and Urban Poor. Those villages were Kasunyatan Village and Cipocok Town in Serang Municipality and Cikiruhwetan Village in Pandeglang Regency. There were two main reasons underlying the selection of research areas, namely (a) The existence of Banten as a relatively new established province during regional autonomy with a quite low poverty rate; and (b) The increasing urbanized areas in Banten, both in Serang Municipality and Pandeglang Regency. During the visits, the author conducted observation to comprehend the rural-urban space as well as their interconnection. Furthermore, life history was conducted in order to understand the people from their narrated biographical “chunk” or the so-called “listening beyond” and “trying to hear, beyond the words of a given person, the speech of a social culture” (Wiame in Kouritzin, 2000, p. 2). While the research team organized life history to 40 households in two provinces (Yogyakarta and Banten), this paper limits the discussion only to nine households in Banten in order to get a deeper insights on the rural-urban linkages as well as the ways people appropriate internet within their context. During the life history, the author spent some time listening to the life stories of all household members, including their ups and downs as they faced hardships of rural-urban

life as well as observing their daily activities. Data was then classified into several concepts used in this study, such as people, capital, and information. Meanwhile, the secondary source, such as institutional data (e.g., Central Bureau of Statistics and Ministry of Communication and Information Technology) as well as related contemporary online data, was used as complimentary macro data to understand the big picture of Indonesian digital divide. All data, particularly the primary data, was then analyzed descriptively to explore and to propose the rural-urban linkages to bridge the digital divide.

Results and Discussion

Two Levels Digital Divide of Indonesian Rural-Urban Dwellers

Understanding the digital divide needs to be started from motivation, the very base reason for people for using or not using ICT. Data of 2016 ICT Indicators show that more than half of Indonesian households (64%) still do not have access to the internet (MCIT, 2016). Moreover, there are at least eight reasons underlying the lack of motivation for most Indonesian households in accessing the internet. Those can be classified into (a) infrastructure reason (i.e., unavailable internet service); (b) financial reason (i.e., not corresponding to the households’ needs, high service cost, high equipment cost); and (c) personal reason (i.e., not needing the internet, lack of confidence, privacy or security concern, cultural reason). Although the data does not show the variation of age, gender, and socio-economic status, the infrastructure is only on the surface a problem for most households not to access the internet.

In the next step, infrastructure should be made available. It will prevent the number of internet dropouts. People might stop using the internet due to the high cost, although they were firstly curious and enthusiastic. Then, it will encourage others to start using the internet. Internet or ICT infrastructure in general still

Table 1.
ICT Indicators

	From Total (%)	Rural (%)		Urban (%)	
		Household Access	Individual Usage	Household Access	Individual Usage
Internet	36.0	26.3	32.5	48.5	41.7
Types of internet access	36.0	-	-	-	-
a. Mobile broadband	93.3	95.4	-	93.3	-
b. Fixed broadband	7.8	7.4	-	14.3	-
Handphone	84.4	79.5	70.1	90.7	76.4
a. Smartphone	-	-	59.2	-	70.7
b. Non-smartphone	-	-	61.5	-	49.4
c. Both	-	-	20.7	-	20.1
Computer	31.4	22.1	20.4	43.4	38.5
Fixed phone	4.5	1.4	-	8.5	-
TV	87.7	82.6	67	94.2	81.2
Radio	40.0	26.3	20.5	48.5	31.3

Source: Compiled by the author from MCIT, 2016, p. 5-43

cannot be accessed equally for all Indonesians. As drawn previously in Figure 1, the internet backbone in the east part of Indonesia is still either planned or on-going, while in the west, it has been already well-existed. Furthermore, Table 1 shows that ICT is distributed unevenly among Indonesians. The gap is wider between those living in rural and urban areas. The internet access is almost parallel with the use of smartphone and computers. The low number of people using internet in the rural areas is in line with the low number of people using smartphones and computers there. Among available media, television still stays as the favourite, while radio and the internet are nearly in the same place.

Then, how are the Indonesian digital skills? This kind of research seems to have never been conducted in Indonesia. Previously, the Ministry of Education had provided ICT as a lesson material at school. It was not only removed from the school curriculum, but also the lesson was more focused on medium-related skills or the ways to operate the technology. These are illustrated from the ways individuals use computers as a tool. Individual computer usage activities mostly include (a) copying or moving the file or folder (80.2%) and

(b) using copy-and-paste tools to duplicate or move information within a document (71.3%) (MCIT, 2016). Most of the computer usage activities are related to the equipment (the hardware) or even to the button.

Table 2.
Computer Usage Activities

Computer Activities	(%)
Copying or moving a file or folder	80.2
Using copy-and-paste tools for duplicating or moving information within a document	71.3
Sending email with attached files	48.5
Connecting and installing new devices	42.8
Transferring file between a computer and other devices	38.7
Finding, downloading, installing and configuring software	38.0
Using a basic arithmetic formula in spreadsheet	24.7
Creating electronic presentations with presentation software	20.9
Making a computer program (coding)	7.9

Source: MCIT, 2016, p. 25

The ways people use the technology are apparently affected by their digital skills. Usage here is not only about the frequency or the intensity with which people use the technology. In this context, usage is more about the ways people can benefit from using the technology. To what extent have people used the technology



for education and work? Or do they just simply use it for entertainment? While these kinds of data are hardly found, the usage activities actually reflect what kind of advantage people will receive from their internet activities. In fact, the majority of Indonesians use the internet for (a) participating in social networks (77.3%), (b) looking for information about goods and services (53.7%), and (c) sending messages via instant messaging (including chatting) (52.7%) (MCIT, 2016). These indicate they mostly use it only for entertainment rather than for higher productivity or even achievement.

Table 3.
Internet Usage Activities

Internet Activities	(%)
Participating in social networks	73.3
Looking for information about goods or services	53.7
Sending messages via instant messaging	52.7
Downloading films, pictures, music, etc.	48.2
Searching education information	47.4
Playing games	44.1
Sending or receiving emails	41.4
Learning activities	39.8
Gaining health information	39.0
Reading newspapers, magazines, e-book	30.8

Source: MCIT, 2016, p. 28

Folowing van Dijk (2012b), Indonesians experience the digital divide due to the lack of four accesses. Indonesians have low motivation to start using the technology. The main reason for most of them not being motivated to access the internet is the households' and the individuals' characteristics. At the household level, it is undeniable that internet access is determined by their socio-economic status as well as by their unaffordable infrastructure. Meanwhile, at the individual level, personal characteristics matter, in which some of the people might be technophobia and have a traditional mind-set. They may believe that using the internet will make people anti-social with less face-to-face communication. Furthermore, the physical and material access has not been built throughout Indonesia, especially in the east and remote areas. Some

of the internet users have even become internet dropouts because of unaffordable infrastructure and high costs. These certainly place Indonesia in the first level of the digital divide.

Then, Indonesians face the second level of the digital divide. This actually correlates with social inequality among Indonesians, particularly on the level of education. Low education levels or so-called positional categorical inequalities to some extent contribute to the digital divide (van Dijk, 2012b). While *medium-related skills* consist of operational skills (button knowledge) and formal skills (handling the formal structure of the medium, such as browsing and navigating), *the content-related skills* involve information skills (e.g., searching, selecting, and evaluating information), communication skills (e.g., mailing, contacting, creating online identity, drawing attention, giving opinions), strategic skills (using ICT as a means to achieve particular professional and personal goals), and content-creation skills (making a contribution to the internet with a particular plan or design) (van Dijk, 2012b). As illustrated in Tables 2 and 3, most Indonesians are more familiar with medium-related skills, such as copy-and-paste tools, and limited content-related skills, such as searching and finding information on job vacancies or even health. Consequently, only a few Indonesians can benefit from the internet as they have very low digital skills.

Rural-Urban Linkages for Bridging the Indonesian Digital Divide

The government has struggled to overcome the illustrated digital divide. Related with the unaffordable infrastructure, the government has been building the Palapa Ring Project since 2007. The project has been dormant for 10 years. As it is predicted to be finished in 2019, the people need to adjust to the lack of infrastructure with building their own as well as relying on several private providers. Indonesians have multiple devices

and SIM cards in order to balance between lower connection prices and signal quality since signals from various operators are distributed unevenly (Azali, 2017). This indicates that the government has not provided any policy or even regulations to reduce the cost, particularly for those in places with a lack of ICT infrastructure. With the data of ICT indicators, the government puts a greater focus on assisting rural areas, similar to their strategy to narrowing the rural-urban divide. For example, the government established the Smart Village Program previously mentioned, as well as the Information and Technology Café (Warung Informasi dan Teknologi-Warintek). Nevertheless, these kinds of programs do not stay long and mostly end as soon as the government budget and (or) program finishes.

Rather than focusing on the rural areas alone, the rural-urban linkages should be examined carefully to bridge the digital divide. These are reflected from visits to two villages (Kasunyatan and Cikiruhwetan) and one town (Cipocok) in Banten Province. The first village, Kasunyatan, is a major rice producing area within 15 km from the "new established city centre." Three-fourth populations in this village work as peasants, including men, women, and boys, in which men are mostly paid higher compared to others. The peasants distribute the works, based on gender (e.g., hoeing for men and planting for women). They closely work together to succeed their rice production in every season as well as helping others' needs. Unfortunately, those peasants mostly depend on the farmers, so they bring or share their crop directly to their patron. Moreover, the agricultural land prices are rapidly increasing with the emergence of non-village buyers, particularly from Greater Jakarta. Some of the men also work as timber porters and wooden crate makers. While they have crops twice a year, the agriculture seems to not change their welfare. Meanwhile, the girls mostly go to various home industries, such as

those producing snack and shoes with a small wage (around IDR 250,000/week). The very low socio-economic status causes a very high social inequality, including a low level of education. Most children only graduate from elementary school, preventing them from advancing. Moreover, they hardly get access to credits from formal banks. As observed during the visit, as well as from the explored life history, only a few households are eager to access digital media, particularly due to the lack of motivation, either from household or personal reasons. Television is the most popular media among them.

The second is Cikiruhwetan, a fishery village in the south coast of Java 40 km from the city centre. Data during visits shows that most of the first generation are migrants from the other coast in Java, such as Cirebon and Brebes, which continues in these recent days. They live on rented illegal land within 5 km from the coast. While the men work as fishermen, the majority of women go to the local auction market to sell captured fisheries. They experience great suffering during *paila*² and usually sell their assets (including household equipment) for daily needs. The data from the life history in Cikiruhwetan Village-Cikeusik District shows that some children have a junior high education, although most of the people in this district have low education (See Table 4). Living on the coast provides greater opportunities for them to interact with various people, including migrant worker recruiters. A young woman narrated her story as a domestic worker in Singapore. The youths at this village are getting used to digital media, particularly the internet for entertainment. Compared with the previous village, the people here have a higher standard of living, although they build their houses on rented land.

² It is the period, in which most men go for fishery with a very bad weather and limited number of captured fisheries. There are almost no men at the village during this period. The women are mostly left with limited or even no money for their daily expenses.

Table 4.
The People’s Highest Education in Cikeusik District, Pandeglang

Highest Education	Number	Low Education
Not/Never attending school	7,821	307,804
Not/Not yet finishing elementary school	12,585	
Elementary school	19,755	
Junior high school	3,302	
Senior high school	1,339	
Vocational school	131	
Diploma I/II	181	
Diploma III	38	
Undergraduate	193	
Postgraduate	17	
Not answer	0	
Total	45,362	

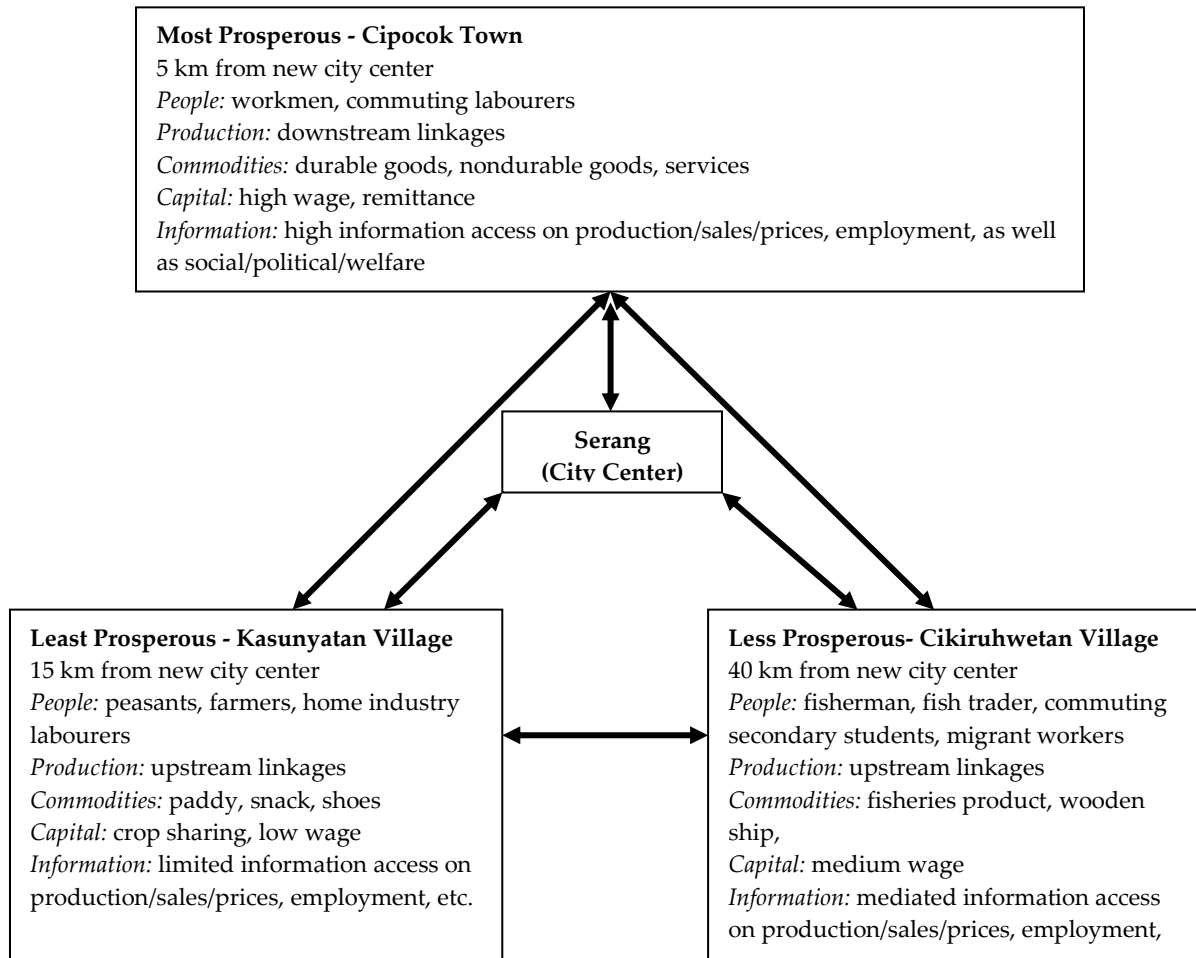
Source: Population Census, 2010

A town in a growing urban area, Cipocok, is the third. This town is located around 5 km from the city centre. As a new urban area, this town developed rapidly, providing offices, settlements mostly for public servants, and modern markets (e.g., supermarkets), which were hardly found ten years ago. This town is within 40 km of large rapidly-growing industrialized cities (such as Balaraja in the Greater Jakarta). Consequently, there is a number of people making a daily commute (especially amongst women) to factories and other work in the urban fringe. Many factories even send buses to pick up workers every day. The youth have opportunities to have formal work since they graduated from senior high secondary education. Besides, some of the middle-age men work as workmen, either in or out of town. These workmen at first act as the agents of change, bringing new imagined welfare and modernity. Later on, the youth continue their roles as the agents of change by influencing the household welfare with diverse skills, including digital skills to achieve their personal goals and community goals. For instance, they can obtain job opportunities from the internet and even encourage them to migrate to Greater Jakarta with a diversified job,

such as accountant or fashion advisor as well as share the information in their community. This town is certainly the most prosperous compared to the two previous villages.

Comprehending the rural-urban linkages provides opportunities to understand the people within their space and relational context. The above stories narrate various resources of the rural-urban inhabitants as drawn in Figure 4. The highest level of prosperity is occupied by Cipocok Town followed consecutively by Cikiruhwetan Village and Kasunyatan Village. These towns and villages are located in the surrounding of Serang, the relatively new city centre. Cipocok, for instance, is transforming from rural to peri-urban (town) areas. The atmosphere of those villages and towns, therefore, still shows strong ties and networks among the people indicating high social capital. While the rural inhabitants work mostly as peasants and fishermen, most of the people in town are workmen and labourers. The production is more upstream linkages in the rural space and downstream in the urban space. This certainly influences the commodities produced by each town and village. Kasunyatan and Cikiruhwetan villages provide rural products, including paddy and captured fisheries. Meanwhile, Cipocok Town supports the city centre and Greater Jakarta by providing labour to produce various durable and nondurable goods, such as cables and shoes. While labourers receive a steady high wage, this is not the case for those working in agriculture and fishery sectors. This actually influences the information exposure among those people. While the people in town are used to commuting to the city centre and the surrounding areas for work, the people in the coastal villages, like Cikiruhwetan, easily interact with new people and migrants, enabling them to receive and exchange information. In fact, the high agricultural productivity in Kasunyatan is imbalanced with their information exposure, generating them as the

Figure 4.
Rural-Urban Linkages: Structure & Flows



Source: Composed by the author

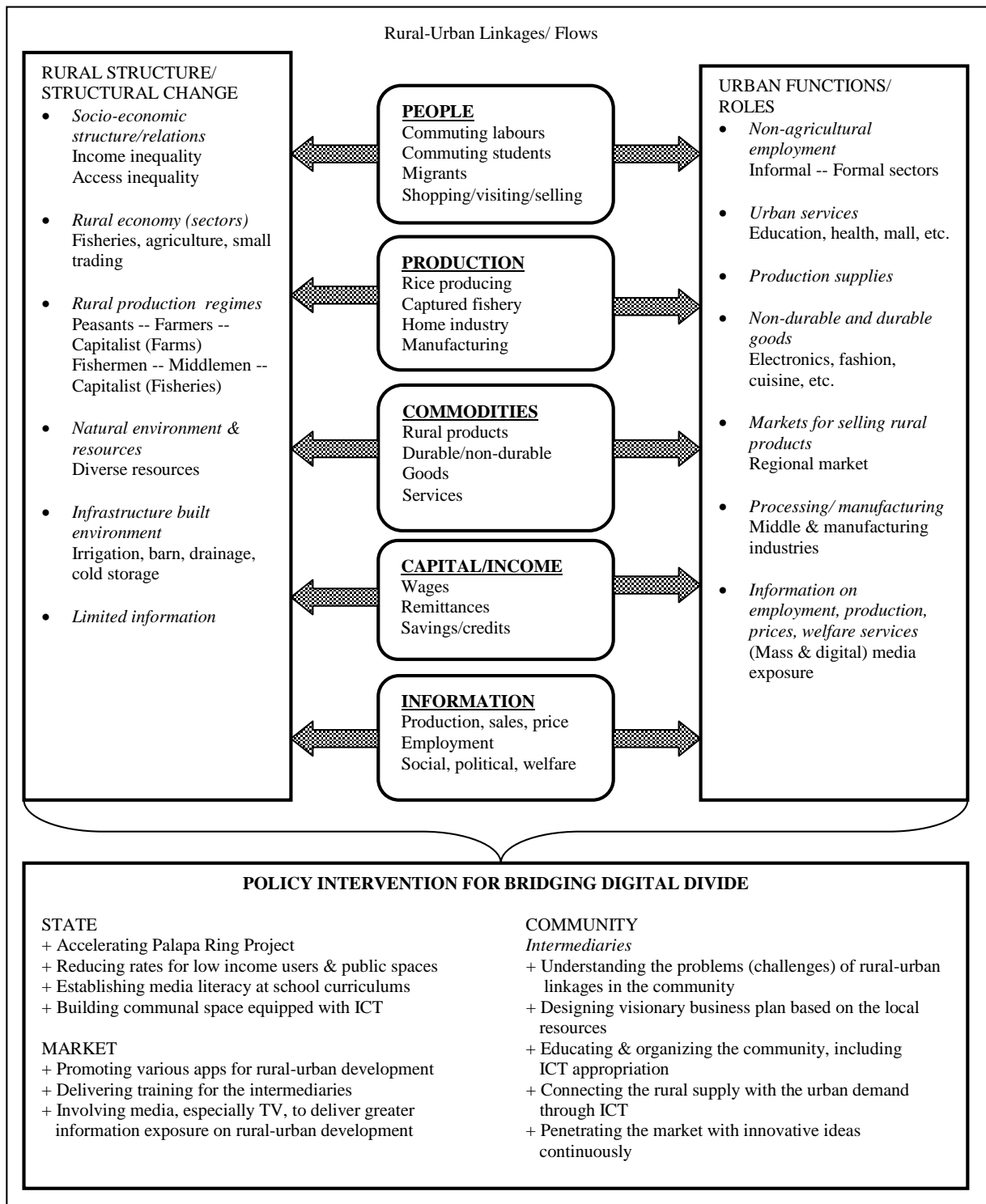
least prosperous peasants. Rural-urban linkages actually show the structure and the flows of people, production, commodities, capital, and information between rural (Kasunyatan and Cikiruhwetan Village) and urban (Cipocok Town) spaces.

While the structure and the flow of people, production, commodities, capital, and information between the rural and urban spaces have been comprehended, technology, particularly ICT, should be determined as material culture and people as the active users within their specific space and context. Then, how can the rural-urban linkages bridge the digital divide? How should the digital divide intervention policy based on rural-

urban linkages be arranged? In this paper, the author proposes policy intervention for bridging the digital divide by incorporating rural-urban linkages as well as involving three main actors, namely state, market, and community. These actors need to comprehend the rural-urban linkages, including the flows of the people, production, commodities, capital, and information in order to arrange their intervention, as drawn in the following figure.

As illustrated in the above figure as well as narrated previously from the story in Cipocok, Cikiruhwetan, and Kasunyatan, the actors need to understand the characteristic of rural-urban before creating any digital divide intervention policy from rural-urban linkages.

Figure 5.
Rural-Urban Linkages for Bridging Indonesia's Digital Divide



Source: Adapted from Douglass, 1998, p. 27 with expansion from author's research

While the rural system mostly depends on agriculture and fisheries, the rural inhabitants often experience income inequality, lack of infrastructure, and limited information access. Meanwhile, the urban system relies on formal, informal, and manufacturing sector producing various urban (durable and nondurable) products and services. Moreover, the urban dwellers mostly have a greater access on health, education, and information compared to their fellows in rural areas. These certainly influence the linkages of people, production, commodities, capital, and information between the rural and the urban areas. From this kind of understanding, the actors are then able to create their policy intervention to bridge the digital divide based on rural-urban linkages.

State is the main actor being responsible for providing the digital infrastructure and guaranteeing digital access for all. In terms of digital infrastructure, the Palapa Ring Project needs to be accelerated to cover all provinces, including all rural-urban areas. Moreover, the state should ensure digital access for all, both economically and socially. From economic perspective, the state is suggested to reduce the rate for marginalized people (i.e., low income households) as well as giving discount for public space (e.g., schools and libraries). Socially, the state should start media literacy as part of school curriculums. Rather than ICT lesson introducing button knowledge (operational skills) or so-called medium related skills (Van Dijk, 2012b), the author suggests media literacy. It does not need to stay as an independent lesson. It can be incorporated in language lessons, for instance. Media literacy encourages students to explore the impact and the influence of media, particularly the actors and the constructed meaning of media texts, both in their lives and in the society (Poerwaningtias & Rianto, 2013; Dvorghetsa & Shaturnaya, 2015). Eventually, they can respond the media intelligently and responsibly. Meanwhile, the local governments are encouraged to build

more and more communal space (e.g., parks and libraries) equipped with ICT.

The presence of the digital age encourages the emergence of new markets. Not only the giant established companies, but nowadays there are also various digital start-up companies for rural-urban economies. *8Villages*, *Blumbangreksa* and *Angon* are just a few start-up companies consecutively in agriculture, farmed fisheries and farmed cattle sectors. The presence of *8Villages* for instance, produces various apps in agriculture, such as *Petani*, *Dokter Tanaman*, and *Rego Pantes*. The start-up companies need to promote their apps, to the government and the non-governmental organizations (NGOs) closely worked with the specific communities. Furthermore, working with them, the digital start-up companies can deliver training for specific targeted communities' intermediaries. For example, the apps can be introduced and trained to the Youth Farmer Ambassadors³ as well as to other intermediaries in their community. Media, particularly television, which is the most popular media in rural-urban areas, should also be taken into account by providing information exposure on rural-urban development, particularly rural economies for youths.

Community is the one actively using the ICT. Here, community has wide coverage, including the rural-urban inhabitants and the intermediaries. The author assumes that each inhabitant should be placed in their own space and context indicating the difference of their material conditions. The intermediaries are required to bridge the digital divide based on the rural-urban linkages. Those, who can act as intermediaries, are the commuting labourers, college students, or even the migrant workers.

³ In 2016, Oxfam, Agri Pro Focus and Koalisi Rakyat untuk Kedaulatan Pangan (KRKP) worked together promoting farming to the youth by selecting the youth farmer ambassadors. There are at least three ambassadors, namely Rici Solihin, Rizal Fahreza and I Gede Artha Sudiarsana, who have initiated farming activities in their communities, consecutively in Bandung, Garut and Karangasem (Yuliastuti, 2016).

These intermediaries are expected to have a quite high education and skills to introduce ICT and to transfer the digital skills, as well as being the leader in term of empowering their community. From the visits, it seems that the intermediaries should be the people from Cipocok Town understanding the linkages between the urban areas (Serang and Cipocok) and the rural areas (Cikiruhwetan and Kasunyatan Village). While these intermediaries are still hardly found in the location under study, they are expected to act as a visionary one, like Sugeng Handoko⁴ and Rici Solihin⁵ consecutively acting as the initiators of Ngelanggeran Ecotourism and Paprici. The author suggests the intermediaries need to take at least five main roles, namely:

a) *Understanding the problems (or challenges) of rural-urban linkages in their communities*

In the case of Ngelanggeran, the intermediary finds the poor productive youth with high urbanization rate as the main problem of their community. Meanwhile, in the case of Paprici, limited (agricultural product price) information access and high logistic costs are the main problems of most peasants in his community.

b) *Designing a creative business plan based on local resources*

While agriculture seems incompatible with the recent youth, Handoko explores the potency of ecotourism in his community, particularly the existence of Ngelanggeran

⁴ Sugeng Handoko is a youth from Ngelanggeran Village-Gunungkidul Regency. He is willing to commute every weekend from Yogyakarta, where he studies Industrial Engineering at Ahmad Dahlan University, to Gunungkidul, where he acts as the leader of *Karang Taruna* (youth organization) in his community (Interview, 15 August 2016).

⁵ Rici Solihin is a youth from Pasirlangu Village-West Bandung Regency. Studying Business Management in Padjajaran University for his bachelor and master degree, he initiated the marketing of local farm product to other urban areas as well as establishing peppers business plan (petanimuda.org).

Ancient Volcano. He then sets various entertaining activities (e.g., mountain tracking and outbound) as well as providing homestay.

Meanwhile, Solihin designs his business plan for empowering the local peasants with sharing economic principle based on his experience as fruit and vegetable retailer (Cerita Duta Petani ..., n.d.). He guarantees the transparency of price information for the peasants as well as assisting the poor peasants with skills and funds.

c) *Educating and organizing the community, including ICT appropriation*

This certainly is the greatest challenge in empowering the community. Both intermediaries need to build community awareness (about ecotourism) and trust (on information transparency). Then, they organize the community to meet the goals of the business plan. Furthermore, both intermediaries “can mediate what can be a rather disruptive experience, for people used to different ways of communicating, seeking and sharing knowledge, and assessing information” (Oreglia, 2013, p. 126). Here, in line with Oreglia (2013), the author argues that the intermediaries should provide opportunities for the community to “invent” themselves as technology users. For example, the community needs to be familiarized with the presence of ICT to access any information about ecotourism and product price as well as to facilitate them for further discussion on the obtained information.

d) *Connecting the rural supply with the urban demand through ICT*

Solihin, for instance, creates and introduces *Farmtastic* to connect the peasants with their final customers in order to protect them from the unfair middlemen (Cerita Duta Petani ..., n.d.). Meanwhile, Handoko provides media literacy for his community, particularly to create a message and to understand the

- Cerita Duta Petani Muda 2016: Rici Solihin "Paprici" Petani Paprika Masa Kini. (n.d.). Retrieved from <http://petanimuda.org/cerita-duta-petani-muda-2016-rici-solihin-petani-paprika/>.
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