

Driver Factors

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The analysis of driver factors on handling collaboration of used cell phone for second hand market actors at Special Region of Yogyakarta, Indonesia

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Abstract: The rate of cell phone usage is increasing from year to year, which has resulted in an increase in used cell phones. Reverse Logistics (RL) is one way to handle End of Life (EoL) or End of Used (EoU) products such as used cell phones. Like other developing countries, the handling of used cell phones in Indonesia is mostly carried out by informal actors starting from second-hand market actors. However, RL activities on informal parties often have an impact that endanger the environment and human health. One way to reduce this impact is to transfer some of RL's activities to formal parties. This requires collaboration from both parties. This study aims to explore the factors driving the collaboration intention of informal actors for handling used cell phones. Second hand market actors in five districts in the Special Region of Yogyakarta Province are respondents in this study. The actors in each district have a driving factor in influencing the intention to collaborate in handling used cell phones. Government support is a factor that often appears in every district and also at provincial level studies. The results of this study can be used as a consideration for the government and cell phone companies to design cell phone waste management.

Keywords: collaboration intention, driver factors, reverse logistics; used cell phone

1. Introduction

Mobile phone users in Indonesia, especially in the Province of the Special Region of Yogyakarta (DIY) are increasing from year to year. Data from the Central Bureau of Statistics (BPS) generally shows that the percentage of the population using mobile phones has increased from 2012 to 2019, although there has been a slight decline in 2020, possibly due to the COVID-19 pandemic. The increase in mobile phone users is shown in Figure 1.

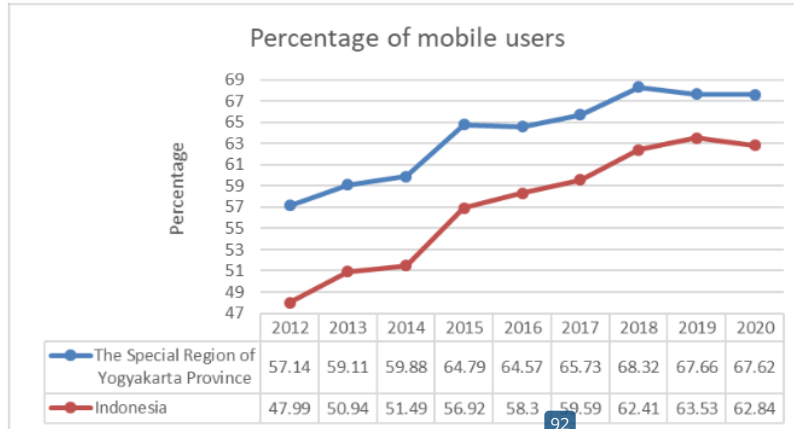


Figure 1. Data on the percentage of mobile phone users in the Province of the Special Region of Yogyakarta (DIY) and Indonesia in 2012-2020

(sumber: Data of the year 2012-2018 was taken from: <https://www.bps.go.id/linkTableDinamis/view/id/985> accessed in March 19, 2022; Data of the year 2018-2020 was taken from: <https://www.bps.go.id/indicator/2/395/1/persentase-penduduk-yang-memiliki-menguasai-telepon-seluler-menurut-provinsi-dan-klasifikasi-daerah.html> accessed in March 19, 2022)

The increase in the number of cell phone usage means that there is also an increase in cell phone waste, which is e-waste. E-waste that is not managed adequately will be harmful to the environment and human health. The content of hazardous metals in e-waste such as lead, cadmium, mercury, hexavalent chromium, and refractory materials (Chatterjee and Kumar, 2009; Chi et al., 2011; Joseph, 2007; Realf et al., 2004; and Schwarzer et al., 2005). These hazardous metals in the long term can have an impact on human health and environmental damage, such as mentioned in Robinson (2009) that for every 1 kg of e-waste, there is 180 mg of cadmium and 0.8 mg of mercury, especially in the battery component. Furthermore, the BBC (2002) in Polak & Drápalová (2012) states that cadmium from a cell phone battery can contaminate 600.000 liters of water. From research conducted by Robinson (2009) in Guiyu City, Guangdong region, China, which is the largest e-waste recycling area in the world, it was found that dioxin contamination in Guiyu air resulted in the level of exposure to humans reaching 15–56 times the maximum standard recommended by WHO. Elevated levels of dioxins are found in breast milk, placenta, and hair, indicating that dioxins are acquired by humans from the air, water, or foodstuffs, at levels sufficient to pose a serious health risk. Children in Guiyu have significantly higher blood lead and cadmium levels than normal children. It was also reported that e-waste recycling workers from villages in the Jinghai region had chromosomal aberrations at about 20-fold higher than villagers who were not exposed to e-waste. For this reason, it can be said that e-waste is a potential source of genetic mutations and can cause cytogenetic damage in the general population exposed to e-waste pollution. Furthermore, it was conveyed by Orlins & Guan (2016) that during the process of dismantling e-waste without adequate technology, the content of hazardous materials in e-waste will remain in the environment for a long time.

Consumers around the world tend to store their small electronic devices as they reach their End of Life (EoL) rather than throwing them away. This is a dilemma because if end-of-life devices are not collected from consumers' homes, those devices cannot be

reused or recycled, resulting in increased production (Nøjgaard, 2020). One of the activities that can be used to manage EoL or End of Used (EoU) products such as used cell phones is reverse logistics. Reverse logistics (RL) is an activity aimed at handling products that have expired or their useful life or products returned by partners in the supply chain to be managed to the original point. RL activities perform recovery of the product so that part or all of the product can be reused.

Rogers & Tibben-Lembke (1998) stated that RL is the process of moving goods from the end user to return to the original point in order to save the value of the goods. Likewise, Jingbo (2005) stated that the essence of RL is to get value from products that are no longer used. When a product has lost its value, RL activities can recover the product to become a new product again by recycling some parts or components of the product. On the other hand, Aquino (2020) proposed a mathematical model to determine the best location to install waste electrical and electronic equipment collection points.

An ideal RL activity is not only providing economic benefits for the actors, but also has a positive impact on the environment. Economic benefits can be as alternative materials for production of raw materials, so that it reduces the use of virgin materials, which are likely to be increasingly scarce. The positive impact on the environment is the avoidance of the disposal of parts or all of the hazardous used products, without adequate processing. In line with this, Jingbo (2005) stated that RL was not only creating economic benefits but also promoting green supply chain construction. It is also stated in Srivastava (2007) that RL is part of green supply chain management. Not only economic and environment, RL is also have social benefits (Feng, 2019) and (Iserna, 2019)

In Indonesia, mobile phone waste is mostly managed by informal actors, through the starting point of the second hand market. Informal actors will get economic benefits from the activities of managing used cell phones. However, if used cell phone management activities are carried out without safe technology, the impact can disrupt the health of informal actors and damage the environment. Several authors such as Chatterjee & Kumar (2009), Chi et al. (2011), Joseph (2007), Li et al. (2011), and Robinson (2009) elaborated contamination of the environment due to e-waste management activities by informal parties.

On the other hand, Original Equipment Manufacturers (OEMs) as formal actors have the technological capabilities to handle used cell phones. However, the offer of a used cell phone return program in Indonesia is not carried out routinely and according to Budijati et al. (2015), that program is not well known by the public, so that consumer behavior after cell phone consumption is identified in the form of selling to the second hand market, throwing away, storing, and donating to other people.

To reduce or eliminate the negative impact of the management of used cell phones by informal parties, but still provide economic benefits for them, it is necessary to collaborate in the management of used cell phones between informal and formal parties. This collaboration aims to regulate the distribution of the stages of managing used cellphones to the disposal process that is safe for the environment and health.

Several authors provide a definition of collaboration within the supply chain framework, including Simatupang & Sridharan (2002) who define collaboration as two or more independent companies that work together to plan and implement supply chain operations in order to get a better success rate than if they were done alone. Next, Dung (2015), Hudnurkar et al. (2014), Soita (2015), and Wu & Chiu (2018) elaborated the definition of collaboration based on the writings of previous authors. Then, Maheswari (2019) proposed an engagement model between government and intermediary businesses

in handling e-waste problems in Indonesia that included empowerment, collaboration, and participation.

The potential or possibility of collaboration between informal and formal actors was conveyed by Ezeah et al. (2013). They reviewed the situation in several countries and proposed the integration of ISR (Informal Sector Recycling) into the formal sector taking into account contexts and local conditions. Furthermore, Sasaki et al. (2014) investigated the possibility of integrating the informal sector into formal waste management in Indonesia. Meanwhile, based on an analysis of the situation in four countries regarding informal sector business processes, Wilson et al. (2009) stated that there was a clear potential for mutually beneficial cooperation between the formal and informal sectors. Furthermore, Li & Tee (2012) suggested to minimize the negative impact of informal channel activities, RL activities and the integration of IWS (Informal Waste Sector) into the formal sector are required.

To the best of the authors' knowledge, no formal and informal forms of cooperation have been found in Indonesia in handling used cell phones. However, there's a community of secondhand market actors in some regions. This community has regular meetings to strengthen their relationship.

This study aims to explore the intention for collaboration between formal and informal parties in RL activities managing used cell phones and the driver factors of collaboration intentions. For this reason, the intention of collaboration in this study is the intention to carry out management activities for used cell phones so that used cell phones can return to their original point for the handling process or if the disposal is required to do, it does not damage the environment or endanger human health.

Meanwhile, the factors driving collaboration intentions are based on factors that can encourage informal actors to carry out activities that lead to the prevention of environmental damage or environmental behaviors in general. Several authors who explain the environmental behavior of managers include Leszczynska (2010), who examines the environmental awareness of managers and sees further whether this awareness is related to socio-economic development. This study involved managers in three countries, namely 200 managers in Australia and Ukraine and 250 managers in Poland. Lopez-Gamero et al. (2011) examined the environmental attitudes of hotel managers in Spain in the form of perceptions of the natural environment which are influenced by internal and external factors of the company. Next, Nambiar & Chitty (2014) examines the views of business managers in India on the relationship between sustainability and the environment. Ye et al. (2013) examined the attitudes of top managers in 209 companies in China regarding the implementation of reverse logistics in companies in the form of product returns and product recovery. Therefore, the research objectives in this study are:

1. Explore the collaboration intention of informal actors to manage used cellphones with formal actors so that cellphone waste remains safe for the environment and human health
2. Find out the driver factors of the collaboration intention of informal actors in handling used cellphones
3. Examine the influence of the driver factors on the collaboration intention of informal actors in handling used cellphones.

2. Literature review and hypotheses development

In this sub-chapter, the driver factors that can influence collaboration intentions for informal channel actors will be described. This collaboration intention means the intention to behave in the environment. The driver factors for environmental behavior comes from internal or external. Internal driver factors are factors that come from individuals as part of the company or factors that describe the company's internal conditions. The external driver factors are factors that come from outside the company, outside the company's control but are able to affect the company's performance.

Fraj-Andrés et al. (2008) stated that the environmental behavior of firms depends on some internal and some external forces, where it is mentioned that one example of an external force is the new environmental law. He et al. (2017) also proposed the existence of internal and external pressures on corporate environmental behavior in their study of 702 paper-making companies in China. Testa et al. (2015) conducted a study to determine the effect of external pressure, internal factors, and environmental attitudes of entrepreneurs on a small and micro-scale of the company's proactive environmental strategy. Yen & Yen (2012) stated internal and external motivations for green purchasing activities in electronic companies in Taiwan.

Furthermore, the factors considered in this research include internal and external factors, which consist of three internal factors (environmental attitude, management commitment, and financial benefits) and two external factors (government support and competitor pressure). These factors were determined based on a literature review of the factors that can motivate environmental intentions and behavior in a company and adjustments to the case studies in this research through field validation by asking several initial respondents in each research area whether the conditions of informal actors have felt these factors involved.

The driver factors considered in this study are explained as follows.

2.1 Environmental attitude

The environmental attitude in this study is intended as a positive attitude of informal actors (secondhand cellphone actors) towards the environment, commonly referred to as an environmentally friendly attitude. In line with Janmaimool and Khajohnmanee (2019), they define environmental attitude as a person's belief in the relationship between humans and the environment. This belief also includes understanding the consequences when environmental damage occurs. Meanwhile, Chan et al., (2017) stated that environmental attitude is often equated or interchanged with environmental concern. Arshad et al. (2022) and Okumus et al. (2019) explored environmental attitudes in environmental knowledge, awareness, and concern.

He et al. (2017) showed that internal pressure could affect corporate environmental behavior, where employee and top management environmental awareness are part of internal pressures. Then, Okumus et al. (2019) presented that the environmental attitude (in terms of environment concern) of hotel employees in Turkey is the best predictor of ecological behavior. Furthermore, Arshad et al. (2022) stated that employees with an excellent environmental attitude would encourage organizations to implement environmental management system policies. Moreover, Long et al. (2017) examined the impact of attitude toward environmental behavior on environmental innovation intention in 182 companies of various types in China. Then, Drag et al. (2020) examined the relationship between employees' environmental attitudes and employees' ecological behavior in 65 small and medium-sized hotels operating in Pakistan's tourist areas. Next, Testa et al. (2016) conducted a study to determine the effect

of environmental awareness of managers to adopt¹⁹ proactive corporate environmental strategy in 355 small and micro-scale businesses¹³¹ in Liguria, a region in central Italy. Then, Zientara and Zamojska (2018) examined the relationship⁹³ between environmental values or beliefs held by hotel employees in Poland with organizational citizenship behavior for the environment (OCBE), and the results showed a positive relationship. From the previous research reviewed, it is expected that someone with a high environmental attitude will²⁶ so show positive environmental behavior. Therefore, the hypothesis of this research is as follows.

H1: Environmental attitude has a positive and significant effect on the intention to collaborate with informal actors in handling used cell phones.

2.2 Management Commitment

Management commitment referred to in this study is a form of responsibility and commitment from the owners and employees of the second-hand cellphone market to carry out activities that support the environment. In this case, it can be realized by collaborating in the management of used cell phones among formal parties so that the activities of handling used cell phones do not damage the environment or endanger workers' health.

In general, as stated in El-Kassar & Singh (2019), management commitment is the encouragement given by the company to carry out environmentally friendly activities and the response to these ideas to be incorporated into the corporate culture. Yusliza et al. (2019) presented that to achieve the goal of successful implementation of green activities, top management must provide a high commitment so that the implementation of green activities can offer a competitive advantage for⁴⁹ the company. In addition, Ates et al. (2012) stated that organizational capability plays a role in facilitating the implementation of the company's environmental strategy and impacts environmental performance, where one source of organizational capability is organizational commitment.

Ates et al. (2012) demonstrated that organizational commitment positively impacts the extent to which firms adopt¹²³ proactive environmental strategy in manufacturing firms in Turkey. Ghazilla et al., (2015) stated that management commitment is one of the drivers for implementing green⁹⁰ manufacturing practices in SMEs in Malaysia. Likewise, Nordin et al. (2014) showed that top management commitment is one of the main drivers of sustainable manufacturing³⁴ implementation in manufacturing companies in Malaysia, involving respondents from operation managers, manufacturing managers, and the environmental, safety and health managers. In addition, He et al. (2017) stated that internal pressure affects corporate environmental behavior, where one form of internal pressure is commitment management. Drag et al. (2021) found that Manager's environmental commitment strengthens the relationship between employees' environmental attitudes and employees' ecological behavior. Yen & Yen (2012) show a positive and significant effect of top management commitment on environmental collaboration with¹⁰¹ suppliers and green purchasing activities in the electronics industry in Taiwan. Yusliza et al. (2019) found that top management commitment influences various green human resource management (GHRM) activities, which include green analysis and job description of job position, green performance, green recruitment, green rewards, green selection, and green training in 400 Malaysian manufacturing and service organizations.

Furthermore, Bhatia and Jakhar (2021) studied the effect of top management commitment (TMCO) on green product innovation (GPI) in Indian automotive

manufacturing companies empirically. Burki et al. (2019) examined the relationship between top management commitment and process innovation in the green supply chain (GSC), in the form of green process innovation and green managerial innovation in selected ISO 14000 certified Turkish exporting firms located in the Izmir region (Turkey). Meanwhile, Lee & Joo (2020) investigated whether support from Top Management can significantly increase the level of environmental collaboration with participating companies in upstream and downstream green supply chains and their impact on environmental work in companies in manufacturing industries in South Korea.

It is necessary to have awareness from its internal parties in implementing environmental conservation activities. The management commitment factor explains organizational commitment from top management to employees in behavior that supports environmental preservation. Therefore, related to this research, the proposed hypothesis is:

H2: Management commitment has a positive and significant effect on the intention to collaborate with informal actors in handling used cell phones

2.3 Financial benefit

The financial benefits as a driver factor in this study is the potential profits obtained when informal actors carry out environmental conservation activities in the form of collaboration in handling used cell phones. Maheswari, et al. (2020) investigated that finance was one of the informal e-waste business performance measurements using a sustainable reverse logistics scorecard. Finance was one of the dimensions/driver factors that influenced the green supply chain collaboration (Paula et al., 2019) and green manufacturing practice in small medium enterprises (Ghazilla et al., 2015).

Likewise Nordin et al. (2014) identified one of the drivers of sustainable manufacturing activity is economic benefit, where the research was conducted in Malaysian manufacturing industries. Aside from the improper disposal, the challenges of the current EoL electrical and electronic equipment recycling program was the home storage and the informal actors. The reason is the lack of economic incentives for the proper return of used electronic equipment, especially for expensive and quickly obsolete products (Shevchenko et al., 2019).

Henriques & Catarino (2016) conducted a preliminary study on small and medium-sized companies in Portugal to adopt energy efficiency improvements. One of the identified motivators is financial factors that provide benefits in strengthening capacity, providing financing, external parties for financial and technical guidance, access to capital, financial resources to develop bankable projects, and financial support for investment. Then, Kudlak (2017) examined the drivers for implementing environmental management systems in companies in Poland. These drivers include efforts to reduce costs, increase sales, and increase market share. Next, Muth et al. (2016) identify the key factors that motivate and hinder the design process of a voluntary energy efficiency program for SMEs in Queensland. It was identified that factors related to economic profit are one of the motivators, namely financial interests in the form of reducing energy costs, opportunities to obtain funding, and obtaining marketing opportunities due to the promotion of environmental performance achievements.

Testa et al. (2016) examined managers' opinions about motivators in the adoption of proactive corporate environmental strategies. One of the motivators is the internal

factor which is cost-saving. While, Wang et al. (2018) stated that one of the reasons companies support green supply chain management activities is the cost driver, where companies can reduce costs while helping environmental sustainability. This research was applied to plants in three industries: machinery, electronics, and transportation in various countries. It was found that the most drivers significantly influence internal and external green practices. Referring to the results of previous studies, the hypothesis in this study becomes:

H3: financial benefit has a positive and significant effect on the intention to collaborate with informal actors in handling used cell phones

2.4 Government support

As one of the stakeholders in environmental control, the government plays a role in motivating environmental conservation. Government support in this study is explained as the role of the government in supporting informal actors to reduce used cell phone management activities that are not safe for the environment and health. This support can be in the form of regulation, providing incentives, and providing facilities and infrastructure that informal actors can utilize in carrying out their activities.

The previous studies showed the government's role in encouraging companies to carry out environmental conservation activities. As stated by Lee (2008), the involvement of local and central governments in green supply chain (GSC) initiatives, in the form of coordinating the GSC initiatives, increasing funds for the activities, providing information and technical assistance to small and medium-sized firms, popularizing knowledge of environmental management, and build infrastructure for facilitating GSC initiatives. While Tatoglu et al. (2015) examined the relative importance of each dimension of the Corporate Environmental Policies (CEP), one of the dimensions is stakeholder pressure, including government policies and regulations.

Several researches are related to an initial study on the importance of government support in environmental activities, including Ghazilla et al. (2015). They conducted a preliminary study to determine the driving and inhibiting factors for applying green manufacturing practice in Malaysian SMEs. They found that the legislation factor in which there is a financial incentive from the government is one form of government support. Then, Henriques & Catarino (2016) identified the situation in small and medium-sized companies in Portugal adopting energy efficiency improvements. Government policy is considered as a motivator, where government policies include: the obligation of the state and government to develop effective energy programs, the need to design energy efficiency programs, there are government representatives in suppressing energy efficiency, providing fiscal subsidies, and providing grants for technology investment. Next, Moktadir et al. (2018) identified the primary motivators in adopting sustainable manufacturing practices for the Bangladesh leather industry. One of the identified drivers is governmental support and legislation, which the government requires to provide funds to implement these activities smoothly.

Meanwhile, studies examining how government support influences corporate environmental activities include He et al. (2017). They examined government pressure influences corporate environmental behavior, which consists of environmental defensive behavior, environmental accommodative behavior, and proactive environmental behavior. Ye et al. (2013) examined government pressure on the attitude of top managers

to implement RL in the form of product returns and product recovery and found that government pressure had a significant effect on managers' attitudes.

From these previous studies, it is clear that government support is one of the drivers of the company's environmental activities. For this reason, the hypotheses developed regarding government support are:

H4: Government support has a positive and significant effect on the intention to collaborate with informal actors in handling used cell phones

2.5 Competitor pressure

In addition, according to Dai et al. (2018), Competitive pressure influences a company's response to aggressive environmental strategies. It is the key role in adopting small medium enterprises because it is sensitive to the competition they have (Nugroho, 2015).

The competitor pressure factor means competitor activities such as obeying existing regulations, being committed to environmental activities, and establishing cooperation in environmental conservation will affect informal parties. The influence of competitor pressure related to environmental preservation will encourage informal actors to do the same.

Ghazilla et al. (2015) considered competitor pressure as one of the business environments for implementing green manufacturing practices. Meanwhile, Tatoglu et al. (2015) examined the relative importance of the Corporate Environmental Policies (CEP) dimension, where competitor pressure is part of the stakeholder pressure dimension. Weng et al. (2015) examined the effect of competitor pressure in applying green innovation in manufacturing and service firms in Taiwan. This study found that competitor pressure had a positive and significant impact on the company's green innovation activities. Furthermore, Ye et al. (2013) examined the effect of competitor pressure on the attitude of top managers to carry out RL activities in the form of product returns and product recovery. It was found that competitor pressure had a significant effect on the attitude of managers to the implementation of the RL. From the previous research reviewed, the proposed hypothesis in this study is:

H5: competitor pressure has a positive and significant effect on the intention to collaborate with informal actors in handling used cell phones

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3. Research Methodology

3.1 Research Object

The objective of this research is to measure the intentions of informal actors who handle used cell phones to collaborate with formal actors. It started from a phenomenon of the rise of informal actors in Indonesia who carry out buying and selling activities, and repairing used cell phones. Consumers who use mobile phones are usually not aware of the sustainable actions they should take with their used phones. Then, informal parties and consumers benefit in the recycling economy.

The driver factors employed in this study are based on the literature review and phenomenon in the real system, namely environmental attitude, management commitment, financial benefits, government support, and competition pressure. Respondents in this study were informal actors in the second hand market in the Special

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Region of Yogyakarta. There are five regions where this research was carried out, such as:

a. Gunung Kidul region

Gunung Kidul region has the position 007°46'00"-008°09'00" south latitude & 110°21'00"- 110°50'00" east longitude with the borders in the north is Klaten region, the south is Indian Ocean, the west is Bantul region and Sleman region, and the east is Wonogiri region. It is the biggest area compared to other, it is about 1,431 km² (http://bappeda.jogjaprov.go.id/dataku/data_dasar/index/422-luas-wilayah) with total population is about 747,161 per 2020 and population growth rate 0.88% (http://bappeda.jogjaprov.go.id/dataku/data_dasar/index/701-penduduk). This region has 41 sub-districts, 144 villages, and 1,431 hamlets. Geographically, Gunung Kidul region is located in the southeastern part of the Special Region of Yogyakarta. Gunungkidul Regency has neither inland nor remote areas. According to geographical conditions, there are 18 coastal villages, 56 villages located on the slopes/ridges of the hills and 70 villages located on the plains. The capital of this region is Wonosari.

b. Bantul region

The position of Bantul region is 14°04'50" - 27°50'50" South Latitude and 110°10'41" - 110°34'40" East Longitude. This region is surrounded by Gunung kidul region in the east, Yogyakarta municipality and Sleman region in the north, Kulon progo region and Indian Ocean are in the west and the south, respectively. The area is about 508.13 km² (http://bappeda.jogjaprov.go.id/dataku/data_dasar/index/422-luas-wilayah). Then, in 2020, the population was about 985,770. This region had the highest growth rate compared to other regions, that is 1.14% (http://bappeda.jogjaprov.go.id/dataku/data_dasar/index/701-penduduk). Bantul region has a plain area located in the middle and hilly areas located in the east and west, as well as a coastal area in the south. This region consists of 17 sub-districts divided into 75 villages and 933 hamlets (https://bantulkab.go.id/data_pokok/index/0000000006/kondisi-geografis.html). The capital of this region is Bantul.

c. Kulonprogo region

The position of Kulonprogo region is 007° 38'42" - 007° 59'3" South Latitude and 110° 01'37" - 110° 16'26" East Longitude. It is surrounded by Bantul region and Sleman region in the west; Magelang, Indian Ocean, and Purworejo are in the north, the south, and the west, respectively. Not much different from Bantul region, the area of Kulonprogo region has 586 km² (http://bappeda.jogjaprov.go.id/dataku/data_dasar/index/422-luas-wilayah). In 2020, the population was about 436,395 with the growth rate at about 0.99% (http://bappeda.jogjaprov.go.id/dataku/data_dasar/index/701-penduduk). This region consists of 12 sub-districts and 88 villages (<https://kulonprogokab.go.id/v31/detil/7670/geografis>). The capital city of this region is Wates.

d. Sleman region

The position of Sleman region is ³⁷ 110° 33' 00" and 110° 13' 00" East Longitude, ⁷² 7° 34' 51" and 7° 47' 30" South Latitude. It is surrounded by Boyolali region and Central Java in the north; Yogyakarta municipality, Bantul region, and Gunung Kidul region in the south; Kulon Progo region and Magelang region in the west; and Klaten region and Central Java in the east. The area of the Sleman region is about 574 km² (http://bappeda.jogjaprov.go.id/dataku/data_dasar/index/422-luas-wilayah). Compare to other regions, Sleman region ³ has the highest population which is about 1,125,804 with the growth rate was 1.06% (http://bappeda.jogjaprov.go.id/dataku/data_dasar/index/701-penduduk). It consists of 17 sub-districts, which have 86 villages and 1212 hamlets (<http://www.slemankab.go.id/wilayah-administratif>). The capital of this region is Sleman.

e. Yogyakarta municipality

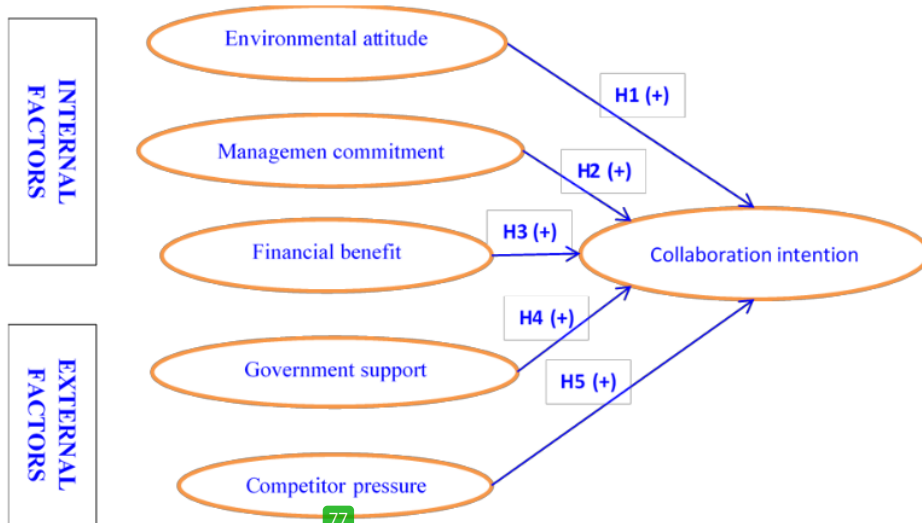
The position of Yogyakarta ⁷¹ municipality is 110°24'19" to 110° 28'53" East Longitude and 7°15'24" to 7°49'26" South Latitude with an average elevation of 114 m above sea level. The borders are Sleman region and Bantul region in the north and the south, respectively. Then, Bantul region and Sleman region are both in the west and the east. Compared to other ³ regions, Yogyakarta municipality has the smallest area which is about 32.50 km² (http://bappeda.jogjaprov.go.id/dataku/data_dasar/index/422-luas-wilayah). Even though the total population was about 373,589 people and the growth rate ³ is 1.06%, this region is the most densely populated in 2020 (http://bappeda.jogjaprov.go.id/dataku/data_dasar/index/701-penduduk). There are fourteen districts and 45 villages (<https://www.jogjakota.go.id/pages/geografis>). The capital of this region is Yogyakarta city.

3.2 Measurement

The measurement of collaboration intention by distributing questionnaires from September to October 2018 with filling out the question⁶⁵ are using a Likert scale of 1 to 5. Figure 2 presents the conceptual framework of this ¹²⁹ research. The driver factors are divided into two parts: internal and external factors. Internal driver factors are environmental attitude, management commitment, and financial benefit. On the other hand, the external driver factors are government support and competitor pressure. Those factors are adapted from previous research, like:

1. Environmental attitude was adapted from (Long et al, 2017) and Testa et.al (2015)
2. Management commitment was adapted from (Ates et al, 2014) and (Ghazilla et al, 2015)
3. Financial benefit was taken from (Meath et al. (2016); Henriques & Catarino, 2016; Wang et al. (2018); Nordin et al. (2014)
4. Government support was adapted from Tatoglu et al, 2015; Henriques & Catarino, 2016)
5. Competitor pressure (Chiou et al. (2011); Ghazilla et al., (2015); Tatoglu et al. (2015); Christmann (2004) dalam Weng et al., 2015)

6. Collaboration intention (3 items adapted from Ajzen, (2006) and 2 items developed in this study)



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Figure 2. Conceptual model

4. Results and Discussion

4.1 Demographic Characteristic

The questionnaire was distributed to second hand market actors (that includes buying and selling, cell phone service or cannibalization) in Yogyakarta province for 424 respondents from September to October 2018. It consists of several regencies, such as Bantul for 75 respondents, Sleman for 160 respondents, Yogyakarta municipality for 90 respondents, Gunungkidul for 50 respondents, and Kulonprogo for 49 respondents. The respondents' characteristics are age, gender, household member, income, education level, marital status, position at work, and treatment of used components as shown in Figure 3 and 4.

The majority of respondents are male and an average of 71% of respondents around the age of 20-30 years. Interestingly, with the total 92% of respondents who have senior high school and above for education level, almost 55% of respondents have an income of approximately 1-2 million per month.

In addition, as shown in Figure 4, the majority of respondents are unmarried and the position at work as an employee. Then, almost 60% of the respondents save the used components. The reasons are the respondents often reuse those parts for other broken cell phones and repair those parts for resale.

Demographics characteristics

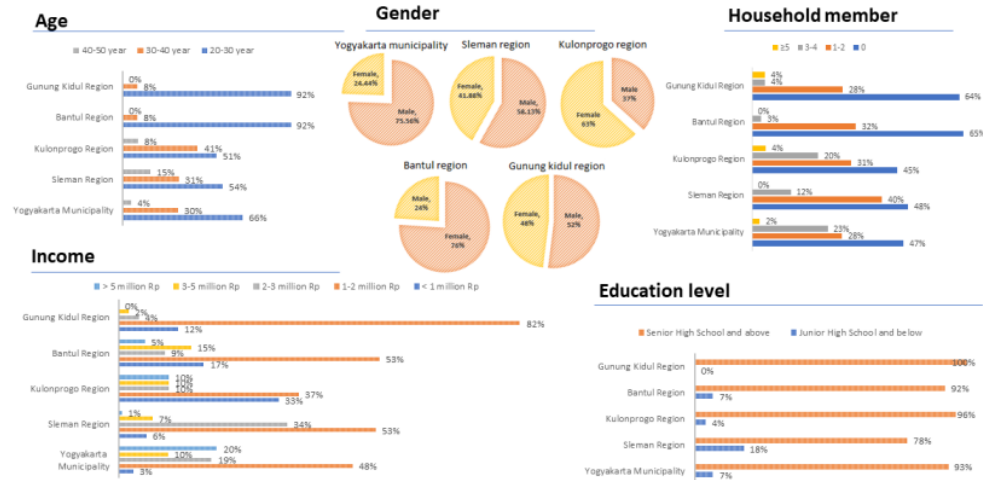


Figure 3. The demographic characteristics: age, gender, household member, income and education level

Demographics characteristics

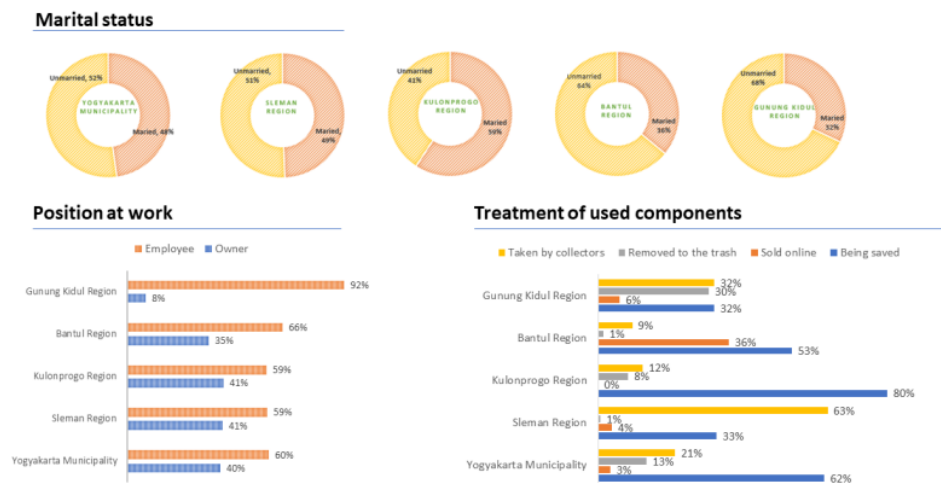
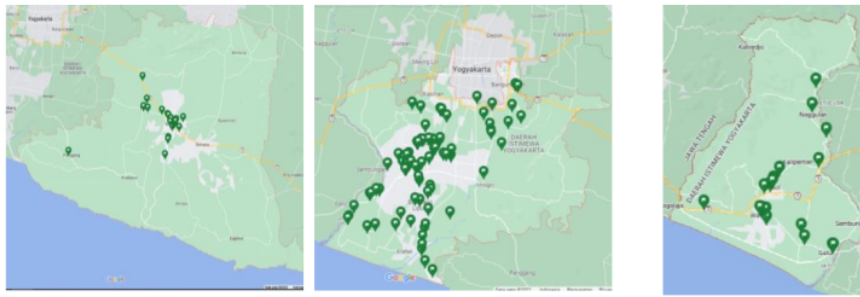


Figure 4. The demographic characteristics: marital status, position at work, and treatments of used components

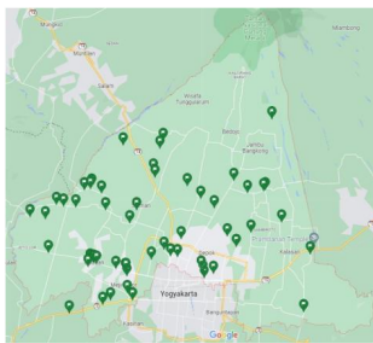
Furthermore, Figure 5 presents the position of used cell phone second hand market actors based on snowball sampling in some regions of the Special Region of Yogyakarta province.



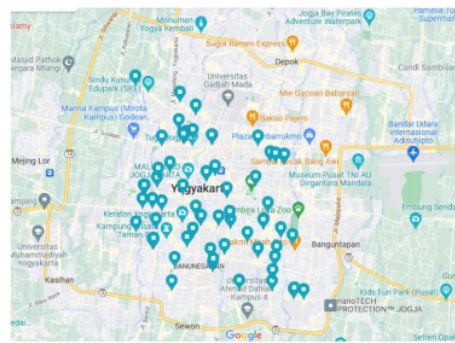
(a) Gunungkidul region

(b) Bantul region

(c) Kulonprogo region



(d) Sleman region



(e) Yogyakarta municipality

Figure 5. The position of used cell phone second hand market actors in some regions of the Special Region of Yogyakarta province

4.2 Regression Analysis Result

This section discusses the results of collaboration intention and regression analysis of driver factors on handling the collaboration of used cell phones for the second hand market actors. Before the regression analysis was applied, the reliability and validity tests were carried out on the questionnaires distributed in each region. For the city of Yogyakarta, Bantul, Gunungkidul, and Kulonprogo districts using 30 initial respondents' answers, while for Sleman Regency used 40 respondents' answers.

Reliability tests were conducted to measure the consistency of the questionnaire which is an indicator of the variables. A questionnaire is said to be reliable if a respondent's answers to the questions are consistent from time to time. According to Barr and Gilg (2007), the questionnaire is said to be reliable if the value of Cronbach α is more than 0.6. The test results for each region showed that the Cronbach α coefficient of six variables were more than 0.6, which means that all the factors were reliable.

In addition, the validity test was required to show the extent to which the questionnaire items used in a study were able to measure what it wanted to measure. Validity test is used to measure the validity of a questionnaire item. The validity test in this study was carried out by comparing the total Pearson correlation value with the R table value (n= 30, df=28, so the R table value=0.3061 and for n=40, df=38, so the R table value=0.2639). Questionnaire items are declared valid if the Pearson correlation value is greater than the R table value. Tests of reliability and validity are conducted by employing SPSS statistical software. The Appendix 1. represents the results of both tests. It shows that all the data collected were reliable and valid.

a. Gunungkidul region

Respondents in Gunungkidul amounted to 50 informal actors, from the respondents' answers the average value of each factor studied and the value of collaboration intentions was obtained, which is presented in Table 1. The calculation shows that the collaboration intention of informal actors in the GunungKidul region is 3.46, which means the Informal actors argue that they are neutral and close to agreeing to intend to collaborate.

Table 1. Results of descriptive analysis of respondents' answers in Gunungkidul Regency

Factor	Collaboration intention	Environmental Attitude	Management commitment	Financial benefit	Government support	Competitor pressure
Average value	3.46	3.00	3.40	3.40	3.70	3.40

Before performing regression analysis, it is necessary to test the classical assumptions. The purpose of classical assumption testing is to provide certainty that the regression equation obtained is accurate in estimation, unbiased, and consistent. This classic assumption test is a prerequisite test that is carried out before carrying out further analysis of the data that has been collected. Classical assumption test consists of normality test, multicollinearity test, autocorrelation test, and heteroscedasticity test.

Classical assumption test results for each region are shown in Appendix 2. It can be seen that for the Gunungkidul area, all classical assumption tests are met.

The regression result of driver factors on handling collaboration of used cell phones for second hand market informal actors in Gunungkidul region is presented in Table 2. It can be seen that the government support is the most significant driver factor compared to others.

Table 2. The regression result for Gunung Kidul region

Model	Unstandardized coefficients		Standardized coefficients		Sig.
	B	Std.	Beta	t	
Constant	0.700	0.572		1.328	0.191
Environmental attitude	-0.084	0.120	-0.089	-0.702	0.486
Management commitment	0.212	0.147	0.218	1.436	0.158

Financial benefits	0.071	0.181	0.71	0.390	0.699
Government support	0.376	0.125	0.388	3.018	0.004
Competitor pressure	0.187	0.186	0.191	1.005	0.320

Factors that affect collaboration intentions are seen if the significance value is smaller than 0.05, then these factors affect collaboration intentions in handling used cell phones. In Gunung Kidul region, there is one factor that influences collaboration intentions in handling used cell phones, namely government support with a significance value of 0.004 and it was also found¹¹ that management commitment had a moderate effect on collaboration intentions with a significance value of 0.158. Based on the results of multiple determination (R^2) of 0.462 (see Table 3), all predictors (independent variables) of collaboration can explain the variation of collaboration intention by 46.2% while 53.8% is influenced by other factors outside the model.

Table 3. The R^2 result for the driver factors of collaboration intention for Gunung Kidul region

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.680	0.462	0.401	0.61640

b. Bantul region

A total of 75 informal actors as respondents in the Bantul area. The average value of each factor⁸³ and the value of collaboration intentions, based on respondents' answers are presented in Table 4. The results show that the value of collaboration intentions of informal actors in Bantul Regency is 3.87, meaning that informal actors have the intention to collaborate.

Table 4. Results of descriptive analysis of respondents' answers in Bantul region

Factor	Collaboration intention	Environmental Attitude	Management commitment	Financial benefit	Government support	Competitor pressure
Average value	3.87	4	3,8	3,8	4.2	3.8

⁵⁷ As in general research uses regression analysis, it is preceded by applying the classical assumption test. The results²⁹ of the classical assumption test for the Bantul region are presented in Appendix 2. The results of the classical assumption test for the Bantul region show that it is fulfilled for all types of tests.

The regression result of driver factors on handling collaboration of used cell phones for second hand market informal actors in the Bantul region is presented in Table 5. It can be seen that the management commitment is the most significant driver factor compared to others. The calculation shows that the collaboration intention of informal actors in the Bantul region is 3.87.

Table 5. The regression result for Bantul region

Model	Unstandardized coefficients		Standardized coefficients		Sig.
	B	Std.	Beta	t	
Constant	0.756	0.728		1.038	0.303
Environmental attitude	0.195	0.135	0.168	1.441	0.154
Management commitment	0.334	0.125	0.321	2.665	0.010
Financial benefits	0.090	0.120	0.103	0.755	0.453
Government support	0.092	0.130	0.086	0.707	0.482
Competitor pressure	0.080	0.160	0.0802	0.498	0.620

Factors that affect collaboration intentions are seen if the significance value of α is smaller than (0.05), then these factors affect collaboration intentions in handling used cell phones. In the Bantul region, there is one factor that influences collaboration intentions in handling used cell phones, namely management commitment with a significance value of 0.010 and also obtained a factor that has a moderate influence on collaboration intentions, namely environmental attitude with a significance value of 0.154. Based on the results of multiple determination (R^2) of 0.270 (see Table 6), all predictors (independent variables) of collaboration can explain the variation of collaboration intention by 27% while 73% is influenced by other factors outside the model.

Table 6. The R^2 result for the driver factors of collaboration intention for Bantul region

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.501	0.270	0.217	0.41717

c. Kulonprogo region

In the Kulonprogo area, there are 49 informal actors who act as respondents. Table 7 shows the average value of respondents' answers for each factor and collaboration intention. The value of collaboration intention is 3.783, meaning that informal actors in Kulonprogo Regency intend to collaborate in handling used cell phones with formal actors.

Table 7. Results of descriptive analysis of respondents' answers in Kulonprogo region

Factor	Collaboration intention	Environmental Attitude	Management commitment	Financial benefit	Government support	Competitor pressure
Average value	3.783	4.097	3.963	4.021	4.438	3.982

Classical assumption test needs to be done before performing regression analysis. The complete results of the classical assumption test are shown in Appendix 2. It appears that for the Kulonprogo area, all classical assumption tests can be met.

The regression result of driver factors on handling collaboration of used cell phones for second hand market informal actors in the Kulonprogo region is presented in Table 8. It can be seen that the competitor's pressure is the most significant driver factor compared

to others. The calculation shows that the collaboration intention of informal actors in the Kulonprogo region is 3.783.

Table 8. The regression result for Kulonprogo region

Model	Unstandardized coefficients		Standardized coefficients		Sig.
	B	Std.	Beta	t	
Constant	0.154	0.811		0.190	0.851
Environmental attitude	0.102	0.161	0.092	0.632	0.531
Management commitment	-0.122	0.150	-0.129	-0.814	0.420
Financial benefits	0.092	0.148	0.091	0.626	0.535
Government support	0.384	0.152	0.326	2.533	0.015
Competitor's pressure	0.414	0.160	0.413	2.593	0.013

Factors that affect collaboration intentions are seen if the significance value of α is smaller than (0.05), then these factors affect collaboration intentions in handling used cell phones. In Kulonprogo region, there is one factor that influences collaboration intentions in handling used cell phones, namely competitor pressure with a significance value of 0.013 and government support in significance of 0.015. Based on the results of multiple determination (R^2) of 0.364 (see Table 9), all predictors (independent variables) of collaboration can explain the variation of collaboration intention by 36.4% while 63.6% is influenced by other factors outside the model.

Table 9. The R^2 result for the driver factors of collaboration intention for Kulonprogo region

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.603	0.364	0.290	0.46400

d. Sleman region

Respondents in Sleman Regency were 160 informal actors. In summary, the average value of the respondents' answers about the five factors studied and the average value of collaboration intentions are presented in Table 10. It can be seen from the table that the value of collaboration intentions of informal actors in Sleman is 4,008. This value is the highest intention value compared to other regions. That means they really intend to collaborate.

Table 10. Results of descriptive analysis of respondents' answers in Sleman region

Factor	Collaboration intention	Environmental Attitude	Management commitment	Financial benefit	Government support	Competitor pressure
Average value	4.008	3.904	3.979	3.983	4.019	4.009

Before performing regression analysis, it is necessary to test the classical assumptions. The results of this test are shown in Appendix 2. The results of the classical assumption test for the Sleman region show that it is fulfilled for all types of tests.

The regression result of driver factors on handling collaboration of used cell phones for second hand market informal actors in the Sleman region is presented in Table 11. It can be seen that the government support is the most significant driver factor compared to others. The calculation shows that the collaboration intention of informal actors in the Sleman region is 4.008.

Table 11. The regression result for Sleman region

Model	Unstandardized coefficients		Standardized coefficients		Sig.
	B	Std.	Beta	t	
Constant	2.408	0.406		5.938	0.000
Environmental attitude	0.029	0.048	0.049	0.603	0.547
Management commitment	0.142	0.069	0.163	2.066	0.040
Financial benefits	0.137	0.071	0.161	1.926	0.056
Government support	0.218	0.069	0.254	3.160	0.002
Competitor pressure	-0.125	0.085	-0.128	-1.466	0.145

Factors that affect collaboration intentions are seen if the significance value of α is smaller than (0.05), then these factors affect collaboration intentions in handling used cell phones. In the Sleman region, there is one factor that influences collaboration intentions in handling used cell phones, namely government support with a significance value of 0.002, then management commitment and financial benefit with successive levels of significance 0.040 and 0.056. Based on the results of multiple determination (R^2) of 0.141 (see Table 12), all predictors (independent variables) of collaboration can explain the variation of collaboration intention by 14.1% while 85.9% is influenced by other factors outside the model.

Table 12. The R^2 result for the driver factors of collaboration intention for Sleman region

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.375	0.141	0.113	0.34253

e. Yogyakarta municipality

For the Yogyakarta city area, there are 90 informal actors as respondents. Table 13. presents the average value of each factor and the value of collaboration intention, which was obtained from the answers of the respondents. It can be seen that the value of collaboration intention is 3.60. This means that the level of collaboration intention of informal actors in the city of Yogyakarta is neutral and close to agreeing to collaborate.

Tabel 13. hasil analisis deskriptif (nilai rata-rata) jawaban responden Kota Yogyakarta

Faktor	Collaboration intention	Environmental Attitude	Management commitment	Financial benefit	Government support	Competitor pressure
Average	3.60	4,00	3.75	3.70	4.21	3.86

The classical assumption test that was carried out before the regression analysis shown in Appendix 2. It shows that all types of tests are met for the Yogyakarta city area, so it can be continued with regression analysis.

The regression result of driver factors on handling collaboration of used cell phones for second hand market informal actors in the Yogyakarta municipality is presented in Table 14. It can be seen that the environmental attitude is the most significant driver factor compared to others. The calculation shows that the collaboration intention of informal actors in the Yogyakarta municipality is 3.60.

Table 14. The regression result for Yogyakarta municipality

Model	Unstandardized coefficients		Standardized coefficients		Sig.
	B	Std.	Beta	t	
Constant	0,866	0,618		1,403	0.164
Environmental attitude	0,396	0,118	0,343	3,372	0.001
Management commitment	-0,011	0,143	-0,009	-0,075	0.940
Financial benefit	0,292	0,121	0,282	2,408	0.081
Government support	0,014	0,106	0,014	0,135	0.839
Competitor pressure	0,010	0,115	0,010	0,089	0.929

Factors that affect collaboration intentions are seen if the significance value of α is smaller than (0.05), then these factors affect collaboration intentions in handling used cell phones. In the Yogyakarta municipality, there is one factor that influences collaboration intentions in handling used cell phones, namely environmental attitude with a significance value of 0.002 and financial benefit have a moderate impact with a significance level of 0.081. Based on the results of multiple determination (R^2) of 0.274 (see Table 15), all predictors (independent variables) of collaboration can explain the variation of collaboration intention by 27.4% while 72.6% is influenced by other factors outside the model.

Table 15. The R^2 result for the driver factors of collaboration intention for Yogyakarta municipality

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.524	0.274	0.232	0.57013

In summary, the most influential factors on the intention to collaborate in each region are presented in Figure 6. From the figure, it can also be seen the position of one region with another in the Special Region of Yogyakarta Province.

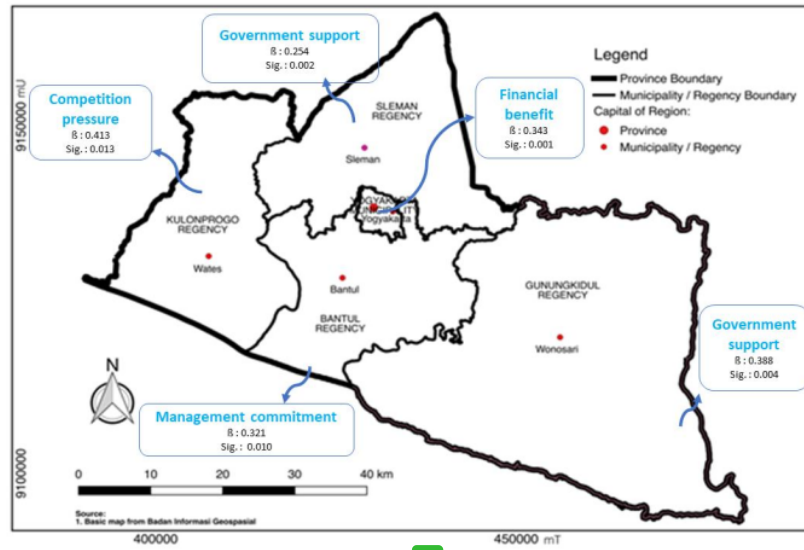


Figure 6. The most significant driver factors in each region in The Special Region of Yogyakarta Province, Indonesia

f. The Special Region of Yogyakarta Province

The results for the Special Region of Yogyakarta Province were obtained by processing the data from five regions, which is the total 424 respondents. The value of this collaboration intention for all actors was 3.744. It means that generally the respondents had the collaboration intention in handling used cell phones with formal actors. The values for each factor, the provincial level, which are obtained from the average values of the five regions are shown in Table 16.

Table 16. Results of descriptive analysis of respondents' answers in Special Region of Yogyakarta Province

Factor	Collaboration intention	Environmental Attitude	Management commitment	Financial benefit	Government support	Competitor pressure
Average	3,744	3,800	3,778	3,781	4,113	3,810

Next, to obtain the factors that influence the collaboration intentions of all actors at the province level, the Structural Equation Modeling (SEM) approach was used. Before the structural model was formed, the CFA (Confirmatory Factor Analysis) was conducted on exogenous variables. For endogenous variables, CFA is not necessary, because there is only one variable. CFA is intended to check whether all questionnaire items can be used. There is no general rule in determining the cut-off value for loading factor (Doll et al., 1995). This paper specified the loading factor as more than 0.5. In the exogenous CFA, the fit model was achieved with the p-value=0.665, $\chi^2=210.536$, GFI=0.960, AGFI=0.931, and RMSEA=0.000. Based on the value of the loading factor, there were two items deleted, namely the first item on the government support factor and the sixth item on competitor pressure.

The structural model result is shown in Table 17. The structural fit model was obtained with $p\text{-value}=0.051$, $\chi^2=343.389$, $GFI=0.94$, $AGFI=0.915$, and $RMSEA=0.019$. It shows the most significant driver factors in the Special Region of Yogyakarta Province is financial benefit and government support with the influence values are 0.231 dan 0.150, respectively and the significance levels are 0.014 and 0.041, respectively.

Table 17. Structural model result

			Estimate	S.E.	C.R.	P	Label
Collaboration intention	<---	Environmental attitude	-.049	.033	-1.491	.136	par_20
Collaboration intention	<--	Management commitment	.148	.141	1.050	.294	par_21
Collaboration intention	<--	Financial benefit	.231	.094	2.463	.014	par_22
Collaboration intention	<--	Government support	.150	.073	2.048	.041	par_23
Collaboration intention	<--	Competitor pressure	.113	.093	1.216	.224	par_24

Hasil perhitungan koefisien determinasi sebesar 0.284 ditampilkan pada Tabel 18, artinya kelima faktor yang dipertimbangkan dalam penelitian ini, menggambarkan niat kolaborasi sebesar 28.4% berarti 71,6% niat kolaborasi dibentuk oleh faktor lain.

Table 18. Squared Multiple Correlations

	Estimate
Collaboration intention	.284

4.3 Discussion

In this discussion section, the results of each factor influencing collaboration intentions and their managerial implications will be discussed as follows.

a. Environmental attitude

The environmental attitude factor is as the dominant factor influencing the intention to collaborate with informal actors in the Yogyakarta municipality and as a moderate driver for informal actors in the Bantul Region. This factor is related to the attitude of informal actors towards the environment. It means that informal actors with high environmental attitudes will also show high collaboration intentions.

The result shows that the average environmental attitude of informal actors in both Yogyakarta municipality and Bantul Region is 4, which means that the perpetrators have a high environmental attitude. Furthermore, when viewed from the level of education, informal actors in Yogyakarta have a minimum of high school education 93.3%, while in Bantul it is 92%. According to Latif et al. (2012) education level had a significant impact in pro-environmental intention and behavior, as did Wenshun et al.

(2011) demonstrated the difference in the education level correlates with environmental behavior. Yin et al. (2014) stated that the differences in the education level will make a difference in the desire to carry out environmentally friendly behavior. Thus, the higher a person's education level, the higher his concern for the environment.

The results of this study are in line with Arshad et al. (2022), where environmental concern significantly affects the ecological behavior of employees in small and medium hotels in Pakistan. Also, according to Chan et al. (2017), environmental concern was positively related to ecological behavior of international tourist hotel employees in Hong Kong. Likewise, He et al. (2017) showed that employee and top management environmental awareness could affect corporate environmental behavior. In addition, Long et al. (2017) demonstrated the positive and significant impact of the attitude toward environment factors on the environment. Still related to the influence of environmental attitude, the results of Okumus et al. (2019) showed that the environmental concern of hotel employees in Turkey is the best predictor of ecological behavior. Then, Tesla et al. (2016) showed that environmental awareness has a positive and significant effect on proactive environmental strategy. Next is also in line with Zicora & Zamojska (2018) research where environmental values were positively related to organizational citizenship behavior for the environment (OCBE).

The managerial implication of this study's results is that to maintain environmental attitudes, informal groups of actors should often hold discussions on environmental issues so that the understanding of the environment becomes even and equal among the actors. Through the Department of Trade and Cooperatives, the government can also contribute to providing information about the environment and its relation to used cell phones. In addition, the formal actors should conduct their social responsibility, such as coaching informal actors to understand how to handle the used cell phones that are safe for the environment and human beings.

b. Management commitment

Management commitment in this study means the commitment of owners and employees in carrying out pro-environmental activities, in this case, collaborating with formal parties in managing used cellphones. The results showed that the management commitment factor strongly influences the intention to collaborate on informal actors in the Bantul and Sleman regions. As for the Gunung Kidul Region actors, this factor has a moderate influence. The value of management commitment in the three regions is 3.8; 3.979; and 3.4 for Bantul, Sleman, and Gunung Kidul, respectively. It can be seen that the management commitment of the informal actors in the Bantul and Sleman Regions is higher than that of the informal actors in Gunung Kidul, so it can be said that it is in line with the level of influence.

The strong influence of management commitment is in line with the research of Ates et al. (2012), which showed that organizational commitment has a positive impact on the adoption of a proactive environmental strategy. It is also in line with the research of He et al. (2017) which stated that one of the internal pressures in the form of commitment management affects corporate environmental behavior. Subsequent results

by Tarik et al. (2020) found that a manager's environmental commitment strengthens the relationship between employees' environmental attitude and employees' ecological behavior. Yen & Yen (2012) show a positive and significant effect of top management commitment on environmental collaboration with suppliers and green purchasing activities. In addition, Yusliza et al. (2019) found that top management commitment positively and significantly affects various green human resource management (GHRM) activities. Lee & Joo (2020) show that top management is an essential factor to influence the level of collaboration between suppliers and customers in a green supply chain.

Meanwhile, Burki et al (2019) found that top management commitment has a positive and significant effect on green process innovation, while its influence on green managerial innovation is moderate. In contrast, the results of Bhatia & Jakhar (2021) are not in line with this study, where top management commitment (TMCO) has no significant effect on green product innovation (GPI).

With the results found in Bantul, Sleman, and Gunung Kidul Region, the managerial implication that can be emphasized is that informal actors with a high level of management commitment need to be maintained. So that owners and employees of informal actors are always committed to carrying out activities that support environmental conservation.

This commitment can be transmitted to other informal actors through meetings held in informal actors associations in several areas so that owners and employees will even understand the importance of being committed to environmental conservation. Local and central governments and formal actors can also contribute to fostering and enhancing this management commitment factor by providing additional information and education related to environmental problems and their handling.

c. Financial benefit

The strong influence of financial benefits on the collaboration intention occurred in informal actors in the Sleman Region and studies at the provincial level. It means that informal actors will intend to collaborate in managing used cellphones if they feel there are economic benefits for them. The effect of moderate financial benefits was found in actors in the Yogyakarta municipality area.

The average value of respondents' answers regarding the financial benefit factor was 3.983 for actors in Sleman Regency, and for all provinces, 3.781 were obtained, which is the average value of financial benefits in all regions. The value of financial benefits to actors in the Yogyakarta municipality area is 3.7. The value of financial benefits that have a strong impact is more significant than those with a moderate influence.

The results of this study are in line with the results of Wang et al. (2018) found that cost drivers significantly influence internal and external green practices. In addition, the used cell phones are usually sold through the informal sector for cashback (Shevchenko et al., 2019).

For managerial insight, the financial benefits for informal actors are one of the most important reasons for running their business. However, the role of these informal actors is less attention. Therefore, the formal actors should support the informal ones to collaborate in handling used cell phones.

d. Government support

There are three regions and a study at the provincial level. It was found that the government support factor had a strong influence on the intention to collaborate, namely in Kulon Progo, Sleman, and the Gunung Kidul Region. Meanwhile, there was no moderate influence of the government support factor for actors in any region. The value of the government support factor in each regions is 4.438, 4.019; and 3.7 for Kulon Progo, Sleman, and Gunung Kidul, respectively. Meanwhile, the value of government support for actors in all provinces is 4.113.

From the government support questionnaire items, it means that the actors expect the government to support the implementation of pro-environment activities. It will encourage the perpetrators to intend to collaborate in handling used cellphones with formal parties. Therefore, by looking again at the value of government support from the Kulon Progo and Sleman regions, as well as at the provincial level, it seems that this value is very high, so it can be interpreted that these actors expect the government to condition, provide information and technical assistance, popularize environmental management, and provide infrastructure for facilitating environmental activities.

The result of the study is that government support significantly encourages collaboration intention, that is in line with studies by Lee (2008) in which government involvement plays an important role in the willingness of suppliers to participate in the green supply chain. Also, in the research of He et al. (2017), government pressure influenced corporate environmental behavior. Ye et al. (2013) showed that government pressure has a significant effect on managers' attitudes to RL implementation. Next, Nguyen et al. (2018) investigated that laws and regulations play the most significant impacts on recycling behavioral intention, compared to environmental awareness and attitude toward recycling, social pressure, cost of recycling, and inconvenience of recycling.

Furthermore, the management implication of this result is that the government is authorized to provide support in collaboration between formal and informal actors. This support can be in the form of rules, policies, facilities, resources, and information. So far, regulations related to e-waste in Indonesia can be seen in Maheswari (2019). However, these regulations, namely Government Regulation no. 101 of 2014, do not explicitly mention e-waste but the waste in question is hazardous and toxic material waste in general. Thus, there are no specific regulations regarding e waste management in Indonesia.

e. Competitor pressure

The results show that the competitor pressure factor strongly influences informal actors in the Kulon Progo Region only and is also not seen as a moderate driver. It means the informal actors in Kulon Progo will be encouraged to do collaborative activities in handling used cellphones when their competitors carry out activities related to the environment.

The value of competitor pressure for informal actors in the Kulon Progo Region is 3.982, which means this value is relatively high and higher than the value of competitor pressure in all provinces. If it is seen from the number of informal actors in Kulon Progo, there are fewer than in other regions, and the positions are not too spread throughout the region, so there is a possibility that the level of competition between informal actors will be high.

The results of research related to competitor pressure are in line with the study of Weng et al. (2015), which found that competitor pressure had a positive and significant effect on the company's green innovation activities. Also in line with Ye et al. (2013), where competitor pressure significantly affects managers' attitudes to RL implementation. This finding was supported by previous research conducted by Riva and Gani (2020) that competitor pressure also positively affects the environmental performance of upscale hotels. Competitor initiatives and strategies guide the hotels to adopt green marketing practices. The managerial implication of the results of this research is the need for the role of government and formal actors to provide counseling and training for upgrading knowledge and skills to informal actors.

Generally, the results of this study can be a basis for consideration for stakeholders who may be involved in handling e-waste, mainly used cellphones in Indonesia. For the government as part of the policymakers, these results can be used as input for setting rules, providing information, providing assistance, funding assistance, etc., for the safe management of used cell phones. For formal actors such as mobile phone manufacturers, the results of this study can be used to redesign and promote a program to take back used cell phones from the hands of consumers as a form of corporate social responsibility. In the end, informal actors' handling used cellphones will not harm health and the environment but still provide economic benefits for informal actors.

Seeing the results of the coefficient of determination in each region and the study at the provincial level, which is below 50%, it is still necessary to explore other factors that can motivate second-hand cellphone market players to collaborate in cell phone management. Furthermore, it is also essential to study the factors that can hinder informal actors from collaborating in handling used cellphones with formal actors. Knowing the factors driving and inhibiting collaboration intentions among informal actors will make it easier to develop policy-making and design appropriate forms of collaboration.

5 Conclusion

The results show that generally, informal actors intend to collaborate with formal actors in the management of used cell phones. The driver factors, including environmental attitude, management commitment, financial benefits, government

support, and competitor pressure, emerged as the driving force for collaboration intentions in various areas.

The environmental attitude factor is the strongest driver factor for informal actors in Yogyakarta Municipality and is moderately influential in the Bantul Region. The management commitment factor has a strong impact in two areas, namely Bantul and Sleman Region, while for informal actors in Gunung Kidul, the management commitment factor has a moderate effect. Furthermore, it was found that the financial benefit factor strongly influenced the secondhand market players in the Sleman Region, while the actors in the Yogyakarta municipality were only moderately influenced. Meanwhile, in Sleman, Kulon Progo, and the Gunung Kidul Region, the government support factor strongly encouraged collaboration among informal actors. The competitor pressure factor only appears as a positive and significant encouraging factor for informal actors in the Kulon Progo Region.

While the study for the provincial level, it was found that two main factors that encourage all informal actors are financial benefits and government support factors. Of all the districts/cities and provincial levels, the driving factors for government support most emerged as predictors that influenced the collaboration intentions of informal actors for the management of used cell phones.

The results of this study can be used as a consideration for policymakers to handle e-waste, mainly used cell phones. Formal actors can also use the results of this study in promoting the program to take back used cellphones from the hands of consumers as a form of corporate social responsibility through collaboration with informal actors.

Acknowledgment

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Appendix

The results of the reliability and validity test of the questionnaires

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Budijati, Siti Mahsanah, N.A. Subagyo,
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