

Indonesian Industrial Estate Firms Sustainability Conceptual Framework

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Abstract

Industrial estate firms, as also Indonesian industrial estate firms, not only play important roles in economic development but also as key environmental protectors as well as welfare creators. To play these roles properly, industrial estates necessarily be sustained. In its development, firms will follow a regular pattern of the life cycle in certain periods. Within each stage of pattern to pursue sustainability, firms need to have a particular competitive advantage. Therefore, the application of the product-service system is suggested, since it offers various bundles of products and services for each stage of the firm life cycle. This paper builds a conceptual framework to study PSS management in each stage of the firm life cycle through the resource-based view concept. To test the concept, we studied the resource-based view elements of an industrial estate firm as a case study. The novelty of this article may be found by integrating the PSS concept, firm's life cycle, and resource-based view. Taken the industrial estate firms as the case also becoming a novelty. The model resulted and tested in this article would be a benefit in form of best practice for Indonesian industrial estate firms, as well as inputs for government to develop policies.

Keywords

Firm's life cycle, industrial estate firm, product-service system, resource-based view

1. Introduction

The common purpose of a company is to gain economic profit. However, aside from economic purposes, a company has other important public roles as an industrial development supporter (The Republic of Indonesia. Industrial Ministry 2015, The Republic of Indonesia. Pusat Komunikasi Publik Kementerian Perindustrian 2015); a job opportunity creator; a welfare raiser; and an equalizer toward national economic development (Ramos and Fonseca 2016). To enable companies to play these roles properly, they need to be sustained in terms of gaining economic profit, supporting social equity, and protecting the environment. In another word, they need to aim at the triple bottom line (Elkington 2004). Industrial estate firms have important roles because they must support the industrial companies in their operation as well as to raise efficient operation of the companies.

As other firms, industrial estate firms follow a regular pattern that can be segmented into stages that are recognized as the firm's life cycle (Belussi and Sedita 2009, Popp and Wilson 2007). Within each stage of the life cycle, there are different pressures, threats, and opportunities (Anderson and Zeithamel 1984) that might affect the firm's competitive strategy and performance (Hanks et al. 1993). To be sustained across the life cycle stages, industrial estate firms need to find proper strategies at each stage of the life cycle.

This research aims to help industrial estate firms to be sustained. Industrial estate firms are built to support industrial growth (Scott 2001) and protect the environment (Ramos and Fonseca 2016, Singhal and Kapur, 2016) by using efficient resources (Singhal and Kapur 2016). An industrial estate firm must provide land; buildings; infrastructure utility services (World Bank Group 2012); and amenities (Fonseca 2015) for industrial companies in the estate. This research has taken Indonesian industrial estate firms to be studied because of their condition and uniqueness.

In Indonesia, industrial estates are placed in an important position by Indonesian government regulation Undang-Undang Republik Indonesia/UU RI No. 3, the year 2014, which establishes industrial development as one of the economic development pillars. Through this government regulation, industrial companies were given strict regulation in building industrial estates (The Republic of Indonesia. Industrial Ministry 2015, The Republic of Indonesia. Pusat Komunikasi Publik Kementerian Perindustrian 2015). With these regulations, it is obvious that industrial estate firms play important roles to support economic development (The Republic of Indonesia 2014) by raising companies' efficiency; attracting investors (Yudoko 2016); creating job opportunities; fostering innovation; and supporting welfare enhancement in surrounding areas (Ramos and Fonseca 2016). Indonesian industrial estate firm has uniqueness can be owned by a private-owned company. Most Indonesian industrial estate firms earn income from selling land and buildings or renting them out in the long term (30 years) as well as providing services as industrial estate management. This then becomes a problem when land and buildings are sold out or rented out. At that time the income of industrial estate firms was only obtained from services. Industrial estate firms need to creatively find alternative income resources based on services. They need to shift their core business into service delivery to be sustained (Mulyadi 2012). At this point, the product-service system (PSS) concept is suitable to maintain sustainability.

PSS concept aims to shift the tangible product consumption onto service delivery by shifting the tangible product consumption onto service delivery within the same function, benefit, and performance (Mont 2002). PSS originally appeared to reduce the consumption of tangible products which would have an impact on reducing environmental burdens and reducing productivity requirements. For industrial estate firms, this concept can be used to maintain sustainability by shift tangible products commodities to services delivery while the tangible products ran out. Thenceforth, the PSS concept is suitable to be implemented at each stage of the life cycle due to each type of PSS having its characteristics. To study the management process, the resource-based view (RBV) concept that can explain how resources can be transferred into a competitive advantage once it is adopted, can be employed. In order to be sustained, industrial estate firms need to recognize their RBV at each stage of the life cycle.

This article built a conceptual framework to study PSS management implementation in each stage of industrial estate firms' life cycle using the RBV perspective. This framework was built deductively from PSS, life cycle, and RBV theory and tested inductively using an industrial estate firm as a case. There are already many research and articles about PSS, life cycle, and RBV conducted and published by experts. This framework serves as the pattern for Indonesian industrial estate firms to be sustained. For the government, this framework helps in developing policies related to industrial estate firms. For academic reason, this article closes the gaps in PSS areas combined with the life cycle and RBV concept that can be a novelty. Another novelty comes from the study about PSS at industrial estate firms. Next, the literature review is discussed.

2. Literature Review

To understand the main concepts that will be used and find the research gap, a literature review was being conducted. The main concepts that will be used are PSS and firm life cycle that will be studied based on resource-based view concept for Indonesian industrial estate firm.

2.1 Life Cycle

As a company, an industrial estate firm will face a life cycle with different conditions of the firm and environment (Jawahar and McLaughlin 2001) that will affect competitive strategy and performance (Hanks et al. 1993), at which point a different management style will be needed. The common firm life cycle pattern consists of introduction, growth, maturity, and growth (Mintzberg 1984). According to Agarwal et al. (2002) industry life cycle was affected by environmental forces and innovation. Due to the limited tangible product owned by the industrial estate, especially private-owned industrial estate firms, the management needs to shift into services to gain alternative income. This effort need to be conducted in order to continue earning enough profit to be sustained across the stages of the life cycle.

2.2 Product-service system (PSS)

PSS is "a system of products; services; networks of players; and supporting infrastructure that continuously strives to be competitive, satisfies customer needs and has a lower environmental impact than traditional business models" (Goedkoop et al. 1999). PSS is categorized into three types: product-oriented, use-oriented, and result-oriented

characteristics as shown in figure 1 (Tukker 2004). In product-oriented PSS, the firm sells products with greater physical composition than services and vice versa. In result-oriented PSS, firms deliver a greater proportion of services than tangible products (Tukker 2004). Thus, the PSS concept can be implemented in industrial estate firms that seek to shift from products to services. Research regarding PSS increased in amount since the early 1990s, with various topics. Some articles found about PSS related to product life cycle design, such as Dewberry et al. (2015), Mourtzis et al. (2016), Haber et al. (2020), etc. Also found articles about PSS related to product life cycle management and improvement, such as Allais and Gobert (2016), Ceschin and Gaziulusoy (2016), Patala et al., (2016), Kim et al. (2020), etc. Next, articles about PSS life cycle engineering such as Zanetti et al. (2016), Brax and Visintin (2017), Salwin et al. (2020) Wang et al. (2020), etc. Also found PSS related to life cycle assessment, such as Kambanou and Lindahl (2016), Auer et al. (2017), Mourtzis et al. (2018), Bonilla-Alicea et al. (2020), etc. and PSS related to customer needs, such as Rese et al. (2009), Jadhav et al. (2020), Liu et al. (2020), Namsawat and Rugwongwan (2020), etc.

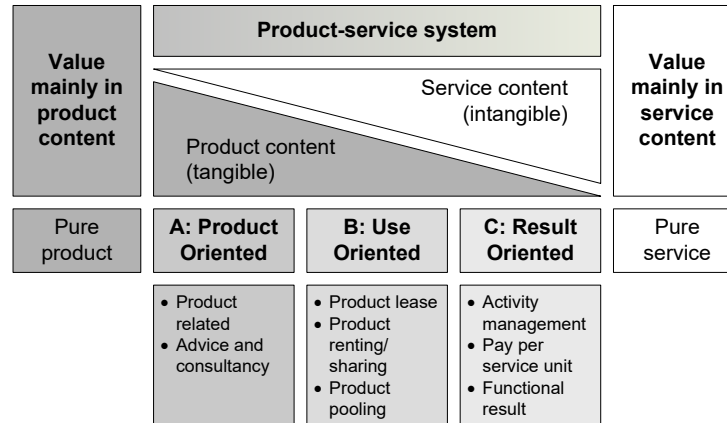


Figure 1. Types of PSS (Tukker 2015)

2.3 Resource-based View (RBV)

Meanwhile, RBV is a concept that firms should consider adopting for their internal resources to create differentiation (Wernerfelt 1984) in an effort to gain competitive advantage and profit (Wernerfelt 1984) toward firm sustainability (Hart 1995). According to Mahoney and Pandian (1992), RBV encourages three views: (1) resource-based theory discusses a firm's distinctive competencies and capabilities, (2) resource-based theory provides value-added, and (3) resource-based view complementary to industrial organization research. The resource-based view concept (Barney et al. 2001, Hart 1995, Newbert 2008) explains that a firm needs internal resources, capabilities, and core competence and to gain the competitive advantage as in figure 2 (Hart 1995). In the resource-based view concept, valuable, rare, inimitable, and organizable resources and capabilities are the keys to the competitive advantage and performance of a firm (Hart 1995, Newbert 2008) as can be seen in figure 2. Therefore, RBV is used as a perspective to study PSS management in industrial estate firms across the life cycle. By outlining the elements of RBV at each stage of the life cycle, it can be seen how the efforts made by industrial estate firms are to be sustainable.

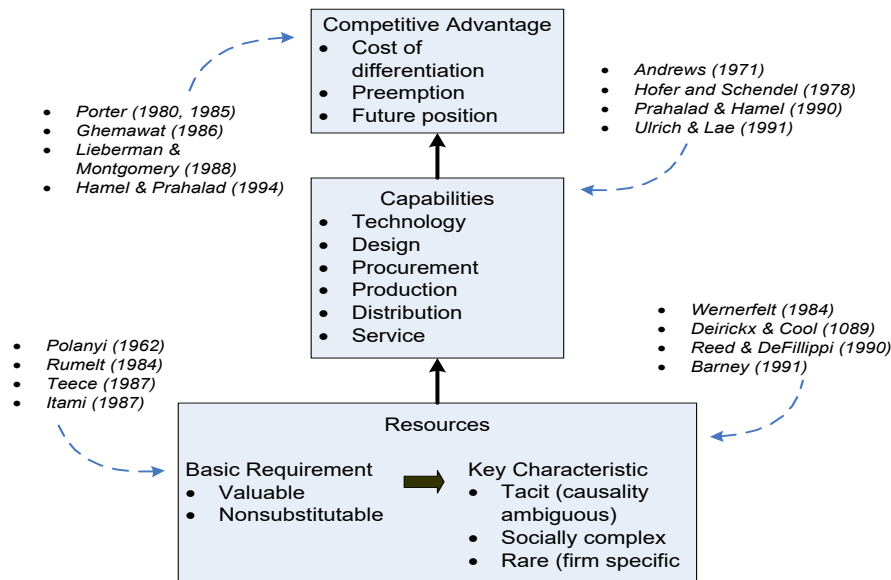


Figure 2. Resource-based view model (Hart 1995)

2.4 Indonesian Industrial Estate Firms

The industrial estate can be stated as a site that is planned, located to accommodate companies, and equipped with facilities and amenities to meet companies' needs. In Indonesia, according to Indonesian regulation about the industrial, industrial estate is an area to centralize industrial activities that equipped with supporting facilities and infrastructures developed and managed by industrial estate firm that already has permission (The Republic of Indonesia, 2014).

In Indonesia, most industrial estate firms' main business is to sell land and buildings or rent them for a long time, but land availability becoming a problem. According to Firman (2000) in the three largest cities in Indonesia, Jakarta, Surabaya, and Bandung, since 1987 there are large development and investment in the manufacturing area and there is a large land conversion from agricultural land (especially in Jakarta, Surabaya, and Bandung) and usually, industry use fringe area that prohibited (Firman 2000). In Jakarta industry also developed in the suburban area (Hudalah and Firman 2012). Another problem regarding the land is the high cost of land in Indonesia. These conditions, make the expansion of land is not always an available alternative for industrial estate firms, especially at Java, to be sustained and maintain the income. Outside Java industrial estate firm commonly industrial estate firm still can expand the land, because outside Java island commonly the population density far below Java Island. But still, the land is limited, the industrial estate firm in a point would run out of the land while no land available for expansion.

Until 2018, there are 63 operated industrial estates and 24 non-operated industrial estates in Indonesia (Himpunan Kawasan Industri Indonesia 2018). Among 63 operated industrial estates, 13 are state-owned industrial estates, while the other 50 are private-owned. From the total of 47,215.18 hectares of land occupied by industrial estates, 72.12% located at Java Island. According to Mr. Sanny Iskandar, chairman of The Association of Indonesian Industrial Estate (HKI), in the interview with Jakarta Post, stated that there is an optimistic future of Indonesian industrial estate development since there are still many industries established. This statement is in line with the large number of new industrial estates being built, so that in 2020 there are 114 industrial estates in Indonesia, not to mention 38 under construction. The bright future of Indonesian industrial estate firms also strengthened with the Indonesian regulation that industrial companies must be operated in an industrial estate firm.

The literature review found no article that neither discusses PSS related to a firm's life cycle nor PSS implementation based on the RBV concept. Papers regarding PSS management implementation in industrial estate firms are also not available. Therefore, this article contributed to close the gaps in the academic area.

3. Methods

The conceptual framework will be built consisting of four steps: (1) develop the basic concepts of a theory, (2) specify the relationships among the concepts, (3) determine the boundaries, and (4) identify the system states (Dubin 1978).

3.1 Basic Concepts of The Theory

The basic concepts that will be used to build the conceptual framework are the firm's life cycle and PSS that will be studied using a resource-based view. These concepts are found in the literature review. The conceptual framework will be developed related to PSS management for Indonesian industrial estate firms, in the stages of the firm's life cycle based on an RBV perspective.

3.2 The Relationship among the Concepts

As mentioned before, PSS is suitable to be implemented in an industrial estate firm because such firms follow a life-cycle pattern in their operation (Belussi and Sedita, 2009) with limited tangible resources. Then, in each stage, the firm needs to have different strategies sustained. In this case, in later stages, an industrial estate firm will need to shift from tangible products to service delivery. This condition matches the three types of PSS that offer different compositions of products and services. Each type can be applied by an industrial estate firm to keep sustaining itself across its life cycle. Table 1 summarizes several characteristics of industrial estate firm that matches PSS based on an analysis from various sources.

Table 1. Industrial estate firm characteristic and PSS concept comparison

	Industrial estate firm's characteristics	Product-service system concept
1	Has limited tangible resources (Mulyadi 2012)	Delivers a bundle of products and services (Goedkoop et al. 1999, Mont 2002, Tukker 2004)
2	Has an obligation to protect the environment (Ramos and Fonseca 2016, Singhal and Kapur 2016, The Republic of Indonesia. Industrial Ministry 2015, The Republic of Indonesia. Pusat Komunikasi Publik Kementerian Perindustrian 2015)	Addresses environmental sustainability (Goedkoop et al. 1999, Mont 2002)
3	Has an obligation to develop the economy of the surrounding area to increase welfare equality (Ramos and Fonseca 2016, Scott 2001, The Republic of Indonesia. Industrial Ministry 2015, The Republic of Indonesia. Pusat Komunikasi Publik Kementerian Perindustrian 2015)	Addresses co-creation relationship between producer, consumer, and other stakeholders (Mont 2002)
4	Follows the firm's life cycle (Belussi and Sedita, 2009)	Flexible bundle of products and services (Goedkoop et al. 1999, Tukker 2004)

The resource-based view is a concept that views the needs of firms' internal resources and capabilities to gain a competitive advantage (Barney 2001, Hart 1995). RBV explains the process of how internal resources can be transformed into core competence, which then becomes capabilities and further becomes the competitive advantage that keeps the sustainability of the company (Barney, 2001). Resource-based view stated that valuable and costly to copy firm resources and capabilities become the key resource for sustainable competitive advantage (Conner 1991, Hart 1995). According to Mahoney and Pandian (1992), RBV encourages three views: (1) resource-based theory discusses a firm's distinctive competencies and capabilities, (2) resource-based theory provides value-added, and (3) resource-based view.

Since in each stage of the firm's life cycle PSS management aims to improve the sustainability of the firm, the study with the RBV perspective is suitable to comprehensively discuss PSS management in an industrial estate firm in terms of resources; core competence; capabilities; processes; competitive advantage; and sustainability components.

Based on the relationship among the concepts, a conceptual framework for PSS management across a firm’s life cycle through a resource-based view was built as shown in figure 3. This figure shows that in the early stage of the life cycle, an industrial estate firm can mostly sell products in accordance with product-oriented PSS. In the middle stage, it can combine products with services in accordance with use-oriented PSS. Then, in the later stage, when the product has already run out, to be sustained the firm must mostly deliver services in accordance with result-oriented PSS. To study the PSS management in each stage of the life cycle and each type of life cycle, the concept of RBV is adopted, since RBV may explain the process to build competitive advantage. The RBV elements are resources; core competence; capabilities; processes; competitive advantage; and sustainability.

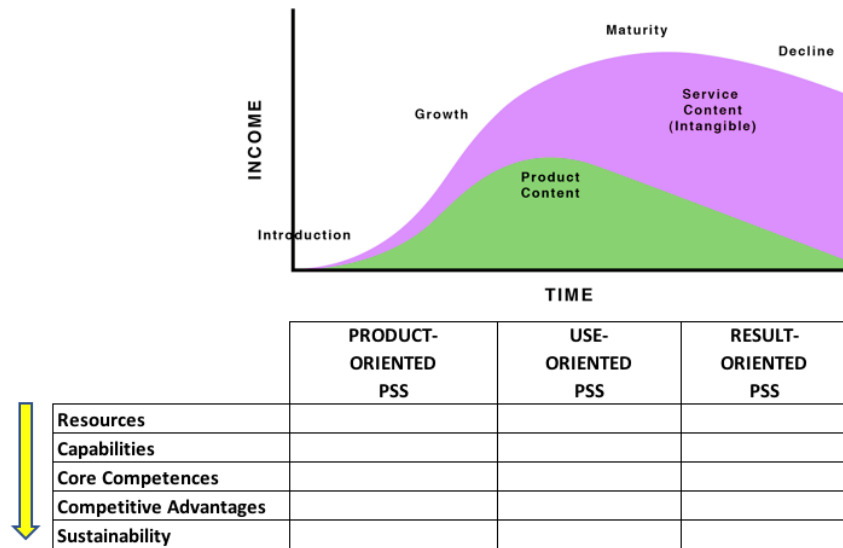


Figure 3. PSS life cycle based on RBV perspective conceptual framework

3.3 The Initial Conceptual Framework Boundaries/Context

The initial conceptual framework is constructed from the literature review deductively and will be especially suitable for an industrial estate firm that has limited tangible resources but needs to be sustained regarding their responsibility, to provide services to companies in the cluster and their role in national industrial development. The conceptual framework was then tested based on the Indonesian industrial estate firm using the inductive process.

3.4 System States in Which the Theory is Expected to Function

The concept can function under the following conditions:

- The industrial estate firm has an awareness and willingness to do business by managing PSS.
- The industrial estate firm can capture information and innovate creatively to manage PSS.
- The customer is willing to participate in PSS.
- The customer and the industrial estate firm have a collaborative relationship to co-create value.

3.5 Conceptual Framework Testing

The conceptual framework that has been created is then tested inductively by studying an industrial estate firm in Indonesia. The industrial estate firm taken is X as one of the private-owned industrial estate firms. The reason for choosing X is (1) because X industrial estate firm has been operating for a long time, from the year of 1990, (2) X has very good sales so that at the year of 1996 the land sold out, (3) X sells land and buildings in an industrial estate but can be sustained until now, (4) X experience introduction, growth decline stages but now the entered regrowth stage. X industrial estate firm is near Jakarta, the Indonesian capital city. The name of the industrial estate firm has been disguised to maintain confidentiality.

To gain data to test the framework, in-depth interviews were conducted with the business development staff, managers, and directors of X to study the RBV elements built and used by an industrial estate firm to sustain each life cycle.

4. Results and Discussion

X's RBV elements include resources, capabilities, core competencies, and competitive advantage owned and used by the industrial estate firm. The RBV elements are described in table 2.

Table 2. X's Resource-based View PSS in each Stage of Life Cycle

	Introduction and Growth	Decline	Regrowth
Resource	<ul style="list-style-type: none"> • Water and waste treatment and processing facilities • Firefighter facilities • Water processing equipment • Land not far from Jakarta 	<ul style="list-style-type: none"> • Skilled and trained laboratory worker • Environmental laboratory • Network with tenants • Water processing equipment • Land not far from Jakarta 	<ul style="list-style-type: none"> • Skilled and trained laboratory worker • Environmental laboratory. • Network with tenants • Water processing equipment • Factories to be rented • Land not far from Jakarta • Certified workers
Capabilities	<ul style="list-style-type: none"> • Provide clean water • Do wastewater treatment • Tenants' Environmental management and monitoring ability • Marketing capability to attract tenants • Respond to tenants' needs rapidly 	<ul style="list-style-type: none"> • Provide clean water • Do waste and water treatment • Tenants' Environmental management and monitoring ability • Respond to tenants' needs rapidly • Build a responsive system to overcome tenants' problem • Awareness about the need to generate another income 	<ul style="list-style-type: none"> • Provide clean water • Do waste and water treatment • Tenants' Environmental management and monitoring ability • Respond to tenants' needs rapidly • Build a responsive system to overcome tenants' problem • Awareness about the need to generate another income • Innovate services • Build laboratory services for tenants and other companies
Core competence	<ul style="list-style-type: none"> • Compliance with regulation through built waste and water treatment and processing before selling land 	<ul style="list-style-type: none"> • Satisfy tenants' by giving excellent services • Waste and water checking • Business innovation • Strict compliance with environmental regulations 	<ul style="list-style-type: none"> • Satisfy tenants' by giving excellent services • Waste and water checking • Business innovation • Strict compliance with environmental regulations • Accredited environmental laboratory
Competitive Advantage	<ul style="list-style-type: none"> • One step ahead for customer satisfaction • Compliance with regulation • Excellent services to tenants • Majority of Japanese tenants: comply with regulation and disciplined 	<ul style="list-style-type: none"> • One step ahead for customer satisfaction • Compliance with regulation • Excellent services to tenants • Majority of Japanese tenants: comply with regulation and disciplined 	<ul style="list-style-type: none"> • One step ahead for customer satisfaction • Compliance with regulation • Excellent services to tenants • Majority of Japanese tenants: comply with regulation and disciplined • Provide services for tenants

X had and used the basic resources required. It provides land, buildings, water and sewage plants, electricity, water, gas, infrastructure, etc. Resource, capabilities, core competencies, and competitive advantages at the introduction and growth stage can be said to be the basic required and required as an industrial estate firm, such as land, building, waste, and water processing treatment facilities, electricity, gas, clean water, etc. X has a uniqueness in that they built waste and water treatment installation and cleans water processing once the industrial estate is built. In addition, the ownership of X, which is a joint venture between an Indonesian company and a Japanese company, is a separate attraction for tenants from Japan. This causes most of X's tenants to be companies from Japan. These companies have the characteristics of being very disciplined towards regulations and respecting the environment. Another uniqueness and also becoming the competitive advantage of X is the commitment to serve tenants excellently. X is very concerned

about service excellence and solving tenant problems that make tenants comfortable, as shown by very few tenants moving from the industrial estate.

X is a very salable industrial estate all the land was sold in just 6 years. Thus, X underwent a fairly short introduction and growth stage. After that, X ran out of land, so he only earned income from services provided to tenants. At that time X entered the maturity stage because initially, only income from basic services called service fees. However, X then carried out service innovations so that it then entered the regrowth stage.

In the regrowth stage, X increases the ability to provide services to tenants, by creating a system to accelerate services and handling complaints. X also improves competence in the field of waste and water treatment by establishing an environmental laboratory with certified human resources. This laboratory serves tenants, and parties outside the industrial estate to increase income. Apart from the environmental sector, X also provides various services for tenants, such as lawn mowing, medical services, water supply, and others.

Through the case taken, it can be seen that the conceptual framework matched with the case taken. X has limited tangible products in form of land and buildings so that they need to combine their commodities with services. The fewer tangible products that are still owned, the greater the proportion of services that must be provided, so that income does not decrease much. For that, innovation is needed. The fewer tangible products that are still owned, the more innovations that must be made.

5. Conclusion

In conclusion, this article built a conceptual framework to study PSS management in each stage of a firm's life cycle toward sustainability through RBV concepts as a basis to study PSS management in guiding industrial estate firms toward sustainability. The novelty of this article is it closes the gap that occurs from neither existing study of PSS related to a firm's life cycle nor any research using the RBV perspective to study PSS management. Moreover, since there is no PSS study of industrial estate firm that can be found.

The conceptual framework describes the general projection of the firm's life cycle. The actual firm life cycle may differ due to different conditions of the industrial estate firm because of different ownership (state-owned or private); the firm's capital (low, medium, or high); the location (on the island of Java or outside Java); the construction timing (early entry or late entry). This pattern was discovered through an in-depth interview with an industrial estate firm's manager or directors and the chairman or director of the Indonesian Industrial Estate Association.

With the case taken in this article, the conceptual framework confirmed, and it can be concluded that along the life cycle, the proportion of services provided by industrial estate firms need gradually added. To add services proportion, firms need to do innovations related to services.

Based on this framework, further research can be conducted by studying more industrial estate firms with various conditions mentioned before to find the pattern of the various condition of Indonesian industrial estate firms' PSS management. With the research, best practices can be formulated for Indonesian industrial estate firms toward sustainability. Other research also can be conducted related to PSS management. Research can be conducted with different perspectives instead of RBV, such as innovation patterns.

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