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Dissecting the Innovation Process of New Product Development in SME's: Case Study Evidence on the Traditional Textile Industry

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Abstract
Innovation is crucial in a company's sustainability. In small-medium enterprises, innovation can be synonymous with the development of new products. This study charts small-medium enterprises' new product development processes in the traditional textile industry, using qualitative methods with companies in two clusters of the batik industry. A coding process is used for processing the data. Using a contingency theory, the research successfully identified and explained the innovation process stages. In this industry, the stages of the new product development process are ideation, idea selection, product development, market testing and commercialization. The new product is an incremental innovation because of the owner's dominant role in small-medium enterprises and the characteristics of the batik industry, such as being rich in traditional culture. By employing a contingency approach, this research fills the gaps in the previous research so that practitioners can effectively and efficiently develop new products which will be accepted by consumers.

Keywords: contingency theory, innovation process, small-medium enterprises, new product development, innovation, traditional textile industry

1. Introduction

Technological changes and rapid product variations significantly influence industrial developments because of progressive technological advances; in competitive markets companies must innovate to maintain growth (Malhotra, Dash, & Gupta, 2013). There are always uncertainties in industry because of dynamic consumer behaviours, however, the markets and products on offer are usually unchanged(Morgan & Anokhin, 2020). Companies should periodically introduce new products to adapt to changes in market tastes (Reid & Brady, 2012). Therefore, an appropriate innovation process strategy is required so that consumer behaviour can be anticipated(Morgan, Anokhin, Song, & Chistyakova, 2019).

There has been wide-ranging research on the innovation process, particularly in regard to new product development (NPD) (Kahn, 2018). The innovation process is comprised of the prioritisation of managerial functions, such as idea generation, problem-solving, implementation, and diffusion (Utterback, 1971). This has been followed by the innovation process placing a greater focus on NPD in large-scale manufacturing companies (Clark & Fujimoto, 1991; Cooper, 2008). There are a number of alternative unique innovation processes which depend on the

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industry, company, or project (Cooper, 2008; Salerno, de Vasconcelos Gomes, da Silva, Bagno, & Freitas, 2015). Innovation process research offers a large amount of NPD process models. However, they are primarily centred upon large-scale enterprises with a strong R&D team, high complexity, resource advantage, long duration, and uncertainty resistance. This innovation process model is not usually suited to the NPD process of SMEs, since it requires fast results, simple processes, whilst having few resources. Previous research indicates that, depending on the company, the innovation process follows a very diverse pattern(Kok & Biemans, 2009; Shenhar, 2001). The innovation process can be used when the stages align with the internal and external conditions of the company(Harmancioglu, McNally, Calantone, & Durmusoglu, 2007). The innovation process is unique for every company as a result of their diversity characteristics, it is therefore necessary to understand the nature of the stages. Guidance is also required to correctly carry out innovations, improve product quality and novelty, and ensure NPD success performance (Kahn, 2018; Pemartín & Rodríguez-Escudero, 2020). The company's innovation process is intricate and must take into consideration socio-economic factors, particularly in regard to uncertainty and market risk (Akhmetshin et al., 2018). Understanding the innovation process is essential for corporate sustainability (Tidd & Bessant, 2018).

There has been less attention paid to the innovation process in the textile and fashion industries. Companies in this industry have to continue to innovate as a result of consumer tastes, therefore and effective NPD process is required. New product sustainability can be accepted by the market, ensuring that the company survives in the fashion industry (Huang, Soutar, & Brown, 2002). This production process of the industry includes the following stages: conceptualisation, production processes, and distribution of finished products to consumers (Keiser, Garner, & Vandermar, 2017). The NPD process in the textile industry is unique. In this industry, the NPD process in large-scale companies also differs from the shorter and simpler SME scale (Muthambi, 2020). However, the uniqueness of the NPD process is under-researched (Huang et al., 2002). The requirement for an innovation strategy is also imperative for company management (Cooper & Kleinschmidt, 1986).

A planned and structured process should be used to design new products. Although innovation can be initiated at any time, continuously innovating requires a pattern and management which is congruent with the internal and external conditions of the company. Generally, companies should explore, manage, and utilise all potential tangible and non-tangible resources. In the textile and fashion industry, the effectiveness of the innovation process, including the creation of NPD, is essential for the company to be successful in maintaining new product sustainability (Giacosa, 2014). Some companies survive by creating a unique innovation strategy to give them a competitive edge. However, the patterns and processes of innovation to create NPD in the textile industries and products requires further research. Owens (2007) states that the NPD application can frequently encounter obstacles in integrating existing expertise, resource management, and the company's organisational environment. Consequently, because of the high risks involved in the process, understanding the innovation process is crucial. Previous research has mapped the NPD process in the textile industries and products in large-scale companies (Vezzetti, Alemanni, & Morelli, 2017). However, NPD process mapping on SMEs is under-researched, particularly in industrial design(Krishnan & Ulrich, 2001; Šenk & Roblek, 2019). To address this issue, this

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study examines NPD stages in SMEs in the traditional textile industry by determining the innovation process and formalising each stage. The study also analyses the needs, keys to success, and supporting internal and external conditions in each stage.

No specific theory can explain innovation process taxonomy (Salerno et al., 2015). However, this study uses the contingency theory approach proposed by Lawrence and Lorsch (1967), which states that the organisational structure and control system depends highly on the business location's internal and external environmental conditions (Van de Ven, Ganco, & Hinings, 2013). This theory analyses the innovation process, which can be seen as a unique and specific configuration for dealing with internal and external environmental conditions to achieve the company's objectives. Thus, the company determines different innovation processes patterns, depending on their internal and external conditions. This study examines company NPD process stages to understand specific contingent conditions. Previous NPD process research presented a linear innovation process, beginning from idea generation, idea and product development and product diffusion (Cooper, 2008; Hansen & Birkinshaw, 2007; Laužikas, Miliūtė, Tranavičius, & Kičiatovas, 2016; Salerno et al., 2015; Sari & Asad, 2019). This linear innovation process is described in Hansen and Birkinshaw (2007) and Crossan and Apaydin (2010), as shown in Figure 1.

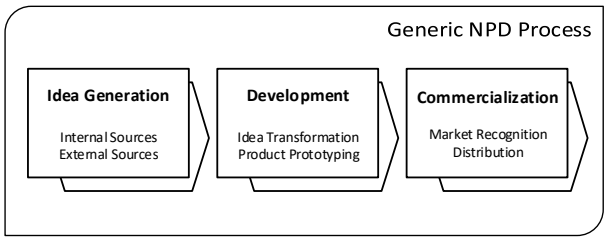

Figure 1. Generic NPD process

Business performance is an indicator of survival in this global era. However, business performance if often determined by sustainable innovation (Latan, Jabbour, de Sousa Jabbour, de Camargo Fiorini, & Foropon, 2019). Innovation within companies can emerge from every production line and business. In market-oriented companies, innovation focuses on the creation of NPD (Frishammar & Åke Hörte, 2007). Traditionally, the innovation process begins upon the generation of an idea. At this stage, the company is open to obtaining external and internal collaboration and networking resources(Hansen & Birkinshaw, 2007). Optimising these resources depends upon its absorptive capacity (Aliasghar, Rose, & Chetty, 2019). Internally, the company is optimised through its tacit knowledge from company management to determine alternative solutions to problems (Fontana & Musa, 2017; Latif et al., 2020). Companies can also elaborate with stakeholders, particularly the customers who utilise innovation results (Roberts & Darler, 2017). The selected ideas are developed into viable, feasible, and sustainable products. At this stage, there are two sources of uncertainty: market and technology application (Salerno et al., 2015). Companies minimise risk in a number of ways, including market research, prototyping, and cooperation with outside institutions. The NPD commercialisation stage often determines innovation success. Research reveals than from thousands of new ideas, only one reaches the commercialisation stage (Stevens & Burley, 1997). Commercialisation refers to all

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activities aimed at introducing and distributing innovation to potential markets (Burgelman, Christensen, & Wheelwright, 2008; Nerkar & Shane, 2007). Crossan and Apaydin (2010) state that the commercialisation stage is formed of three parts, market research, market testing, and distribution. In this case, market research and testing are a form of market introduction process, which can be integrated into a market recognition.

Market recognition stages include analysis, determination of the target market, and marketing planning (Verhaeghe & Kfir, 2002). Market analysis includes surveys of market needs and trends and in-depth studies of potential consumer needs. This stage is used to determine the viability of new products and is a required step. Needs assessments of the target customer ensures that the product provides value to users. This relates to the previous stage when the new product isa prototype. Companies also need to ensure that the new products are unique. This relates to the first-mover advantage with benefits, including brand loyalty, reputation, and the benefits of product scarcity with a positive impact on business performance (Przychodzen, Leyva-de la Hiz, & Przychodzen, 2020). The marketing and distribution process includes product launch, intellectual property, pricing, and product distribution (Song & Parry, 1996). Project launching relates to correct timing, market trends, and launch locations. Regarding trademark registration and the production license determines the chosen supply chain strategy. Pricing is related to positioning strategies and the target market's purchasing power. New product distribution involves determining strategies to ensure that consumers receive goods quickly and cost-efficiently.

2. Method

This research maps the NPD process in small-medium enterprises (SMEs) and uses a qualitative approach. This has many advantages: First, it is conducted intensively on informants in a natural setting to investigate individuals or organisations. Second, the researcher must conduct a holistic overview of the research context. Third, researchers attempt to capture data based on the informant's perceptions via empathic in-depth attention and understanding without preconceptions (Huberman, Miles, & Saldana, 2014). To map the innovation process in various institutional situations and conditions, this study uses the multiple case study method (Clark & Fujimoto, 1991; Cooper, 2008; Eisenhardt, 1989; Salerno et al., 2015; Voss, Tsikriktsis, & Frohlich, 2002).

The unit of analysis is the traditional batik textile industry cluster as a result of the similarity in the production process. Batik is a type textile recognised by UNESCO as a world heritage because of its unique production process. The location of this study is Surakarta, a centre of Indonesian batik industry. There are two main clusters of the batik industry in the city (Kauman, denoted as X and Laweyan, denoted as Y). Each company has a distinct and unique batik design pattern. The population includes companies that independently produce batik. From the X and Y clusters, 11 and 16 companies fit the criterion, respectively.

A purposive sampling method is used to choose the informants, including actors in selected companies with accurate knowledge of the NPD process. In this case, the informant is the owner or manager of the company. The results of preliminary observations and interviews show that

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three companies were selected from one cluster, and two from the other. This amount is deemed to be sufficient because of the consistency of the obtained information. To ensure consistency in the data collection process, a data collection protocol applied is established (Voss et al., 2002). Hernandez, Montoya, and Martínez (2014) state that there are three basic steps. The first step involves a study of the product innovation process, beginning with details shown in Figure 1, which is meant for specificity to technology and company scale. Specifically, this step is used to gain a better understanding of each innovation's potential value. The second step examines the industry's internal and external conditions and company specifics through associations and local government departments related to the batik industry. The third step compiles data collection standards using the face to face interviews with semi-structured questions The questions include the general condition of the company, organisation, and innovations and new products worked on; the innovation process begins with idea generation, commercialisation development, including specific, unplanned, and informal processes and potential obstacles; and any special events which might affect the NPD process, including financing, stakeholder participation, or marketing. For each of the objects, observations are made by directly reviewing the company's production process or workshop. The interview is considered sufficient when the production process data has been completed at each stage (Eisenhardt, 1989).

To ensure the obtained data is correct and accurate, the triangulation method is used for validation (Piperopoulos, 2010). Triangulation is performed by confirming the interview results through digital communication media or re-interviewing the informant, comparing interview results between informants in the same cluster, verifying the data through batik textile industry experts, and comparing interview data with observations and secondary data from local batik associations. The data is analysed using a coding process (Huberman et al., 2014). The analysis steps include transcribing the interviews, data classification based on themes and sub-themes, examining the relationship between the themes, and weaving them into a sequential process. The results of the analysis are in the form of a series of initial innovation processes, which are then verified by the experts in the batik production process.

3. Results

Surakarta is one of the Batik craft centres in Indonesia with the two most dominant industrial clusters, X and Y. The emergence of cluster X stems from the royal family environment, whilst cluster Y had emerged from groups of batik makers and traders in the area. Regarding industrial characteristics, business actors' cooperation patterns are relatively the same, including strong networking and mutual dependence between entrepreneurs in terms of resources. In addition, the target market of the two clusters is almost the same. The industrial ecosystem involves customers, financial institutions, and government (Mayangsari, Novani, & Hermawan, 2015). Moreover, the government supports and cooperates with industrial entrepreneurs by adopting policies that directly support them, for instance the subsidised interest for SME's working capital and city planning regulations by developing the tourism sector in both industrial areas.

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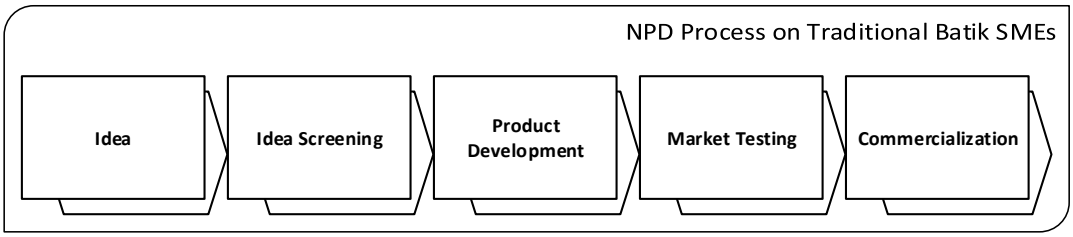

Figure 2. NPD process on traditional batik SMEs

The generation of batik motifs by internal ideas is determined by a classical pattern, a legacy of a pre-existing pattern. The model variations are gathered from consumer tastes and by exploring non-traditional patterns. However, owner preferences also determine the production of batik motifs. At the idea screening stage, the entrepreneur determines the batik motifs which are included in the production process. Thus, the role of entrepreneurs is more dominant in selecting various existing batik motifs. The batik screening process involves timing, in particular the right time estimate to be introduced to consumers. This is performed by company management based on a hereditary tradition, and rarely involves external parties. The company is still managed privately within the family circle. The founder's tacit knowledge of traditional batik patterns also has a significant impact. Changes are only observed in consumer tastes and the prediction of future fashion trends.

Based on the new creation pattern produced, both clusters use a project base at the product development stage. There are two different approaches at the market testing stage, the first involving market penetration tests, specifically by producing limited products and directly testing them in the target market. Consumer feedback is the basis for product improvement. Less desirable products are withdrawn and are therefore unable to enter the commercialisation stage. The second approach involves testing the product with the key person representing the target market. The commercialisation stage aggressively strengthens product branding. Another alternative is to use a market approach through distributors and directly enter the market in this way. Table 2 shows a detailed understanding of the NPD process.

NPD Stage	Industry Cluster X	Industry Cluster Y
Idea	Internal idea: modification of traditional standards External idea: the traditional motif of the palace standard	Internal idea: modification of the company's distinctive motives External idea: observation of consumer tastes
Idea Screening	Owner's consideration	Owner's consideration
Product Development	Product development by project	Product development by project
Market Testing	Direct product trials in target markets Continuous product penetration	Product testing by a figure who represents the target market. Using influencers on social media
Commercialization	Exhibition	Through distributors

Table 1. Characteristics of the innovation process in each cluster of the traditional batik SMEs

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4. Discussion

Batik production in Indonesia is part of the traditional textile industry. Family businesses dominate the industry through traditional production processes over the generations. A historical legacy characterises this industry in trust, prestige, reputation and cultural values passed successively across generations (Vezzetti et al., 2017). Additionally, new products launched need to be in line with traditional values and strengthen existing brands. Felekoglu and Moultrie (2014) found that strict control over the innovation process is an important role for the company's management. By recognising the potential differences in the innovation process, researchers emphasise the importance of studying the innovation process focusing on a specific industry, company, or project (Pich, Loch, & Meyer, 2002; Rice, OConnor, & Pierantozzi, 2008).

This research indicates that the innovation process of the batik industry has a different pattern compared to the traditional one of Hansen and Birkinshaw (2007) and Crossan and Apaydin (2010). This research uses a contingency theory approach to show how the company's internal strategic action hugely depends upon internal resources and the external environment of the company(Harmancioglu et al., 2007; Tsai & Liao, 2017). innovation pattern involves successive stages, in particular idea generation, idea screening, product development, market testing, and commercialization, as shown in Figure 2. The NPD process is concise and simple, in line with Muthambi (2020). This simplicity follows the classical NPD process pattern. Salerno et al. (2015) states that this classic process demands time and resources and results in incremental innovation. Many resources are required for stages to operate sequentially. At each stage greater human resources and expertise are required. The impact of the rigidity of each stage relates to the time taken for each innovation project as the industry is usually high in human resources. Moreover, innovation by the industry is restricted to batik motifs and fashion designs as existing product variations, and batik patterns are still based on traditional designs. For innovation sustainability, the right strategy must be considered by using advances in production and information technology. Anand and Kodali (2008) have shown that implementing a lean NPD process reduces costs by limiting resource usage.

It is important to understand that innovation process stage modelling is crucial to understand NPD in the industry. Companies which utilise the NPD stage frequently have improved performance (Kahn, 2018). The formalisation of the NPD process increases new product novelty and quality (Pemartín & Rodríguez-Escudero, 2020). However, small and medium industries in the fashion sector often follow formal and informal processes (Bandinelli, Rinaldi, Rossi, & Terzi, 2013) as the number of product items handled is limited. In the batik industry, production is handled on a project-by-project basis for each pattern. There is no formally defined NPD process to support the creation of specific products. In small and medium industries, stages of the NPD process occur with greater flexibility, both sequentially and in parallel, which accelerates the innovation process (Leithold, Woschke, Haase, & Kratzer, 2016).

In the innovation process, the involvement of top management increases the chances of NPD success (Felekoglu & Moultrie, 2014). At the initial stage of the innovation process, the batik industry is dominated by company owners. The analysis indicates that the roles of the owner and

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leader dominate in determining the innovation strategy. Thus, the involvement of top management in the NPD process affects the innovation strategy of the company(Fontana & Musa, 2017; Jeffrey Thieme, Michael Song, & Shin, 2003). Owners who have an in-depth knowledge of batik motifs usually dominate such processes. However, the role of tacit personal knowledge is still dominant in the fashion industry (Bandinelli et al., 2013). In this study, the owner also functions as a designer, have a vital role in the NPD management process. Because of the dominant role of the owner in new product innovation, the progress of the batik industry is primarily determined by entrepreneurial leadership. The entrepreneurial leadership of the owner has an effect on the innovation process and performance of the company(Fontana & Musa, 2017). Involvement of the owner has an additional effect on stakeholders, particularly their participation as co-creators of the innovation process. This occurs in the early stage of the NPD process. In this industry, stakeholder involvement in the innovation process only becomes apparent at the market testing stage using influencers or well-known figures. Involving consumers in the innovation process is the foundation of the NPD process concept, from a traditional to a more sustainable product development perspective (Roberts & Darler, 2017). This necessitates the understanding, willingness, and commitment from the owner in constructing a co-creation strategy. Barrane, Ndubisi, Kamble, Karuranga, and Poulin (2020) remark that it is important for stakeholders to be involved in all innovation processes. Their presence mitigates organisational risk, which increases NPD success(Salavati, Tuyserkani, Mousavi, Falahi, & Abdi, 2016).

5. Conclusion

Previous research has examined the NPD process from one-sizefits all innovation process models to a specific business model or project, focusing on large, medium, or mixed companies. Previous studies on innovation processes in various businesses and projects reveal various NPD process models. However, innovation process research on SMEs remains limited. This study has successfully identified an innovation process model using a contingency approach. The distinctness of the NPD process in this industry depends upon internal resources and the external environment. Unlike the traditional innovation process model, the NPD process stages of the traditional batik industry include ideation and idea screening, product development, market testing, and commercialisation. The innovation process can differ, depending on the internal and external dynamics. However, as in the traditional form, this study has found that the innovation process remains rigid and linear. In regard to the innovation process, this research also reveals an important role for the owner and its relationship with stakeholder involvement. As a consequence, future research could be aimed at examining the impact of the leader's character and experience on the innovation strategy. The findings in this research indicate that the NPD stage still follows a linear process and thus further research is needed to determine whether non-linear processes in NPD occur in SMEs in similar industries.

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