



Research article

Quantifying the economic benefit of standard on auto-electric stove for *Batik* small medium enterprises in Indonesia



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ABSTRACT

One of the important issues in standard implementation is its economic impact. This is because the economic benefits of the standard implementation are intangible and difficult to be measured. Therefore, this research aims to analyze the economic benefit of standard implementation in Indonesian auto – electric stove for *batik* SME by using the economic benefit of standard (EBS) approach developed by ISO. The data collection and the empiric case study analysis was performed through in-dept interview with the key informants are the owner of the SME, the SME's supervisors and experts in the field of standard implementation. This study uses a value chain approach to measure the economic impact of the implementation of SNI IEC 60335 and the SNI ISO 9001 standard. The research result showed that the standard implementation provided economic benefits of 5.432,5 USD per year. Furthermore, the economic benefits were obtained by the cost efficiency of the business function or the increased revenue from the production.

1. Introduction

Small and Medium Enterprises (SMEs) in Indonesia have a very important role in social and economic growth, in terms of numbers, the amount of contribution to GDP, and empowerment of the employee (Hamdani and Wirawan, 2012). According to Malecka (2017), SMEs significantly contribute to the macroeconomic index in each national economy. In Indonesia, SMEs can contribute to GDP by 60.34% and absorb a significant number of labor (Phalitayasetri et al., 2020). Thus, it can be said that SME is an Indonesian's economic pillar. In times of economic crisis, SMEs are able to create uniqueness to survive and improve performance. They are able to adjust the production process, develop with their own capital, pay loans at high interest rates and are not much involved in bureaucratic matters (Hamdani and Wirawan, 2012).

Indonesian's SMEs produce around 55 millions products (Fahma et al., 2018). In order to improve SMEs' competitiveness, Indonesian government encourages the SMEs to apply Indonesian National Standard (SNI). However, there are less than 20% of the products that have SNI certification (Fahma et al., 2018). One of the important issues on

standard implementation is how much the economic benefit will be obtained from standard implementation activities, including product certification. This is because the benefits of standard implementation are intangible and difficult to be measured (Fahma et al., 2018; Fu, 2016; Lecraw, 2014; Susanto et al., 2017). In any country, the basis for implementing standards is voluntary, if the economic benefits of implementing standards for SMEs are not demonstrated, they are unlikely to be interested in implementing standards. Measurement of standard benefits is very important to monitor, prioritize standardization activities, raise awareness, improve communication and promote the use of standards as well as encourage stakeholder participation in standardization activities. Thus, it is important to study and demonstrate the economic benefit of standard implementation in the context of SMEs.

There are a plenty of studies that investigated the economic impact of standard implementation. Several studies found the positive relationship between standard implementation and economic performance. The other studies revealed that there is no significant impact of standard implementation on economic performance. Furthermore, several studies showed the negative effect of standard implementation on economic

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Table 1. Recency and research position.

| Problem | | Domain | | | | | |
|------------|--------------|---------------------------------|----------------------|-------------------------------|---------------------------------|-------------------------------|-----------|
| | | Company | | Benefit | | Method | |
| | | SMEs | Large scale Industry | Tangible (economy) | Intangible | EBS | Interview |
| Case Study | Construction | (Fu, 2016) | | | (Fu, 2016) | | |
| | Manufacture | | | | | | |
| | Textile | (Phalitayasetri et al., 2020) | | (Phalitayasetri et al., 2020) | | (Phalitayasetri et al., 2020) | |
| | Agribusiness | (Griffith et al., 2009) | | | | (Griffith et al., 2009) | |
| | Food | (Mulyono and Pudjiastuti, 2013) | | | (Mulyono and Pudjiastuti, 2013) | | |
| | Cosmetic | (Susanto et al., 2017) | | (Susanto et al., 2017) | | (Susanto et al., 2017) | |
| | Electronic | This study | | | This study | | |
| | General | (Trajković and Milošević, 2018) | | | | (Rosawan et al., 2016) | |

performance Psomas et al. (2010); Heras-Saizarbitoria and Boiral (2013); Prodromos et al. (2015).

The inconclusive findings of the research on the relationship between standard implementation and economic performance are due to the different methods used to measure the economic impact. The majority of the studies were performed by using survey method. The economic performance was measured using various variables that represent business performance, such as ROI, sales revenue, profitability, etc. More specifically, the previous research focused on the economic performance measures that can be categorized as the bottom line of the business. In other hand, the economic benefit of standard implementation may come from all elements contained in the value chain of a company and/or industry (International Organization for Standardization, 2013).

Using the developed approach by the world standards organization (ISO) called as Economic Benefit of Standards (EBS), this study explores the benefits of implementing standards that might come from all elements contained in the value chain of SMEs. This because, a value chain perspective will produce more comprehensive data and describe the real economic impact of standard implementation. Furthermore, the approach can be used to measure the benefit impact of the implementation of two or more standards concurrently (International Organization for Standardization, 2013). In other words, EBS can be used for measuring the economic impact of standard implementation by both practitioner and academician.

Precise quantifying of standard benefits is a collective task. The EBS approach is a major step for observers of standards and has succeeded in increasing the motivation of various organizations to take measurements. Various sectors and scales of organizations that have applied the standard try to measure it in order to prove the effectiveness and benefits received. Case studies conducted by ISO in several countries in large-scale industries, so that it has a structured recording and business processes. In contrast to SMEs, documentation and business processes are often not clearly available so it is difficult to get value drivers that are impacted by standards. To avoid this bias, the research method in the form of EBS is combined with in-depth interviews to determine the business flow and value drivers or operational indicators impacted by standards. Through

in-depth interviews it is also necessary to explore the immeasurable benefits of implementing standards.

Phalitiyasetri et al. (2020) also calculated the standard economic benefits of batik cloth SMEs using EBS. Meanwhile, Susanto et al. (2017) uses EBS with interviews to get the significance of the effect of standards on each indicator, but does not explain the benefits of intangibles so that he has not seen the benefits of the standard as a whole. The position of this research is to get tangible (economic) and intangible (the influence of innovation, technology, and social) standard benefits on batik stove SME in Indonesia. Thus, this research aims to analyze the economic benefit of standard implementation in an Indonesian auto – electric batik stove SME by using EBS approach.

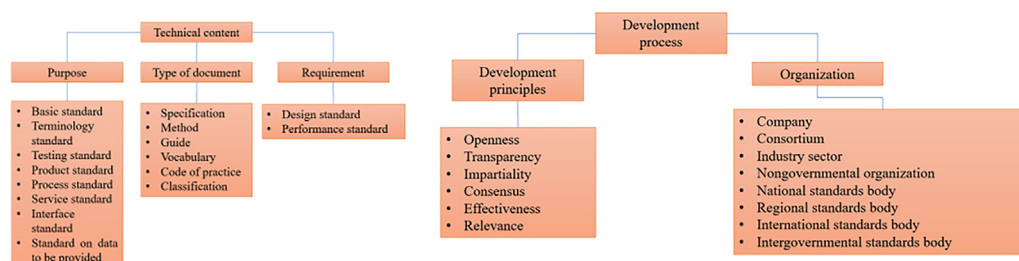
Fu (2016) on her research there are 21 countries that have reviewed the standard benefits with EBS, including Indonesia. Studies in the electronics sector have been carried out in Vietnam, Germany, and Italy. The economic benefits of applying standards to SMEs engaged in the electronics sector have never been done. Based on the previous description, it is essential to perform a research that investigates the economic impact of standard implementation in other SME types by using EBS approach. Furthermore, a research on EBS needs to be performed in different business function compared to the previous research (Table 1).

2. Literature review

2.1. Standard

Standard is something that is standardized based on a consensus. The consensus generally involves several parties that have expertise and interest on the issue that is regulated by the standard. Therefore, standard can be viewed as "a formula that describes the best way of doing something" (International Organization for Standardization, 2020). Standards and their application can help companies of any size reduce costs in all areas of the business, from purchasing raw materials, production, R&D, sales processes, quality assurance, environmental protection, and occupational health and safety (Kellermann, 2019).

In this research, standard is any standard document produced by Standards Development Organizations (SDOs), such as ISO, National

**Figure 1.** Classification of standard (Kellermann, 2019).

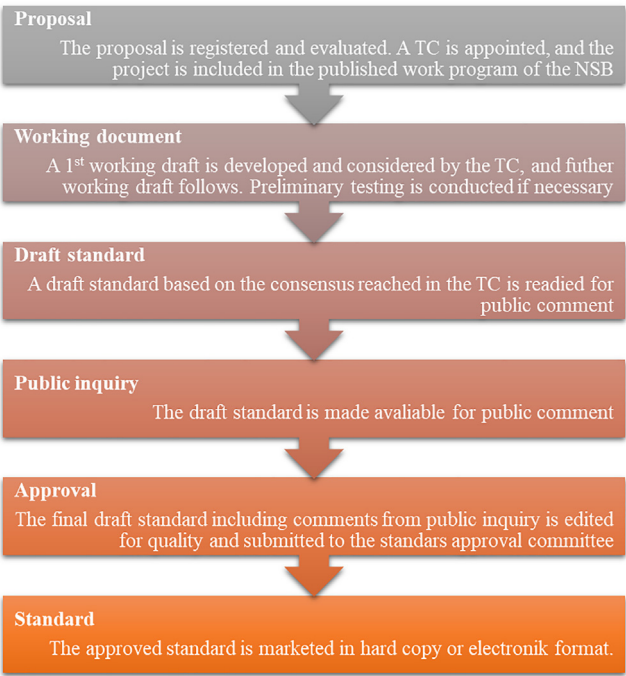


Figure 2. Standard development value chain (Kellermann, 2019). TC: technical committee; NSB: National Standard Body.

Standards Bodies (NSBs), and other SDOs such as American Society for Quality (ASQ), American Petroleum Institute (API), and others. The standard that was produced by SDOs are often referred to as “external standards” by companies. This is because companies can have their own internal standards (International Organization for Standardization, 2013). Standards can be classified according to their content, the mechanisms used for their development, and the organization that developed them. The following Figure 1 show the standard classification with their various types (Kellermann, 2019).

Standards are categorized as international, regional, and national standards. National standards are issued by standards bodies whose legal status is recognized. This is to ensure that the standards produced can easily be used as references in statutory regulations, for example in technical regulations. Organizations that develop national standards must comply with the requirements of the WTO TBT Treaty if the country is a member of the WTO (Kellermann, 2019).

In Indonesia, the national standard body is run by a non-ministerial government institution under the President, namely the National Standardization Agency or *Badan Standardisasi Nasional* (BSN). The complete value chain (Figure 2) including defining processes is managed by BSN. The Indonesian national standard are known as SNI.

In developing SNI, BSN involves government, academia, experts, consumers, and industry with the principle of openness through consensus. The SNI can be applied by a company voluntarily or mandatory. The mandatory implementation of standards occurs when SNI adopted into a regulation by the government in order to ensure that a products are safe, secure, fulfilling the quality requirement, and/or environmental friendly. A company's product that doesn't fulfill a mandatory standard is prohibited to be sold or circulated in the market.

2.2. Economic benefit of standard (EBS)

The growth of global trade has resulted in the need for standards to define the characteristics and quality of products in trade contracts. This allows each individual to qualitatively identify the impact of implementing standards (Kellermann, 2019), however, sometimes these impacts are difficult to identify quantitatively. In a report written by WTO economists, it shows the growing importance of international standards. The other result is identifies ISO, IEC, and ITU as the most important organizations of the 50 or more international standardization bodies known to the WTO (WTO, 2005). The contribution of standards to the growth rate in each country is equivalent to 0.9% in Germany, 0.8% in France and Australia, 0.3% in the UK and 0.2% in Canada (Blind et al., 2012).

In calculating the benefits of standardization activities, often a beneficial impact cannot be naively claimed as a result of standardization activities. At the macro level, contributions occur in several factors, such as the general state of the economy and additional investment. On the micro level, there are the effects of creativity, technology development, and innovation that need to be taken into account (Sunarya et al., 2015).

ISO has developed an approach for measuring the economic benefits of implementing a standard known as EBS (Economic Benefit of Standard). This approach is a guide issued by ISO for measuring the economic impact of implementing external standard (International Organization for Standardization, 2013) and can be used for both voluntarily and mandatory of standard. More specifically, the main objective of the method is to asses quantitatively the contribution of standards to value creation in an organization.

EBS uses the value chain perspective, in this way will divide a company's operations into several business functions related to the value of

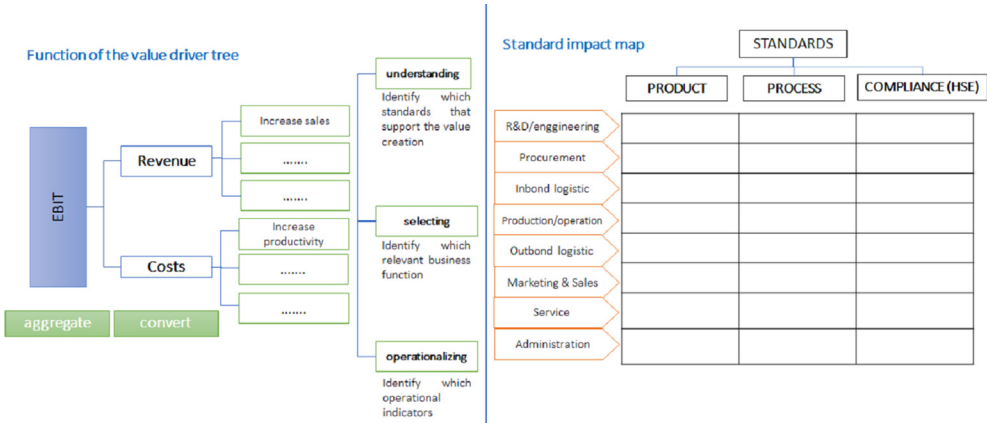


Figure 3. Relating value drivers to the impact of standards, and calculating their impact on value creation (Gerundino and Hilb, 2010).

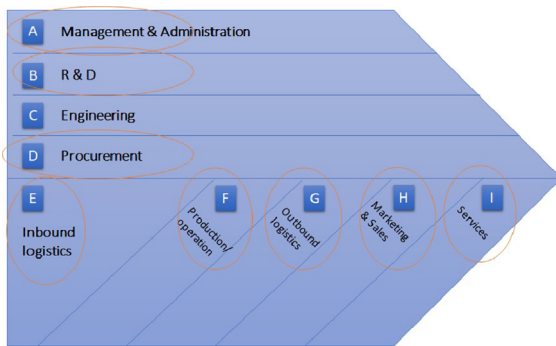


Figure 4. The PT. PMC Teknikindo value chain.

the company. Generally, the functions can be grouped into primary functions and support functions (International Organization for Standardization, 2013) (Sunarya et al., 2015) (Blind et al., 2011). The primary functions include inbound logistics, production/operations, outbound logistics, marketing and sales, and after sales services while the support functions consist of management and administration, research and development, engineering, and procurement (International Organization for Standardization, 2013).

In assessing the economic impact, EBS focuses on the activities that are closely related with a company's value driver. Value driver can be defined as "crucial organizational capabilities that give a company a competitive advantage" (International Organization for Standardization, 2013). The economic impact can be viewed as the performance of standard implementation in making the value driver related activities better. The performance is measured by using certain operational indicator that is transformed into earning before incomes and taxes (EBIT). In other words, EBIT is the operational indicator achievement accumulation that is transformed into increased revenue or decreased cost (International Organization for Standardization, 2013).

Mulyono and Pudjiastuti (2013) conducted a research on the economic impact of standard implementation in two Indonesian food companies using the ISO EBS. The results of their research showed that the two companies received an economic impact from the application of the standards valued at USD 2,755,139.82 and USD 546,432.33, respectively. However, the study is not conducted on SMEs. In addition, the business functions analyzed are only procurement, inbound logistics, production, and outbound logistics.

The research that measured the economic impact of standard implementation in SME by using EBS was performed by Phalitayasetri et al. (2020) and Susanto et al. (2017). Phalitayasetri et al. (2020) investigated the economic impact of standard implementation in a Batik – a

Indonesian traditional clothes – producers SME in Surakarta, Indonesia. The research revealed that the economic impact of standard implementation in SME is USD 5.974,29.

3. Methodology

3.1. Research approach

EBS was developed in 2010 and the pilot project of its implementation was carried out for measuring the economic impact of standard implementation in 21 organization across the worlds during 2010–2012 (Fu, 2016). The results of the pilot project were published by ISO in ISO publications (Fu, 2016).

EBS is an approach in the form of steps that can make it easier to measure the impact of the standards applied to the system. Generally, research is related to standard benefits related to sales and costs (Trajković and Mijatović, 2014). There are requirements in using this approach in order to be able to calculate the impact of the standard accurately, one of which is that the organization must be certified with a recognized standard for at least three years (International Organization for Standardization, 2014). Organizations can analyze data for at least the last 3 (three) years for accuracy and relevance of results. Another requirement according to Gojkovic (2014) is that companies must have clear business processes and have records of all operational indicators that show the progress of the standard benefits after being implemented. Several methods that can be developed to support ISO Methodology are: before-after comparisons, Comparing concurrent conditions - Projects, and What-if comparisons (Trajković and Mijatović, 2014).

The main problem in this approach is extracting the standard effect of other factors that affect the economic performance of the company (Trajković and Mijatović, 2014). The other hand, in general, business processes and records are often not well available on SMEs, so that it becomes an obstacle in measuring the benefits of the standard. The hypothesis of this study is EBS can be applied to measure the benefits of implementing standards in the SME sector.

This research adds a way that does not exist in the EBS approach that is using the in-depth interview method to obtain the company's business processes and the impact of implementing standards so as to get the right operational indicators. In depth interviews are also used to identify and analyze the intangible benefits of standard application and the factors that influence it so that the overall benefits of the standard can be obtained. Therefore, the selection of sources as expert judgment is important. The use of expert judgment from internal and external SME can reduce bias and error in the assessment, so that the results obtained can represent the actual conditions.

This research using key informants form internal SME and external SME. Previous studies have used owner or company management

Table 2. The PT. PMC Teknikindo business function and value drivers.

| No | Value Driver | Business Function | Relevant Operational Indicator |
|----|------------------------|-----------------------------|--|
| 1. | Operational excellence | Procurement | Quality of raw material The time needed to purchase raw material |
| 2. | Operational excellence | Inbound Logistic | Quality of raw material |
| 3. | Operational excellence | Production | Production capacity Production time |
| 4. | Operational excellence | Outbound logistic | The time needed to find equipment and perform warehousing process |
| 5. | Operational excellence | Management & administration | Employee turnover The Number of recruitment process |
| 6. | Customer intimacy | Services | The Number of customer complaints Customer complaints handling time |
| 7. | Customer intimacy | Marketing & sales | The time needed for marketing |
| 8. | Product leadership | R&D | The time needed for carrying out R&D |

Source: Research data (2019).

representatives when determining the percentage of economic benefits from implementing standards. The key informant will provide and justify the impact of standards application of a before-after comparison. They will find out which indicators (value drivers) have the impact of standards and the significance of their effects.

This research is a case study research. The case study is an Indonesian SME that produces auto - electric *Batik* stove – PT. PMC Teknikindo -. We selected PT. PMC Teknikindo as the case study due to several reasons. First, because he has a commitment to apply SNI, the second is a pilot project from BSN in the application of SNI in the SMEs level.

PT. PMC Teknikindo has 19 employees. and consists of 4 departments, which are consist of Admin & Finance (A&F), Production & Stock (P&S), Sales & Marketing (S&M), Research & Development (R&D). PT. PMC Teknikindo has implemented two standards, namely SNI IEC 60335 on Household and similar electrical appliances- Safety - Part 1: General requirements and SNI ISO 9001 on Quality Management System. The standards were implemented starting from 2017. The standards implementation was guided by BSN.

3.2. Data collection and data analysis

The data that are collected in this research are the data that are needed to perform the calculation of the economic impact of standard implementation by using EBS. In-depth interview was applied to gather the data. The informants of the interview are the SME owner and the supervisors of each business function. To eliminate biased analysis, experts from external the SME were added as informants. In dept interview interviews were conducted to find out how standards provide benefits to each business process, including budget savings that occur after implementing standards. The interviews are conducted in August–November 2019. Data collection and data analysis was carried out based on the steps that have been set out in the EBS (Figure 3) (Gerundino and Hilb, 2010). Therefore, there are four analysis steps that are carried out, as follows:

a. Analyse the value chain

The first step is to define the industry value chain and determine the value chain to be assessed. This analysis is conducted to identify parts of the industry's value chain and to consider the company's core competencies and key activities that can create value. The key business functions consist of primary function and support function.

b. Identify the impact of standard

Develop a comprehensive standard impact map. This step is used to identify the standard and the impact of its application on each of the main business functions and activities. The standard impact map provides a detailed list of potential activities of each business function.

c. Determine value drivers and define key operational indicators

This step is to determine the value driver. value driver is an important organizational capability that provides a competitive advantage for the company. value driver analysis helps assess the most relevant most desirable impacts in standard impact maps.

d. Collect information and measured the impact

Based on the operational indicator, the economic benefit was calculated by transforming the operational indicator into increased revenue or decreased cost. This is done by translating the impact into financial metrics. It can be directly measurable, or determined on the basis of existing data. Quantifying benefits is a key step in extracting the role of standardization activities. In order to identify the increased

revenue or decreased cost, the conditions before and after the standards implementation were compared. The time frame used is one year before and after the standard implementation. The standard contribution on the economic benefits was identified based on the informant justification.

3.3. Internal and external validity

As a case study research, this research also ensured the internal and external validity of the data collection and analysis. In order to ensure the internal and external validity, we performed Member checking. Within qualitative research, the researcher is often both the data collector and data analyst, giving potential for researcher bias (Miles and Huberman, 1994). Qualitative researchers might impose their personal beliefs and interests on all stages of the research process leading to the researcher's voice dominating that of the participant (Mason, 2002). However, the potential for researcher bias might be reduced by actively involving the research participant in checking and confirming the results. The method of returning an interview or analysed data to a participant is known as member checking, and also as respondent validation or participant validation. Member checking is used to validate, verify or assess the trustworthiness of qualitative results (Doyle, 2007).

4. Result and discussion

4.1. SME's value chain

ISO EBS methodology identified that a company may have nine business functions, namely inbound logistics, production/operations, outbound logistics, marketing and sales, after sales services, management and administration, research and development, engineering, and procurement. However, our research showed that PT. PMC Teknikindo has only eight business functions. PT. PMC Teknikindo didn't perform engineering business function from the start, these functions were incorporated into the production and operations functions.

The value chain of PT. PMC Teknikindo can be seen in Figure 4. From Figure 4, the primary business function of PT. PMC Teknikindo are inbound logistics, production/operations, outbound logistics, marketing and sales, and after sales services. The support business function of PT. PMC Teknikindo are management and administration, research and development, and procurement.

4.2. SME's value driver

The value drivers of PT. PMC Teknikindo are product leadership, operational excellence, and customer intimacy. Product leadership is offering customers leading edge products that consistently enhance the customers use or application of the product, thereby making its rivals goods obsolete (Santosa, 2016). Product leadership becomes a value driver for PT. PMC Teknikindo because raises consumer perceptions of the value and quality of the product so that consumers want to buy the product. Value driver also differentiates the SME products from competitors products, so that they have competitiveness in trade competition. Regarding to product leadership, the owner of PT. PMC Teknikindo stated that: "with standards, local products of SME have global competitiveness".

Operational excellence is organizations making improvements to attain a competitive advantage. Modern day organizations not only maximize the benefits for the organizations, but also the customer and other stakeholder's needs are taken care (Sony, 2019). Operational excellence becomes a value driver for PT. PMC Teknikindo because production and support processes are structured with due regard to effective and efficient values in order to obtain competitive products. Regarding to operational excellence, the owner of PT. PMC Teknikindo stated that: "business processes are planned, worked and evaluated to create competitive products".

Table 3. The standard implementation and PT. PMC Teknikindo's business function.

| Business Functions | Standards | |
|-------------------------------|---------------|--------------|
| | SNI IEC 60335 | SNI ISO 9001 |
| Inbound logistic | - | x |
| Production/Operational | x | x |
| Outbound Logistic | - | x |
| Marketing and sales | x | x |
| Services | - | x |
| Management and administration | - | x |
| Research and Development | - | x |
| Procurement | x | x |

Source: Research Data (2019).

Customer intimacy is deliver products and services to customers exactly what they want (Nora, 2019). Customer intimacy becomes a value driver for PT. PMC Teknikindo because customer intimacy is a crucial step in value chain processes in relational marketing. Customer intimacy create a trust from customer. Once trust is created, customers are likely to repurchase. Trust is the foundation necessary for long-term relationship success. Regarding to customer intimacy, the owner of PT. PMC Teknikindo stated that: “the customer is king and queen”.

The value drivers of PT. PMC Teknikindo are supported by its business function. Table 2 shows the relationship between the value drivers,

the business functions, and the business function's operational indicators that are relevant to support the value drivers.

4.3. The impact of standard implementation on value driver

PT. PMC Teknikindo used 2 (two) standards in its operation, namely SNI IEC 60335 on Household and similar electrical appliances-Safety - Part 1: General requirements and SNI ISO 9001 on Quality Management System. Table 3 shows the business functions that are supported by the standards. SNI ISO 9001 supported all PT. PMC Teknikindo business functions. SNI IEC 60335 supported three business functions, namely production, marketing and sales, and procurement. More specifically, the impacts of the standards implementation on the business functions are shown in Table 3. Visually, Figure 5 shows the relationship between standards and its' impact on the value driver.

4.4. The economic benefits of standards in PT. PMC Teknikindo

Standardization has an important role in facilitating an international trade. For a government, standardization opens opportunity to improve its industry's competitiveness and widener the market. In other hand, standardization can be seen as an instrument for government to protect its citizen from unsafe, unsecure, lower quality, and unenvironmental friendly product.

The ISO EBS methodology estimates the measurable benefits of implementing the standard in terms of economic value by converting the identified impact of implementing the standard into economic value. The

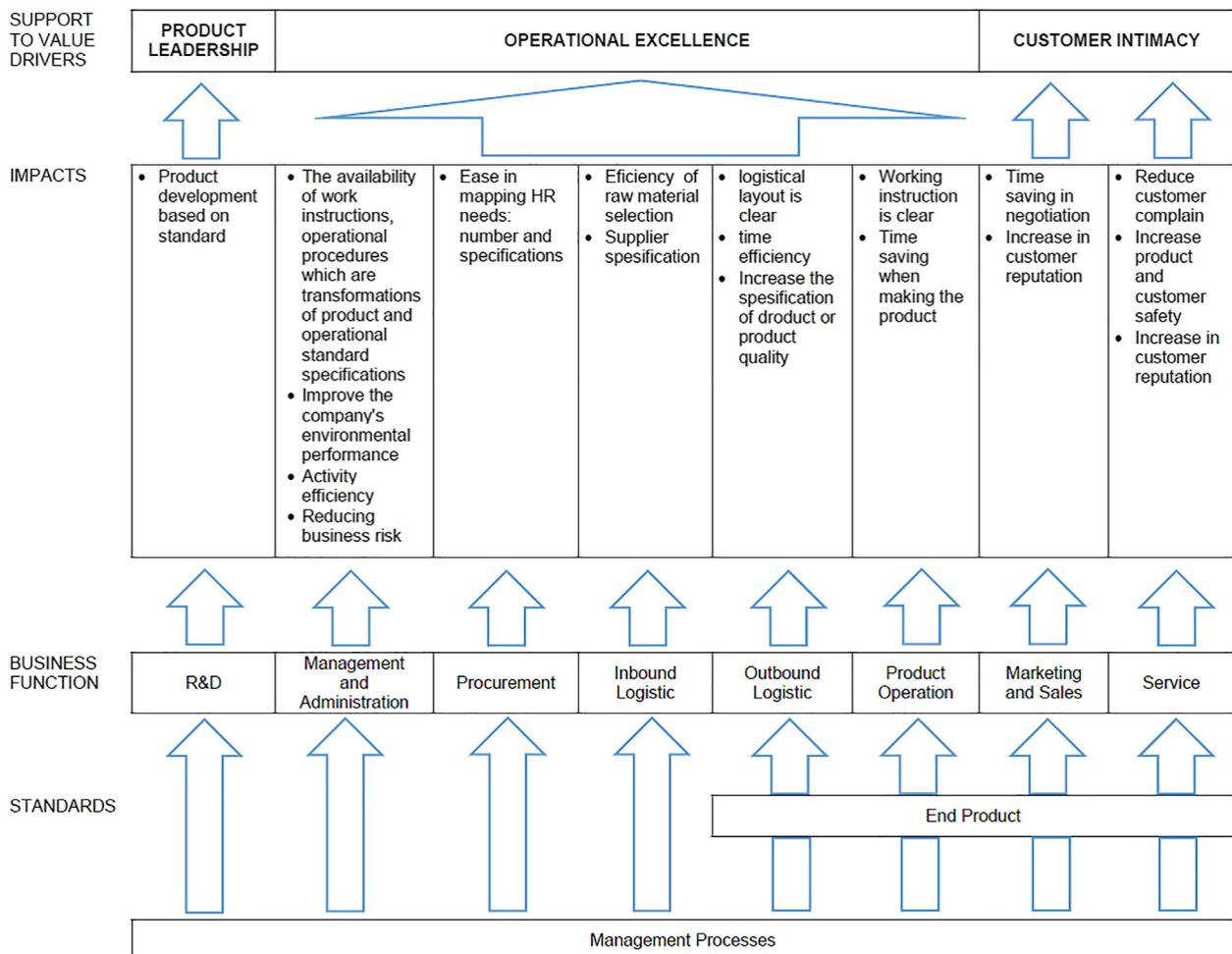
**Figure 5.** The relationship between standards, business functions, impacts and value drivers.

Table 4. The economic value of the impact of standard implementation in PT. PMC Teknikindo.

| No | Business Function | The Impact of Standard | The Economic Value (EV) Formula | Standard contribution (SC) | The Economic Value of Standard Implementation (USD) (EV x SC) |
|--|-----------------------------------|---|---|----------------------------|---|
| 1. | Procurement | Reduce the time needed to purchase raw material from 3 h to 2 h | = time needed x salary x activity per month x 12 month | 100% | 99,43 |
| 2. | Procurement and Inbound Logistics | Improve the quality of raw material. The depreciation value of raw material was decreased from 15% to 5%. | = 10% x raw material average price x raw material demand = 29 day x salary per day x 7 person | 50% | 1.071,43 |
| 3. | Production | Reduce production time for a stove from 78 min to 48 min | = 9 min x 2 person x salari per minute x 12 bulan | 100% | 928 |
| 4. | Outbound Logistic | Reduce the time needed to find equipment and perform warehousing process from 12 min to 3 min. | = 1 min x 2 person x salari per minute x 12 bulan | 95% | 65,1 |
| 5. | Management & administration | Reduce the number of recruitment process from 3 recruitments to 2 recruitments. | = (number complaint x product price) + (number complaint x expedition cost) + (number complaint x cost of production) | 30% | 1.255,7 |
| 6. | Services | Reduce the number of complaints from 24 to 0 | = reducing time x salary pe minute x 2 person x 12 month | 100% | 671,8 |
| 7. | Marketing | Reduce the time needed for marketing from 2 hours/product presentation to 30 minutes/product presentation | = an increase in the number of products x selling price x benefit | 50% | 257,1 |
| 8. | Marketing | Improve the selling product from 1.600 pcs to 1900 pcs | = 2 % x selling price x number of product sold | 35% | 487,5 |
| 9. | Research and Development | Reduce the time needed for carrying out R&D | = time needed x salary x activity per month x 12 month | 65% | 596,3 |
| Total economic benefits of applying standards | | | | | 5.432,5 |

Note: 1 USD = IDR 14.000.

economic value may represent the reduced cost or increased revenue. Table 4 shows the calculation results of the economic value of standard implementation in PT. PMC Teknikindo.

From Table 4, it can be seen that the total economic benefit of standard implementation in PT. PMC Teknikindo is USD 5.432,5. The biggest economic benefit that received by PT. PMC Teknikindo is the economic benefit in Management & Administration business function. This is because it is able to save on the cost of employee recruitment advertising through print media US\$ 4.183,33.

The lowest economic benefit that received by PT. PMC Teknikindo is the economic benefit in Outbound Logistic business function. This is because in this business process, the activity impacted by the implementation of standards is a reduction in the time spent setting up the finished product, while the number of people doing it does not decrease.

This research found that EBS can be used to quantifying the standard implementation provided economic benefit for the SME. In other word, standard implementation positively influence economic performance. Thus, this research several studies that also found the positive relationship between standard implementation and economic performance (Psomas et al., 2010; Heras-Saizarbitoria and Boiral, 2013; Prodromos et al., 2015; Trajković and Milošević, 2018).

Using ISO EBS methodology, a research can reveal not only the economic benefit of standard implementation but also the mechanism how

the economic benefit received by a company. Figure 5 shows the mechanism how the economic benefit received by PT. PMC Teknikindo. The standard implementation affected the performance of the SME's business functions in supporting the value drivers. The economic benefit was obtained by the cost efficiency of the business function or the increased revenue from the production.

This research revealed that the economic benefit of standard implementation in an SME are dominantly coming from cost efficiency. Standard implementation makes the business functions of the SME to be more efficient. For example, in procurement business function, the process in purchasing raw material becomes faster due to the availability measurable raw material specifications. In production business function, production time is also faster than the previous ones. This is because the SME develop standardized working instruction after the standard implementation. Before the standard implementation, the production employees of the SME performed their task based on their experience and instincts.

Based on the previous explanation, the use of ISO EBS methodology can assist a company in identifying the problem of standard implementation. More specifically, it can identify the business functions that are not significantly affected by standard implementation. Furthermore, ISO EBS methodology may also explain why several organizations didn't receive a significant economic benefit. This is because the standard implementation doesn't affect the value driver related activities.

The results of this study are the same as those of (Farkah, 2012; Mulyono and Pudjiastuti, 2013; Phalitayasetri et al., 2020; Philpott et al., 2007; Susanto et al., 2017; Ulkhaq, 2011), that the application of standards provides tangible and intangible benefits for companies. Intangible benefits are usually greater and more because the application of standards is a supporting factor that gives impetus to the successful delivery of the product to the market and is accepted by consumers.

4.5. The intangible impact from standard implementation in PT. PMC Teknikindo

As previously stated, standards have both tangible (economic value) and intangible effects. Trajković and Milošević (2018) states that the benefits of standards are not only economic, but are positively correlated with the influence of innovation, technology, and social as an intangible benefit.

a. Innovation

Innovation is not limited to increasing industrial capacity, but also capabilities in terms of efficiency and simplification of processes. Standardization is very close to the existence of innovation, this is shown by standardization is one of the processes to make products more competitive. In maintaining competitiveness in the international market, standardization can be a bridge between research, innovation and the market, which in turn will bring significant economic benefits (Trajković and Milošević, 2018).

Since implementing SIN ISO 9001 Astutik has made R&D for company and product innovation. PMC Teknikindo conducts product development continuously to produce new products and make efficiency from existing products. This innovation was carried out to meet the quality requirements according to SNI and several other certificates for export requirements. Innovations were made, for example ergonomic model design, stabilization of temperature settings, the use of quality components.

b. Technology

By applying standards, innovation is accompanied by the use or creation of new technologies to create quality products. Often this technology creation is done to achieve:

- better access to international trade for companies;
- shorter lead time for new products;
- faster approval/confirmation/acceptance of the product in other countries;
- savings generated by the self-labeling and avoiding checking through a third party;
- improved procurement process due to the definition of product quality and built-in standards;
- faster inventory turnover, the production of 'just-in-time'.

c. Social

Social influence is more about the benefits that standardization brings to industry or the economy. Besides that, standards also have a direct benefit and influence on society. In Indonesia, one of the goals of standardization is to protect consumers and has been legally stated in Law Number 20 of 2014 concerning Standardization and Conformity Assessment.

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products or activities related to health, security, safety and the environment such as electrical installations, household appliances, and so on.

By applying standards, PT. PMC Teknikindo able to create an auto – electric batik stove with certain technologies to give confidence to security products for consumers; health and safety for the general public; reduction of risks in business and public life.

5. Conclusion

This research has analyzed the economic benefit of standard implementation in PT. PMC Teknikindo, an auto – electric batik stove SME in Indonesia. Using ISO EBS methodology, this research has found that standard implementation in PT. PMC Teknikindo provided economic benefits. More specifically, the economic benefits are 5.432,5 USD per year. The economic benefits were obtained by the cost efficiency of the business function or the increased revenue from the production. Through in-dept interview with experts from outside the company about the percentage results of the standard economic impact set by the internal MSEs, an average percentage value is more representative of the actual conditions. This step is taken to eliminate the bias that has been a problem in calculations using EBS when extracting the effects of standard use from other factors that affect the company's economic performance.

It can be concluded that the application of standards provides positive benefits for the industry. This result is in line with the literature study conducted by Isharyadi and Kristiningrum (2021) which shows the benefits of implementing standards in the form of product certification, including cost savings in each of its business chains. In contrast with this, there are still many industries, especially SMEs, which are reluctant to implement standards mainly due to the high cost of SNI certification (Setyoko et al., 2018). Seeing the considerable economic benefits of applying standards to SMEs, it is necessary to conduct socialization to related agencies that have the function of developing SMEs to increase awareness and interest of SMEs in applying standards so that SMEs products are more competitive and able to compete in global trade (Susanto et al., 2017).

The number of research related to the calculation of the economic benefits of implementing standards needs using EBS need to be improved. The results of the literature show that there are still few publications related to similar research in several countries, including Indonesia. Future research could be focused on SMEs in the food and beverage sector because of their large number in Indonesia. The more publications related to the economic benefits of applying standards will encourage industries, especially SMEs to implement SIN, so that they can improve the quality of their products and access a new market.

Declarations

Author contribution statement

Ellia Kristiningrum: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Wrote the paper.

Meilinda Ayundyahrini and Ajun Tri Setyoko: Performed the experiments; Analyzed and interpreted the data; Wrote the paper.

Danar Agus Susanto: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Wrote the paper.

Renanta Hayu Kresiani: Performed the experiments.

Nova Suparmanto: Contributed reagents, materials, analysis tools or data.

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Data availability statement

Data will be made available on request.

Declaration of interests statement

The authors declare no conflict of interest.

Additional information

No additional information is available for this paper.

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