Increasing economic value of mondol and thorn stingray skin through the processing of commercial leather creative products

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Abstract. The aim of the study was to compare the total economic value, added-value, consumer preferences and the superiority of commercial products developed from mondol and thorn stingray skins. The stingray skins were processed into wallet and women products and this processing increased the value of mondol and thorn sink up to 1,650,000 and IDR 2,300,000, respectively. Survey on customer preferences found that the model, colour, quality, price and purchasing power of commercial products from thorn stingray more preferred than those from mondol stingray. In conclusion, the commercial products from thorn stingray skin is better than those from mondol stingray.

Keywords: economic value, commercial product, quality, strigrays leather

1. Introduction

The Indonesian ministry of maritime affairs and fisheries has revitalized the policy on the utilization of waste and by-products of the fishing industry (capture, aquaculture and processing) based on the diversification and development of food and non-food products that have important economic values (Sahubawa et al 2018). One type of the by-product of fishing is stingrays which are often thrown back into the sea because the meat smells of ammonia so it is not liked by consumers. Nationally, the production of stingrays reached 71,650 tonnes at the end of year 2017, consisting of bird stingrays, shovel noses, whitespotted guitarfish, bats and flower/tiger (Directorate General of Capture Fisheries, Ministry of Marine Affairs and Fisheries Republic of Indonesia 2018).

Stingrays from the by-product of catching are only sold at cheap prices (IDR. 4,000-5,000 per kg) (Sahubawa et al 2008, Sahubawa and Pertiwiningrum 2010), however the surface skin can be utilized and processed into raw materials for commercial leather products with very high economic value (Pratama et al 2018, Sahubawa et al 2018). The skin of the mondol stingray (Himantura gerrardi) and the skin of thorn stingray (Himantura jenikinsii) have a high economic value if they are processed into a commercial leather creative product because they have beads and pearls on the skin surface making
leather products more attractive (Sahubawa 2011, Sahubawa and Pertiwiningrum 2016). Meanwhile, the meat can be further utilized as food products (Sahubawa 2013).

Stingrays are caught at large quantities and are mostly sold in fresh form during landing season. Stingray skin is often considered as worthless, however with technological advances and innovation, the skin can be utilized into a raw material for commercial leather, having economic values up to IDR 125,000 per sheet (figure 1). Small size mondol stingrays skins are sold at IDR 60,000-75,000 per sheet, while the medium size are sold at IDR 75,000-100,000 per sheet, and large size at IDR 100,000-125,000 per sheet (Sahubawa 2011, Sahubawa et al 2010). The aim of the study was to assess the total economic value, added value, level of consumer preferences and the superiority of commercial stringray products.

![Figure 1](image1.png)

**Figure 1.** Fresh stingray at fish landing place (a), stingray leather tanning (b), stoning and drying of skin (c) (Sahubawa et al 2008, Sahubawa and Pertiwiningrum 2016).

## 2. Materials and methods

### 2.1. Materials

Mondol and thorn stingray skins were obtained from a small leather business company called Zazmi Leather in Sleman Yogyakarta. The mondol skin had a dimension 80×20 cm, while the thorn skin had a dimension 60×30 cm (figure 2).

![Figure 2](image2.png)

**Figure 2.** Tanned stingray leather sample (a) mondol and (b) thorn stingray types.

### 2.2. The processing of stingray leather creative products

The processing of stingray leather creative products was divided into seven stages, starting from product design until packaging. The complete production of stingray leather product was described in Sahubawa et al (2018).
2.3. Analysis of consumer demand levels
The analysis of the consumer demand for commercial stingray leather products was carried out using consumer preferences method (Sahubawa et al 2018). Total of 60 respondents consisting of fifty females and ten males were interviewed. The respondents represented three market segments including lecturer, employee and student. The respondents were questioned regarding 4 product quality parameters namely product model, colour, price and purchasing power.

3. Results and discussion
3.1 Types and specification of commercial stingray leather product
The types of commercial stingray leather products that were produced and analyzed with attractive shapes and colours as well as competitive selling points were (1) women and men wallet (2-in-1 and 3-in-1 types) and (2) women and men wallet-bag (2-in-1 and 3-in-1 types), with specifications shown in figure 3a and 3b. In addition to the main products, derivative products were also produced using raw materials from the skin leftover with the specifications as shown in figure 4a and 4b.

Figure 3. Commercial leather products from (A) mondol and (B) thorn stingray skins.

Women and men wallet and also women and men wallet-bag (rectangular model, 2-in-1 and 3-in-1 types) are products to facilitate medium to large personal identity often used in travel and banking transactions. The main products (wallet type 2-in-1) are used to facilitate several important identities and needs, namely paper money, business cards, ATM cards, shopping notes, and small cellphones. Wallet-bags/purse (type 3-in-1) are used to facilitate for a variety of important identities and needs, namely paper money, business cards, atm cards, bank accounts, passports, shopping notes and small and medium cellphones. The wallet-bag (purse type 3-in-1) can facilitate a number of identities and consumer needs because it has a larger size than the wallet type 2-in-1. This wallet was also more

### Specification
- **Model**: rectangular
- **Type**: 2-in-1
- **Length**: 20.0 cm
- **Width**: 10.0 cm
- **Thickness**: 3.0 cm
- **Prices**: IDR 650,000
- **Materials**: mondol stingray leather

### Specification
- **Model**: rectangular
- **Type**: 3-in-1
- **Length**: 22.0 cm
- **Width**: 15.0 cm
- **Thickness**: 5.0 cm
- **Prices**: IDR 1,500,000
- **Materials**: thorn stingray leather
attractive and had a higher selling value and consumer demand compared to similar products produced from cow leather (conventional leather).

3.2. Economic value and consumer preferences from mondol stringray leather product

3.2.1. Economic and added values. The economic value of fresh mondol stingray skin was IDR 30,000 per sheet while the tanned leather (raw material for commercial product) was IDR 125,000 and main commercial leather product (wallet) type 2-in-1 and type 3-in-1 was IDR 650,000 and IDR 1,250,000, respectively. One sheet of stingray skin can be processed into one wallet (type 2-in-1) and 2 pieces of pearl bracelets (IDR 400,000). The total economic value reached IDR 1,050,000 with added value Rp 1,020,000. Meanwhile, one wallet-bags (type 3-in-1) plus 4 pieces of pearl bracelets (IDR 800,000) can be produced from 2 sheet of stingray skin. The total economic value reached IDR 2,050,000 with added value IDR 1,020,000.

3.2.2. Consumer preferences. The consumer preferences for mondol stringray leather product were (1) models: 80% of respondents expressed a very interesting and 20% of interesting; (2) colour: 88% of respondents expressed a very interesting ad 12% of interesting; (3) quality: very good is 80% and 20% of goods; (4) price: 16% of stated they were quite expensive, 30% of considering it very expensive and 54% said reasonably priced ; (5) purchasing power: 24% said affordable, 66% said reasonably priced and 10% of unreachable.

3.3. Economic value and consumer preferences from thorn stringray leather product

3.3.1. Economic and added values. The economic value of fresh thorn stingray skin was IDR 50,000 per sheet while the tanned leather (raw material for commercial product) was IDR 300,000 and economic value of main commercial leather product (wallet) type 2-in-1 was IDR 950,000 and type 3-in-1 was IDR 1,500,000. One wallet (type 2-in-1) and 2 pieces of pearl bracelets (IDR 500,000) can be produced from 1 sheet of stingray skin. The total economic value reached IDR 1,450,000 with added value IDR 1,400,000. While the wallet-bag (type 3-in-1) plus 4 pieces of pearl bracelets (IDR 1,000,000) can be

![Figure 4. Accessories (pear bracelet) for ladies from mondol (A) and thorn (B).](image)
produced from 2 sheet of stingray skin. The total economic value reached IDR 2,500,000 with added value IDR 2,400,000.

3.3.2. Consumer preferences. The consumer preferences for mondol stingray leather product were (1) models: 85% of respondents expressed a very interesting and 15% of interesting; (2) colour: 90% of respondents expressed a very interesting ad 10% of interesting; (3) quality: very good is 85% and 15% of good; (4) price: 20% of stated they were quite expensive, 42% of considering it very expensive and 38% said reasonably priced; (5) purchasing power: 26% said affordable, 62% said reasonably priced and 12% of unreachable.

Consumer preference analysis revealed that while the lecturers and employee had similar opinion in the parameter of product model and colour, the lecturer had different opinion on the parameter of price and purchasing power. The lecturers are known to have steady and bigger income compared to the employees or the students. Surprisingly, although the students did not have steady income, they had higher buying interest compared to the employees. Previous study found that several factors influenced consumer demand on a product including (1) the price of the product/commodity itself, (2) the average household income of the population, (3) the price of the related product, (4) consumer tastes, (5) income distribution among households and (6) population size (Suriiani and Juliansyah 2012). The rules of consumer demand can be stated in its simplest form are (1) at high product prices, fewer items are requested when compared to low prices and (2) when product prices are low, then more products will be requested when compared to when prices are high. So the rules of demand say that the quantity of product requested is inversely related to the price of the item at each price level (Miler 2000). If income increases, the share that consumers will spend will also increase so that the number of products can be bought by consumers is increasing. Increasing the income of the population will increase the purchasing power of the people towards the product. In this context, the lecturers had high demand and purchasing power due to high-income levels, education, experience and interest. Nevertheless, the creative products from stingray leather were very attractive and could be afford by all market segments.

4. Conclusion

The economic value of commercial mondol stingray leather product (wallet) type 2-in-1 was IDR 1,050,000 with added value IDR 1,020,000. The economic value of commercial mondol stingray leather product type 3-in-1 reached IDR 2,050,000 with added value IDR 1,020,000. The economic value of commercial thorn stingray leather product (wallet) type 2-in-1 was IDR1,450,000 with added value was IDR 1,400,000. The economic value of commercial mondol stingray leather product type 3-in-1 reached IDR 2,500,000 with added value IDR 1,400,000. The level of consumer preferences for thorn stingray leather creative product (type 2-in-1 and 3-in-1) on all attributes (model, colour, price, quality and purchasing power) was higher compared to creative mondol stingray skin products with the same type.

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