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## **Innovative bamboo handicraft business models: case study in Chuong my district, Hanoi, Vietnam**

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### **Abstract**

With around 700 bamboo and rattan handicraft villages nationwide, Vietnam is known for the country's long-standing tradition of producing exquisite bamboo handicrafts such as kitchen utensils, home décor objects, and storage bins. Apart from its cultural importance, bamboo handicraft production plays an important role in social and economic improvement with women and ethnic minorities being one of the key beneficiaries. In order to enhance the performance of bamboo handicraft production and consumption system, there are efforts to establish collaboration between processing enterprises and handicraft households. However, a comprehensive analysis of this sector is lacking so far. This paper analyzes the collaborative model between enterprises and handicraft households in Chuong My district which is one of the key bamboo handicraft villages in Vietnam. In-depth interviews with five enterprises, 17 households, and three bamboo traders were carried out. Observations were also conducted to cross-check the information obtained from the interviews. The findings revealed the characteristics and performance of stakeholders involved in the collaborative model. The contribution of this model to social and economic development as well as its facing challenges was additionally delineated. In general, raw material prices have increased by approximately 20% compared to five years ago due to the increasing scarcity of bamboo resources, and low productivity because only 5% of production stages applied with machines. Handicraft households were responsible for most of the production stages which generated an average income of 161 \$ monthly. Small-scale businesses are facing capital and business skills constraints hindering up scaling and accessing international markets, and urbanization leading to labor migration towards industrial zones, resulting in a decline in bamboo traditional crafts. Recommendations to sustain and enhance the performance of the collaborative model were illustrated.

**Keywords**    Livelihood; Bamboo production; Handicraft village

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## **1. Introduction**

Bamboo is known to be a rapidly growing plant, capable of reaching heights of up to 40 meters and diameters of up to 30 centimeters in just four months (Benton 2015; Chaowana 2013; Koren 2010; Lobovikov et al. 2007; Rao et al. 1998; Zhang et al. 2007). In 2010, the total global bamboo area was nearly 31.5 million hectares, accounting for approximately 4% of the world's total forest area (Phimmachanh et al. 2015). Among this, over 65% of the bamboo area is distributed in Asia, 28% in the Americas, and 7% in Africa (Liese and Köhl 2015; Lobovikov et al. 2007). With approximately 1.5 million hectares, of which more than 74,000 hectares are planted forests, Vietnam is currently the fourth-largest country in terms of bamboo area in the world, with an annual bamboo raw material output in Vietnam of about 5.2 million tons (Phimmachanh et al. 2015; WWF 2015). As one of the most valuable non-timber forest products, numerous studies have emphasized the significant role of bamboo in socio-economic development, in addition to its environmental benefits (Benzing et al. 2005; Embaye 2004; Song et al. 2011; Tripathi and Khawlhing 2010). The livelihoods of approximately 2.5 billion people worldwide are dependent on bamboo. For instance, the bamboo industry in India provides approximately 120 million jobs annually (Adkoli 1995; Din 2014; Hogarth and Belcher 2013; Lobovikov et al. 2007, 2007; Lou et al. 2010). In Vietnam, bamboo production and trade activities generate about 3.4 million jobs. In 2018, the export value reached 384 million \$ (Moard 2019; Moit 2019). The global bamboo industry is estimated to be worth 10 billion \$ (Borah et al. 2006; Endalamaw 2015). Europe, the United States, and Japan are the world's largest importers of bamboo products. Vietnam's bamboo industry has significant development potential, with an estimated value that could reach 1 billion \$ (Ly et al. 2012; Oxfam Hong Kong 2006). However, 68% of bamboo resources in Vietnam are utilized for low-value-added products such as construction, making disposable chopsticks, and producing votive paper (Marsh and Demestre 2008). Meanwhile, higher-value-added products like industrial bamboo and handicrafts have not been well-developed. Furthermore, due to high market demand for bamboo, inadequate tending, and overexploitation, bamboo area has been decreasing (DOFA 2015; Nguyen and Eiligmann 2010; Oxfam Hong Kong 2006; Sass 2018; Tran 2010; Trieu 2014). The bamboo and rattan handicraft industry is the predominant sector within Vietnam's handicraft landscape, encompassing approximately 700 bamboo and rattan handicraft villages across the country. With a rich historical heritage, Vietnam enjoys a commendable reputation for its diverse array of traditional bamboo and rattan handicraft products, including kitchen utensils, home decor items, storage containers, trays, and baskets (Fanchette and Nicholas 2009). These items not only hold significant commercial value but also serve as cultural and historical symbols, encapsulating the essence of Vietnamese heritage. These

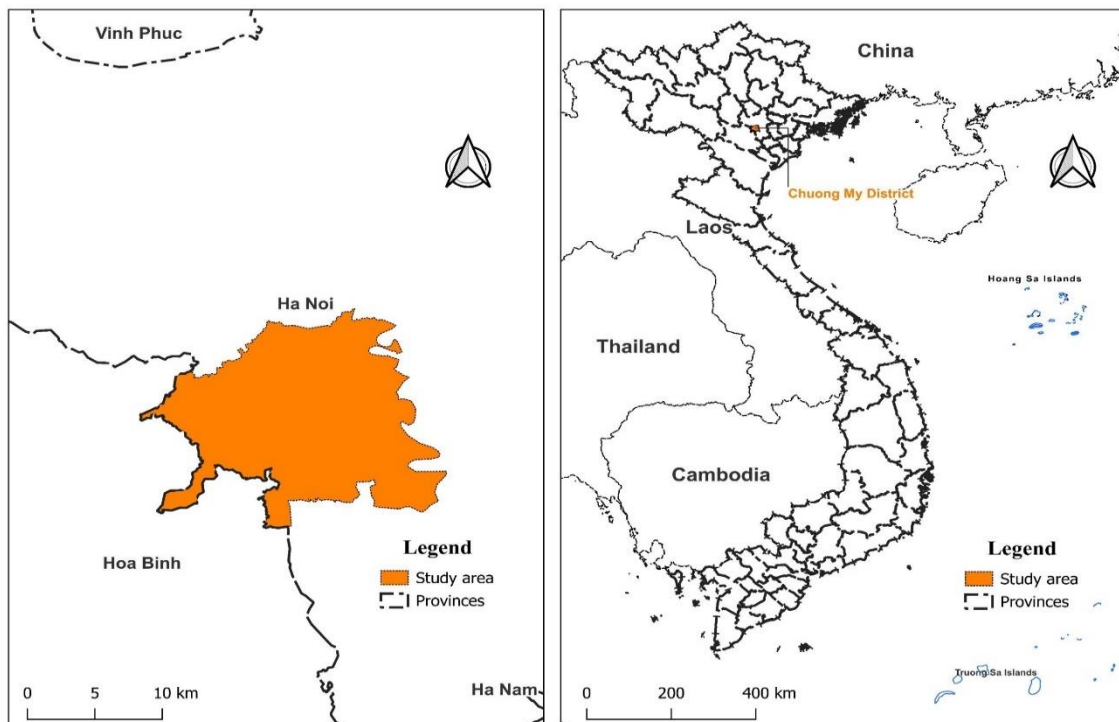
handicraft villages are primarily concentrated in the Red River Delta region, accounting for 47% of the total number of such villages nationwide. Following closely, the North-Central region constitutes 17% of these villages, while the North-East region comprises 11%. In contrast, the Mekong Delta region has the lowest representation, with only 10% of the total number of handicraft villages (Oxfam Hong Kong 2006; Smith et al. 2006). In recent years, factors such as urbanization, rapid industrial development, and the inconsistent income derived from traditional handicraft production have prompted many workers to transition away from traditional crafts in pursuit of more stable employment opportunities offering higher income prospects. Those who continue to engage in traditional handicraft production are predominantly women and elderly individuals who remain within their villages, shouldering familial responsibilities. According to a report on Mekong Bamboo (2006), women constitute over 60% of the labor force in bamboo and rattan handicraft villages. These women often receive practical training from an early age, apprenticing under the guidance of their parents or relatives. However, the allure of urban areas, with their promise of more secure employment, often lures skilled artisans away from their villages. Consequently, bamboo enterprises grapple with a shortage of labor, making it challenging to fulfill orders within tight deadlines. Vietnam's bamboo handicraft industry has a long-standing history and has made significant contributions to economic and social development. Some studies have investigated some aspects, such as challenges in accessing international markets for bamboo handicraft products, job creation, tourism attraction, and livelihood improvement for local communities (Fanchette and Nicholas 2009; Tuong Trang and Eiligmann 2010). However, a comprehensive study analyzing the business model of collaboration between local artisans in craft villages and bamboo enterprises in the production of handicraft bamboo products is still lacking. This paper employed methods such as in-depth interviews, group discussions, and direct observations to gather data for evaluating the collaboration model between local artisans in craft villages and bamboo enterprises. It examines the challenges associated with cooperation among stakeholders within the value chain, raw material collection and processing, income generation for local communities, and market access.

## **2. Materials and Methods**

The fieldwork for this study was conducted in Chuong My district, located within the Hanoi Capital region (Fig. 1). Chuong My is renowned in Vietnam for its vibrant bamboo and rattan handicraft industry (DONRE 2017). The district has a total of 35 handicraft villages, out of which 27 are dedicated to bamboo and rattan handicrafts. Furthermore, there are 36 bamboo and rattan enterprises operating in Chuong My. These enterprises tend to be small in size, face capital

constraints, and rely on outdated technology, which presents significant challenges for them in terms of accessing international markets. Nevertheless, some of these enterprises have effectively managed their operations, successfully secured credit, expanded production and market, and implemented innovative marketing and production strategies (DOARD 2018).

Secondary resources can provide invaluable data that may not be obtainable through interviews, discussions, and observations. In this research, various key secondary resources have been utilized, encompassing bamboo supply information, local government and international organization policies supporting enterprises, the business environment, technological advancements, innovation trends, and socio-economic contexts. A wide array of sources, both published and unpublished, were referenced. These include reports issued by authorities and organizations, documents from enterprises, and international articles pertaining to the bamboo sector and small-scale bamboo enterprises.



**Figure 1.** Location of the case studies

In addition to synthesizing secondary documents, this study employed three primary data collection methods: (1) in-depth Interviews with representatives from five enterprises, 17 households, and three bamboo traders; (2) Focus Group Discussions (FGD) were organized with various stakeholders, including business owners, artisans, local authorities, and the discussions centered around bamboo collection, bamboo handicraft production, and supportive policies; (3) Direct Observations were carried out to corroborate and validate the data acquired during the interviews. The study predominantly applied qualitative analysis methods, primarily content

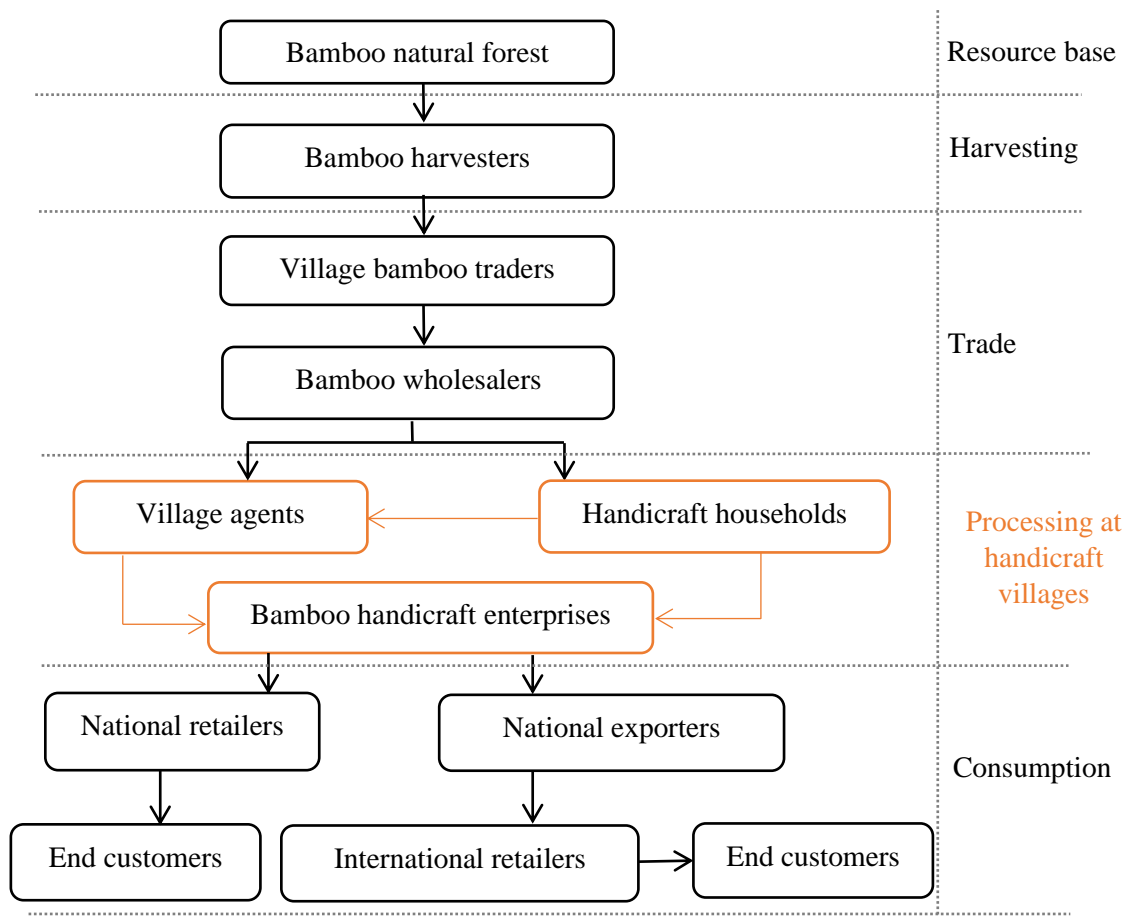
analysis, to examine various aspects such as bamboo collection, bamboo processing, bamboo production, harvesting techniques, cost-benefit analyses, relevant support policies, and the value chain/sales process.

### **3. Results**

#### **3.1. Overview of bamboo handicraft production in Chuong My district, Ha Noi**

In the handicraft bamboo value chain (Fig. 4.2), raw materials are sourced from natural forests in Hoa Binh and Thanh Hoa provinces by local villagers. Each commune in the harvesting areas typically employs up to three local bamboo collectors who gather fresh bamboo from the harvesters. Subsequently, these harvested materials are transported to the Dong Yen Phuong market located in Chuong My district. Wholesale traders at this market distribute the bamboo to various stakeholders, including handicraft households, bamboo pre-processors, and bamboo handicraft enterprises. It's worth noting that Dong Yen Phuong market is the sole marketplace for bamboo materials within the district. This market operates daily, and the proximity of households to the market, typically less than three kilometers, allows artisans to easily access it and transport bamboo using private motorbikes.

Given the variability in bamboo prices, which largely depends on factors like material quality, quantity, and the timing of purchase, households must negotiate prices with wholesale traders on a case-by-case basis. Furthermore, the bamboo material is processed manually, involving cutting it into sticks using knives and subsequently drying it in sunlight. Within Chuong My, Hanoi, small handicraft bamboo enterprises typically subcontract with local handicraft households to manually create semi-finished products within their homes. These artisans, often women, must carry household chores and farming activities, making it challenging to distinctly separate their homes from the workshop. Enterprises then collect these semi-finished products from households to carry out final stages of production, including gluing, painting, labeling, and packaging. This study highlights that some enterprises share substantial orders with counterparts through subcontracting to meet tight deadlines.



**Figure 2.** Handicraft bamboo value chain structure in Chuong My district, Hanoi

Typically, customers provide an advance payment of approximately 30% of the contract value to the enterprises. Additionally, local traders offer financial support to enterprises by extending the payment period for orders by 2-3 weeks.

**a. Performance of bamboo handicraft households**

*Maclurochloa tonkinensis sp. nov.* (referred to as "Giang" in Vietnamese) and *Schizostachyum aciculare* (known as "Nua" in Vietnamese) are two commonly utilized bamboo species in the production of bamboo handicraft items. These bamboo varieties, Giang and Nua, are sourced from natural forests in Tuyen Quang, Phu Tho, Hoa Binh, and Thanh Hoa provinces by local harvesters. Subsequently, local collectors aggregate the harvested Nua and Giang bamboo and supply them to traders operating within the Chuong My district.



**Figure 3.** A. *Giang* bamboo at the wholesale market, Chuong My district B. Raw material processing at a handicraft household, Chuong My district

It's important to note that Transactions between households and bamboo traders are not formalized through written contracts. Instead, households personally select suitable bamboo at the bamboo wholesale market and engage in direct negotiations with the traders regarding pricing. Typically, households transport the bamboo culms using their own means of conveyance, such as bicycles or motorbikes, as the average distance from the wholesale market to their residences is less than three kilometers. The prices of *Giang* and *Nua* bamboo materials depend significantly on the quality of the bamboo. For *Giang* bamboo culms with a diameter of 4 centimeters and a length of 50 centimeters, the cost is \$ 0.19 per culm, while *Nua* bamboo culms with a diameter of 3 centimeters and a length of 60 centimeters is priced at \$ 0.14 per piece. Bamboo material faces a shortage during the rainy season, leading to a 15% price increase compared to other seasons. This inflation is due to the challenges associated with harvesting and transporting *Giang* and *Nua* bamboo from natural forests during the rainy season, which includes sloping hills and the distance from residential areas. Households in the handicraft village classify the quality of *Giang* and *Nua* bamboo based on several criteria. The bamboo must be fresh, have a diameter greater than four centimeters, a pole section length of at least 0.5 meters, and it must have been grown for a minimum of one year. When all these criteria are met, *Giang* and *Nua* bamboo become soft enough for easy splitting and offer a high utilization rate. The processing of Bamboo *Giang* and *Nua* by handicraft households involves several steps. The bamboo is carefully split into thin and straight sticks using knives, with the size of the sticks tailored to each type of product. Subsequently, the sticks are dried either under the sun or with the use of coal dryers during the rainy season to maintain the material's humidity level below 17%. Moreover, due to the traditional practice of using knives for processing raw materials and limited financial resources, most households are reluctant to invest in machinery to improve their production processes. This presents a significant barrier to enhancing their productivity.

**Table 1. Costs and profit margin at handicraft households**

No	Cost items, income	\$/year
1	Semi-finished bamboo products revenue	2,880
2	<b>Material cost (raw bamboo and accessories)</b>	942
3	Payments to suppliers (water, electric, internet)	14
4	Interest	0
5	Transportation cost (fuel)	7
6	Labor cost	864
7	Depreciation	9
8	Taxes and local duties	0
9	Total cost (2+3+4+5+6+7+8)	1,836
<b>10</b>	<b>Net profit (1-9)</b>	<b>1,044</b>
11	Profit margin % (10/1)	36

Households not only enter into subcontracting agreements with one enterprise but simultaneously engage with multiple enterprises for diversified product production. This approach is taken to ensure that their production activities are not solely dependent on a single enterprise. Consequently, in this study, the calculation of households' costs and revenues is based on the average cost and revenue of the bamboo products they produce. Table 1 illustrates that the largest expense is the purchase of bamboo raw materials, amounting to \$942 per year out of the total costs. Households do not incur labor costs as they rely on family labor. Therefore, the research estimates the labor cost per unit in line with the opportunity cost of daily labor in the region. Handcrafting bamboo products requires a significant amount of labor, resulting in labor costs of \$864 per year, ranking second in total costs after material costs. Since households have not invested in machinery, depreciation costs represent a very small proportion at \$9 per year. Interest expenses do not arise during production because households receive advance payments from enterprises. Moreover, households are exempt from taxes and fees. After deducting the total unit cost, the unit net profit amounts to \$1,044 per year, with a profit margin of 36% (Table 1).

#### **b. Performance of bamboo processing enterprises**

Enterprises often subcontract with a varying number of households, ranging from 50 to 300, in the handicraft villages of Chuong My, Hanoi. These households handle most of the production stages, while the enterprise is responsible for the final stages required to complete the products. These final stages include painting, drying, attaching labels, packaging, and product storage. Enterprises note that the drying of products is highly dependent on weather conditions, and during the rainy season, they encounter significant challenges in drying the products. To address this issue, some enterprises have invested in a coal drying system (Fig 4). However, this system



has presented certain drawbacks. Specifically, gas emissions from the system contribute to pollution, and the heat is released unevenly so that products get moldy easily. The companies are located within handicraft villages, so the majority of their employees are local residents. Furthermore, as it is a family-run business, all key positions, such as the director, deputy director, and manager, are held by family members or their relatives. For instance, the father serves as the director, his wife assumes the role of deputy director, and their daughter manages the finances. It's worth noting that most family members involved in these businesses have not received formal business training, which has led to various challenges in running and expanding the enterprises. Approximately 90% of the workforce in these bamboo handicraft enterprises are women, with an average monthly salary of \$180.



**Figure 4.** A. Coal-heating oven; B: Products dried in the sunshine

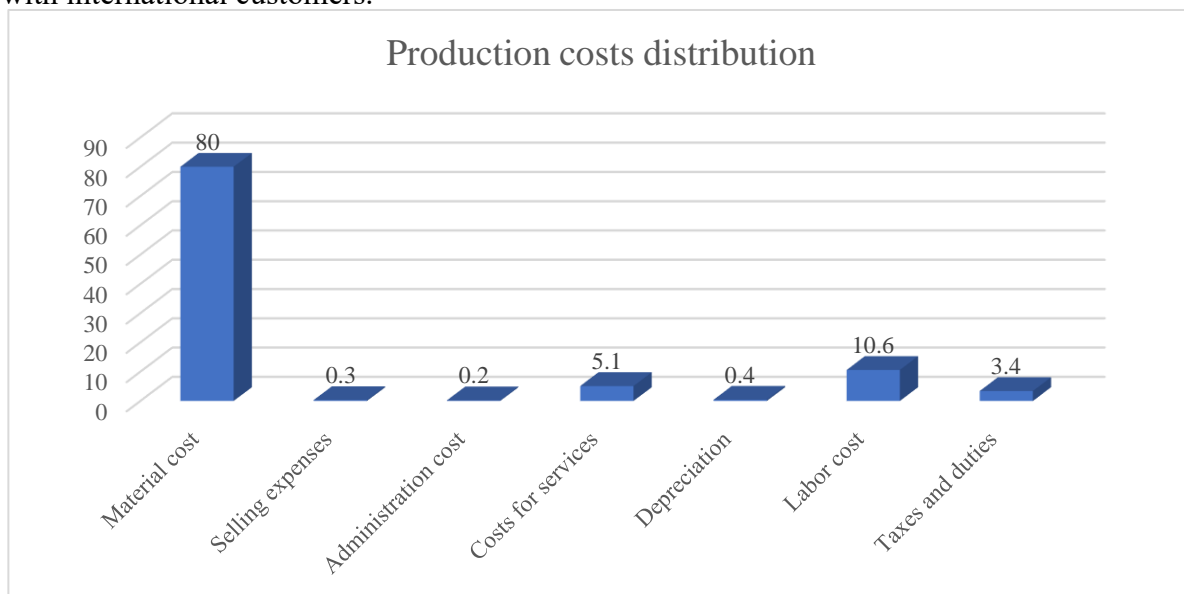
Although most of the handicraft products are exported to international markets such as the EU, USA, Japan, and China, the bamboo enterprises have not invested in marketing activities, such as participating in domestic and international handicraft fairs. One major reason for this is that enterprises lack the financial resources to engage in such events. As per the Hanoi Bamboo and Rattan Association, participating in a handicraft trade fair in Hanoi, Vietnam, for four days requires a minimum payment of \$ 3,296.

**Table 2. Costs and profit margin at handicraft households**

No	Cost items, income	\$/year
<b>1</b>	<b>Total revenue</b>	<b>407,103</b>
<b>2</b>	<b>Material cost</b>	<b>293,994</b>
-	Semi-finished bamboo product	288,229
-	Accessories	5,765
3	Selling expenses (excluding labor cost)	1,098
4	Administration cost (excluding labor cost)	576
<b>5</b>	<b>Costs for services</b>	<b>18,837</b>
-	Service suppliers (electricity, water, internet)	8,935

- Interest	814
- Transportation from households to factory	1,018
- Transportation from factory to port	8,070
6 Depreciation	1,627
7 Labor cost	38,911
8 Taxes and duties	12,439
<b>9 Total cost (2+3+4+5+6+7+8)</b>	<b>367,483</b>
<b>10 Net profit (1-9)</b>	<b>39,621</b>
11 Profit margin % (10/1)	9.7
<b>12 Value added (7+8+10)</b>	<b>90,971</b>

Moreover, many enterprises do not have a website or utilize social networking platforms such as Facebook, LinkedIn, and Twitter to promote their products. Consequently, expanding into new markets proves to be challenging, and they heavily rely on export trading companies to connect with international customers.



**Figure 5.** Production costs distribution at bamboo handicraft processing enterprises

Bamboo enterprises often produce a variety of products. Therefore, in this study, production costs and income for the enterprise are calculated as an average for various products over a year. The cost of materials is the largest contributor to the total cost, amounting to \$293,994 per year, which corresponds to 80% of the total cost (Table 2; Fig 5.). Labor costs only account for 10.5% of the total cost, equivalent to \$38,911 per year, as most production stages are carried out by households. Next are service costs, including transportation, electricity, water, and interest expenses, totaling \$18,837 per year. Due to the presence of only a few small, low-value machines, machinery and equipment depreciation is minimal, at \$1,627 per year, or 0.4% of the total cost. After deducting these expenses, the net profit of the enterprise reaches \$36,921 per year, resulting in a profit margin of 9.7% annually.

#### **4. Discussion**

The significant role of vertical cooperation between businesses and suppliers in enterprise development has been corroborated in recent studies (Tambunan 2005; Zeng et al. 2010). Handicraft households serve as essential suppliers, providing semi-finished products to enterprises. The collaboration between households and enterprises is well-established over several years, constituting a mutually beneficial relationship. From the perspective of enterprises, they can leverage the expertise of skilled artisans in the handicraft villages to produce semi-finished products. This enables enterprises to minimize labor and administrative costs while maximizing their profit margins. The outsourcing of production to households is an optimal scenario, as companies engage households for specific orders. Households have the flexibility to manage their own schedules, allowing them to continue production while tending to household chores and agricultural activities. Importantly, households are not reliant on a single company; instead, they can work for multiple competitors at the same time. Furthermore, income from handicraft bamboo production plays a significant role in improving the livelihoods of households (Oxfam Hong Kong 2006; Tuong Trang and Eiligmann 2010), this research indicates that income generated from bamboo handicraft production contributes to over 30% of the household' total income. Inter-firm cooperation is vital for promoting firm development, encompassing aspects like market share expansion, financial support, reduction of transaction costs, technical assistance, and pooling resources for larger orders (Birru 2011; Lamprinopoulou and Tregear 2011; Zeng et al. 2010; To 2017). However, this research demonstrates that enterprises do not engage in extensive cooperation to bolster production capacity and competitiveness due to the competitive mindset of owners. This impedes the advancement of small bamboo enterprises. The rapid urbanization in Vietnam has posed a threat to the labor resources in handicraft villages. Many new industries are now offering better and more stable incomes, which has led to the migration of artisans from these traditional villages. As a result, the labor force in handicraft villages includes more senior citizens and even schoolchildren. This shift has created a shortage of skilled labor for bamboo enterprises, making it challenging to maintain the production of high-quality products. To address this issue and attract skilled labor back to the bamboo handicraft industry, joint efforts from all stakeholders are required. Enterprises should consider signing long-term contracts with artisans, improving working conditions, and contributing to their health insurance. If local authorities do not have policies in place for labor training in handicraft villages or fail to cooperate with enterprises to attract skilled labor, it can put enterprises at a disadvantage in meeting their production deadlines. Therefore, collaboration among all stakeholders is

essential to sustain the bamboo handicraft industry. Marketing activities are considered an important factor in increasing competitiveness, expanding markets, and increasing sales (Afriyie et al. 2018; Liu 2019). Most of the small-scale enterprises fail to implement marketing activities as well as research and develop new products. Therefore, it has experienced difficulties in expanding information on its products and services to customers, as well as in accessing the markets. These results are in line with the findings of other studies (Liu 2019; Maro'ah et al. 2018; O'Dwyer et al. 2009). As a result, it is of necessity for enterprises to cooperate in executing marketing activities. The government and associations should create favorable. Concerning entrepreneurial characteristics, it's evident that higher levels of education, proficiency in English, work experience, and an extensive personal network can significantly enhance an entrepreneur's capacity to address challenges and seize business opportunities (Pham and Matsunaga 2019; Reeg 2013; Andadari,2008; Muda and Rahman 2016). Nevertheless, it's worth noting that some bamboo entrepreneurs lack formal education in key areas such as marketing, business administration, and accounting, which can cause certain difficulties in doing business.

## **Conclusion**

This study highlights the significant role of handicraft households in producing semi-finished products for enterprises. However, the cooperation between enterprises and households in the craft villages is facing substantial challenges due to the rapid urbanization in Vietnam, which has led to the loss of handicraft villages land. Additionally, the emergence of various industries, namely textiles and footwear has attracted laborers from these craft villages with attractive salaries and stable job opportunities. In addition, the younger generation within these craft villages generally lacks interest in traditional bamboo craft apprenticeships. Consequently, traditional bamboo craft villages are at risk of decline in the near future. The income generated from the production of bamboo handicraft products by households remains low due to high labor costs and the limited application of machinery in various production stages. Productivity could be significantly enhanced through employing machines in key production stages such as cutting bamboo, splitting bamboo, and drying products. Enterprises encounter numerous challenges when attempting to expand their production scale and access international markets, primarily stemming from difficulties in securing financial support from banks. Therefore, traditional bamboo craft villages and bamboo processing enterprises require support from the government and international organizations in key areas. These areas include product marketing strategies for international markets, business skills training, and e-commerce training for enterprise leaders.

## Conflict of Interest

The authors declare there is no conflict of interest.

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## Appendix 8: Photos and video from field trip

1. **Link Video** with English subtitles made by the research team while exploring the bamboo and rattan villages in Chuong My district, Hanoi, Vietnam:

[https://youtu.be/Ocyq\\_3dIAQY](https://youtu.be/Ocyq_3dIAQY)

2. **Photos** from field trip



