

# **Key factors affecting small bamboo enterprises upgrading in North Vietnam: Case studies from Chuong My, Hanoi and Thanh Hoa province**

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## Declaration of Conformity

I hereby confirm that this copy conforms with the original dissertation on the topic:

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## ABSTRACT

The bamboo sector significantly contributes to environmental protection, employment opportunities, and poverty reduction in rural and mountainous areas. This assertion holds true for Vietnam. Bamboo processing enterprises play increasingly important roles in value chain upgrading, despite growing overexploitation and mismanagement. This significantly affects small bamboo enterprises (SBEs) upgrading. In effect, SBEs are constrained by several factors, including the application of outdated technology, the lack of product innovation, limited capital, unstable labour resources, and poor market access. In addition, these enterprises do not only face stiff competition from large scales enterprise, but they are also confronted with international competitors (e.g. bamboo and rattan manufacturers from China). As current policies are yet to address these issues, SBEs remain exposed to shocks that may cause them to disappear. The consequences may include rising unemployment and poverty levels within rural communities in Vietnam. In the face of multi-faceted structural deterrents to the survival of SBEs, a few SBEs in the study region have grown successfully, and have established themselves in international markets over the last years. The conditions under which such SBEs thrived remain relatively less understood. Furthermore, a comprehensive analysis of the key determining factors for the upgrading of SBEs is lacking. To address this gap, this thesis presents evidence of both successful and unsuccessful cases of SBEs upgrading in Vietnam.

A case study approach was employed to analyze the situation of selected SBEs, with a focus on their production activities, organization, managerial processes, business performance, and value-added among chain actors. Further evidence was derived through an analysis of the factors influencing enterprise development. SBEs and chain actors in Chuong My, Hanoi, and Thanh Hoa Province are selected as embedded cases to examine the factors affecting SBEs upgrading. The thesis employed key informant interviews, focus group discussion, and field observations to generate qualitative data. Data for the case studies was collected qualitatively, accompanied by a description of the enterprises' characteristics. Furthermore, the thesis explores the relationship among value chain upgrading factors and their impact on enterprise upgrading. Through a comparative analysis, the thesis examined the similarities and differences in the factors affecting the growth of SBEs. Furthermore, structural analysis and MicMac method were used to analyze the complexity of factors and facilitate the systematic analysis of current and future factors affecting SBEs upgrading.

The results indicate that both handicraft and semi-industrial enterprises consider credit access and entrepreneurs as the key factors affecting the upgrading of SBEs. Handicraft enterprises

highly depend on handicraft households to produce handicraft bamboo and rattan products, while participation at trade fairs plays an important role in facilitating market access. Innovation in product design and raw materials is viewed as an important factor that can provide a competitive advantage for handicraft enterprises. Meanwhile, technology and cutting-edge machinery are considered as very important factors that can introduce competitive advantage for small semi-industrial bamboo enterprises. Through the use of more advanced machines, the utilization rate of raw bamboo material increases from 17% to nearly 40%. The role of the government and other institutions equally shape SBEs upgrading.

Regarding the distribution of value-added among chain actors, the results indicate that value addition is dominant at the enterprise level compared to other actors. The only exception is the handicraft household in the bamboo lamp value chain who are the most important actors. Local value addition in bamboo value chains is very low, because farmers and traders do not invest in primary processing. The results indicate that chain actors do not cooperate to enhance production capacity and competitiveness, due to the barrier of owners' competitive view. This hinders the upgrading of small bamboo enterprises.

Based on the aforementioned results, and informed by further group discussions and expert consultations, three scenarios were conceptualized for SBEs: (1) Business As Usual, there will be no changes in the production capacity of enterprises in the future; (2) Upgrading traditional production, the enterprises continue to produce traditional bamboo products such as disposable chopsticks, votive paper, handicraft, and furniture, but their production capacity and competitiveness will improve; (3) the transformation from traditional production to industrial production, the enterprises will produce high-value industrial products, namely bamboo flooring, modern bamboo furniture, bamboo panels with advanced technology and machines. Under the current situation, the transformation from traditional production to industrial production is not feasible because of the numerous requirements (e.g. quality of bamboo resources, investment capital, technology of bamboo processing, and quality human resources). The thesis concludes that upgrading traditional production that is partly integrated with industrial production, is a suitable development pathway for the Vietnamese bamboo industry.

**Keywords:** Bamboo products, resources, value chain, value-added, business performance, handicraft households, and bamboo growers.

## KURZFASSUNG

Der Bambussektor trägt wesentlich zum Umweltschutz, zu Beschäftigungsmöglichkeiten und zur Armutsbekämpfung in ländlichen und bergigen Gebieten bei. Dies trifft auch auf Vietnam zu. Bambus verarbeitende Unternehmen spielen eine zunehmend wichtige Rolle in der Wertschöpfungskette, trotz des wachsenden Raubbaus und Missmanagements. Dies hat erhebliche Auswirkungen auf die Entwicklung kleiner Bambusbetriebe (small bamboo enterprises - SBEs). Tatsächlich werden SBEs durch mehrere Faktoren eingeschränkt, darunter die Anwendung veralteter Technologie, der Mangel an Produktinnovationen, begrenztes Kapital, instabile Arbeitsressourcen und schlechter Marktzugang. Darüber hinaus stehen diese Unternehmen nicht nur im harten Wettbewerb mit nationalen Unternehmen, sondern auch mit internationalen Marktteilnehmern (z.B. Bambus- und Rattanverarbeiter aus China). Da die derzeitige Politik sich diesen Problemen noch nicht gewidmet hat, sind die SBEs weiterhin Schocks ausgesetzt, die zu ihrem Verschwinden führen können. Die Folgen können steigende Arbeitslosigkeit und Armut in den ländlichen Gemeinden Vietnams sein. Trotz der vielschichtigen strukturellen Hindernisse für das Überleben von SBEs sind einige wenige von ihnen in der Studienregion erfolgreich gewachsen und haben sich in den letzten Jahren auf internationalen Märkten etabliert. Die Bedingungen, unter denen solche SBEs gedeihen sind, sind noch wenig bekannt. Zudem fehlt bislang eine umfassende Analyse der wichtigsten Einflussfaktoren für die Weiterentwicklung von SBEs. Um diese Wissenslücke zu schließen, werden in dieser Arbeit sowohl erfolgreiche als auch erfolglose Fälle von SBEs in Vietnam vorgestellt.

In einer Fallstudie wurde die Situation ausgewählter SBEs analysiert, wobei der Schwerpunkt auf den Produktionsaktivitäten, der Organisation, den Managementprozessen, der Unternehmensleistung und der Wertschöpfung unter den Akteuren der Kette lag. Weitere Erkenntnisse wurden durch eine Analyse der Einflussfaktoren auf die Unternehmensentwicklung gewonnen. Für die Studie wurden SBEs und weitere Akteure der Bambuswertschöpfungskette in den Provinzen Chuong My, Hanoi und Thanh Hoa ausgewählt. Zur Datenerhebung wurden Experteninterviews, Gruppendiskussionen und teilnehmende Beobachtungen eingesetzt. Die so gewonnenen, überwiegend qualitativen Daten wurden für die Beschreibung der einzelnen Unternehmen verwendet. Darüber hinaus untersucht die Arbeit die Beziehung zwischen den Faktoren für die Aufwertung der Wertschöpfungskette und ihre Auswirkungen auf die Aufwertung der Unternehmen. Durch eine vergleichende Analyse untersuchte die Arbeit die Gemeinsamkeiten und Unterschiede in den Faktoren, die das



Wachstum von SBEs beeinflussen. Mit einer Strukturanalyse und der MicMac-Methode wurden Komplexität und wachstumsrelevante externe Faktoren analysiert.

Die Ergebnisse zeigen, dass sowohl Handwerks- als auch kleinindustrielle Unternehmen den Zugang zu Krediten und unternehmerische Kompetenz als die Schlüsselfaktoren für den Aufstieg von SBEs betrachten. Handwerksbetriebe sind bei der Herstellung von handwerklichen Bambus- und Rattanprodukten stark von Heimarbeitern abhängig, während die Teilnahme an Messen einen wichtigen Faktor für den Marktzugang darstellt. Innovation im Produktdesign und Versorgung mit Rohstoffen werden als wichtige Faktoren für den Wettbewerbsvorteil der Handwerksbetriebe gesehen. Gleichzeitig werden Technologie und modernste Maschinen als sehr wichtige Faktoren angesehen, die einen Wettbewerbsvorteil für kleine halbindustrielle Bambusunternehmen bringen können. Durch den Einsatz von fortschrittlicheren Maschinen erhöht sich die Rate der Ausnutzung des Rohbambusmaterials von 17% auf fast 40%. Die Rolle der Regierung und anderer Institutionen prägt die Modernisierung der SBEs gleichermaßen.

Hinsichtlich der Verteilung der Wertschöpfung auf die Akteure der Kette zeigen die Ergebnisse, dass die Wertschöpfung auf Unternehmensebene im Vergleich zu anderen Akteuren dominiert. Die einzige Ausnahme stellen hier die Handwerkerhaushalte in der Bambuslampenschirm-Wertschöpfungskette dar. Die in den ländlichen Gebieten verbleibende Wertschöpfung der Bambus-Wertschöpfungsketten ist generell sehr gering, da Bauern und Händler unverarbeitetes Material verkaufen und nicht in eine Primärverarbeitung investieren. Weitere Ergebnisse deuten darauf hin, dass die Akteure der Kette nicht kooperieren, um so ihre Produktionskapazität und ihre Wettbewerbsfähigkeit zu erhöhen. Das Konkurrenzdenken der Unternehmer verhindert die Realisierung dieses Potenzials zur Verbesserung der Wettbewerbsfähigkeit und zum Aufstieg der kleinen SBEs.

Mit den oben genannten Ergebnissen, komplementiert durch weitere Gruppendiskussionen und Expertenkonsultationen, wurden drei Szenarien für SBEs konzipiert: (1) Business-as-usual: keine Veränderungen der Produktionskapazität der Unternehmen in der Zukunft; (2) Modernisierung der traditionellen Produktion: die Unternehmen produzieren weiterhin traditionelle Bambusprodukte wie Einweg-Esstäbchen, Papier für kulturelle Brandopfer, Kunsthandwerk oder Möbel, aber unter verbesserter Produktionskapazität und Wettbewerbsfähigkeit (3) Transformation der traditionellen Produktion zur technologieintensiven Produktion: die Unternehmen produzieren hochwertige Industrieprodukte wie Bambusparkett, moderne Bambusmöbel oder Bambusplatten mit moderner Technologie und Maschinen. In der gegenwärtigen Situation ist die Umstellung von traditioneller Produktion auf

industrielle Produktion aufgrund der zahlreichen Anforderungen (z.B. fehlende Verfügbarkeit von hochwertigem Bambus-Rohmaterial, Zugang zu Investitionskapital, Technologie der Bambusverarbeitung und qualifizierte Arbeitskräfte) nicht realistisch. Die Studie kommt zu dem Schluss, dass eine Weiterentwicklung der traditionellen Produktion mit teilweiser Integration in eine industrielle Produktion, eine geeignete Strategie für die nachhaltige Weiterentwicklung der vietnamesische Bambusindustrie wäre.

**Stichworte:** Bambusprodukte, Ressourcen, Wertschöpfungskette, Wertschöpfung, Unternehmenserfolg, Heimwerker, Bambusbauern.

<b>ACKNOWLEDGEMENTS</b> .....	i
<b>ABSTRACT</b> .....	ii
<b>CHAPTER 1</b> .....	1
<b>INTRODUCTION</b> .....	1
<b>1.1. Background</b> .....	1
<b>1.2. The concept of SMEs</b> .....	2
<b>1.3. Problem statement</b> .....	3
<b>1.4. Research objectives</b> .....	4
<b>1.5. Research questions</b> .....	4
<b>1.6. Scope of the research</b> .....	4
<b>1.7. Structure of the dissertation</b> .....	5
<b>CHAPTER 2</b> .....	6
<b>THEORETICAL BACKGROUND</b> .....	6
<b>2.1. Introduction</b> .....	6
<b>2.2. Determinants of SME upgrading</b> .....	8
2.2.1. External factors.....	8
2.2.2. Internal factors.....	10
<b>CHAPTER 3</b> .....	17
<b>RESEARCH METHODOLOGY</b> .....	17
<b>3.1. Conceptual framework</b> .....	17
<b>3.2. Data collection</b> .....	20
3.2.1. Case study design .....	20
3.2.2. Selection of case studies .....	21
3.2.3. Process of data collection.....	23
3.2.4. Methods of data collection .....	25
<b>3.3. Analytical approaches</b> .....	27
3.3.1. Prospective structural analysis and MicMac computer software .....	27
3.3.2. Scenario approach.....	33
<b>3.4. Data analysis</b> .....	34
3.4.1. Qualitative analysis.....	34
3.4.2. Financial analysis .....	35
<b>CHAPTER 4</b> .....	37
<b>THE BAMBOO SECTOR IN VIETNAM</b> .....	37
<b>4.1. Primary production of bamboo</b> .....	37
4.1.1. Bamboo resources.....	37
4.1.2. Bamboo harvesting .....	39

<b>4.2. The bamboo processing industry in Vietnam</b> .....	40
4.2.1. Handicraft processing .....	41
4.2.2. Bamboo semi-industrial processing.....	43
4.2.3. Contribution of bamboo production to the national economy and society and opportunities for the bamboo sector development in Vietnam.....	45
<b>CHAPTER 5</b> .....	48
<b>SMALL HANDICRAFT ENTERPRISES</b> .....	48
<b>5.1. Introduction</b> .....	48
<b>5.2. Case Study-I</b> .....	48
5.2.1. History of development.....	48
5.2.2. Raw material supply .....	49
5.2.3. Institutional conditions.....	51
5.2.4. Human resources .....	51
5.2.5. Production technology .....	53
5.2.6. Marketing activities .....	55
5.2.7. Innovation .....	57
5.2.8. Financial resources and business performances.....	57
5.2.9. Distribution of value-added along the bamboo bowl value chain.....	60
5.2.10. Value-added and appropriation .....	64
<b>5.3. Case Study-II</b> .....	66
5.3.1. History of development.....	66
5.3.2. Raw material supply .....	67
5.3.3 Institutional conditions.....	67
5.3.4. Human resources .....	68
5.3.5. Production technology .....	70
5.3.6. Marketing activities .....	71
5.3.7. Innovation .....	73
5.3.8. Financial resources and business performances.....	73
5.3.9. Distribution of value-added along the bamboo lamp value chain.....	76
5.3.10. Value-added and appropriation .....	78
<b>5.4. Comparative analysis of the two handicraft case studies</b> .....	80
5.4.1. Introduction .....	80
5.4.2. External factors.....	80
5.4.3. Internal factors.....	81
5.4.4. Business performances.....	84
5.4.5. Comparison of the value-added by actors of the value chains .....	86
5.4.6. Synthesis of handicraft case study results.....	88

<b>CHAPTER 6</b> .....	89
<b>SMALL SEMI-INDUSTRIAL ENTERPRISES</b> .....	89
<b>6.1. Introduction</b> .....	89
<b>6.2. Case Study-III</b> .....	89
6.2.1. History of development.....	89
6.2.2. Raw material supply .....	90
6.2.3. Institutional conditions.....	92
6.2.4. Human resources .....	93
6.2.5. Production technology .....	94
6.2.6. Market activities .....	96
6.2.7. Innovation .....	97
6.2.8. Financial resources and business performances.....	98
6.2.9. Distribution of value-added along the chopstick value chain .....	101
6.2.10. Value-added and appropriation .....	103
<b>6.3. Case Study-IV</b> .....	105
6.3.1. History of development.....	105
6.3.2. Raw material supply .....	106
6.3.3 Institutional conditions.....	107
6.3.4. Human resources .....	107
6.3.5. Production technology .....	109
6.3.6. Marketing activities .....	111
6.3.7. Innovation .....	112
6.3.8. Financial resources and business performances.....	113
6.3.9 Distribution of value-added along the bamboo votive paper value chain .....	116
6.3.10. Value-added and appropriation .....	117
<b>6.4. Comparative analysis of two semi-industrial case studies</b> .....	118
6.4.1. Introduction .....	118
6.4.2. External factors.....	118
6.4.3. Internal factors.....	119
6.4.4. Business performances.....	123
6.4.5. Comparison of value-added by actors of the two value chains.....	125
6.4.6. Synthesis of semi-industrial case study results .....	127
<b>CHAPTER 7</b> .....	128
<b>DETERMINANTS OF KEY FACTORS AFFECTING SMALL BAMBOO ENTERPRISES UPGRADING</b> .....	128
<b>7.1. Introduction</b> .....	128
<b>7.2. Key factors affecting small handicraft enterprise upgrading</b> .....	128

7.2.1. Total impact strength and the strongest direct impact between factors.....	128
7.2.3. Factor classification of the structural analysis based on the direct impact.....	131
<b>7.3. Key factors affecting small semi-industrial bamboo enterprise upgrading .....</b>	<b>135</b>
7.3.1. Total impact strength and the strongest direct impact between factors.....	135
7.3.2. Factor classification of the structural analysis based on direct impact.....	138
<b>7.4. Synthesis of key factors affecting four case studies.....</b>	<b>141</b>
<b>7.5. Future pathways: three scenarios for small bamboo enterprises in Vietnam.....</b>	<b>145</b>
7.5.1. Assessment of upgrading scenarios .....	145
7.5.2. Scenario I: Business-As-Usual.....	146
7.5.3. Scenario II: Upgrading traditional production .....	149
7.5.4. Scenario III: The transformation from traditional production to industrial production .....	153
7.5.5. Assessment of scenario feasibility.....	158
<b>CHAPTER 8 .....</b>	<b>162</b>
<b>FINAL REFLECTIONS AND RECOMMENDATIONS .....</b>	<b>162</b>
<b>8.1. Lessons learned and critical reflection from the case studies .....</b>	<b>162</b>
<b>8.2. Limitations of the research and suggestions for further research.....</b>	<b>165</b>
<b>References.....</b>	<b>167</b>
<b>APPENDICES .....</b>	<b>184</b>

## List of Figures

<b>Figure 3-1.</b>	The conceptual framework for determining the key factors affecting small bamboo enterprise upgrading in Vietnam, adopted and modified from a resource-based view and onion model	18
<b>Figure 3-2.</b>	Case study design with embedded units	20
<b>Figure 3-3.</b>	Location of the case studies	22
<b>Figure 3-4.</b>	Arrangement of factors having an impact on a given research area in influence-dependence plane	29
<b>Figure 3-5.</b>	Flow diagram of the structure analysis process	30
<b>Figure 4-1.</b>	Cumulative frequencies of criteria for high-quality raw material	38
<b>Figure 4-2.</b>	Handicraft bamboo value chain structure in Chuong My district, Hanoi	42
<b>Figure 4-3.</b>	Luồng bamboo value chain structure in Thanh Hoa province	44
<b>Figure 5-1.</b>	Total assets from 2012-2016	48
<b>Figure 5-2.</b>	1: Giang bamboo at the wholesale market, Chuong My district; 2: Raw material processing at a handicraft household, Chuong My district	50
<b>Figure 5-3.</b>	1: Workers of the finishing team; 2: Workers of the packaging team	52
<b>Figure 5-4.</b>	1: Products carried by trolleys and dried in the sunshine; 2: An electric drier	54
<b>Figure 5-5.</b>	1: Seagrass laundry baskets; 2: Bamboo fiber products	55
<b>Figure 5-6.</b>	Short-term, long-term, and total assets from 2012-2016	58
<b>Figure 5-7.</b>	Debt to equity ratio from 2012-2016	59
<b>Figure 5-8.</b>	Revenue and profit from 2012-2016	60
<b>Figure 5-9.</b>	Distribution of value-added across the bamboo bowl value chain	65
<b>Figure 5-10.</b>	Total assets from 2012-2016	66
<b>Figure 5-11.</b>	1: Rattan is split by artisans; 2: Rattan stored at village traders	67
<b>Figure 5-12.</b>	Number of employees from 2012-2016	68
<b>Figure 5-13.</b>	1: Quality control section; 2: Dipping glue section	69
<b>Figure 5-14.</b>	1: Coal-heating oven; 2: Products dried in the sunshine	71
<b>Figure 5-15.</b>	1: Semi-finished products stored in the workshop; 2: Final products at the workshop	72
<b>Figure 5-16.</b>	Short-term, long-term, and total assets from 2012-2016	74
<b>Figure 5-17.</b>	Debt to equity ratio from 2012 -2016	75
<b>Figure 5-18.</b>	Revenue and profit from 2012-2016	76
<b>Figure 5-19.</b>	Distribution of value-added across the bamboo lamp value chain	79
<b>Figure 5-20.</b>	Number of employees from 2012-2016	81

<b>Figure 5-21.</b>	Debt to equity ratio between Case I and II, from 2012-2016	84
<b>Figure 5-22.</b>	Total assets between Case I and II, from 2012-2016	84
<b>Figure 5-23.</b>	Revenue between two Case I and II from 2012-2016	85
<b>Figure 5-24.</b>	Net profit margin between Case I and II, from 2012-2016	85
<b>Figure 5-25.</b>	ROA between Case I and II, from 2012-2016	86
<b>Figure 6-1.</b>	Total assets from 2012-2016	89
<b>Figure 6-2.</b>	1: Fresh bamboo stored; 2: Fresh bamboo cut at the Xuan Duong Chopstick Company	90
<b>Figure 6-3.</b>	The average price of fresh bamboo per kilogram from 2012 to 2016	91
<b>Figure 6-4.</b>	The number of employees from 2012 to 2016	93
<b>Figure 6-5.</b>	1: Bamboo sticks smoothed by machine; 2: Chopsticks produced by a machine at the Xuan Duong Chopstick Company	95
<b>Figure 6-6.</b>	Bamboo chopstick processing at the Xuan Duong Chopstick Company	96
<b>Figure 6-7.</b>	1: Semi-disposable chopsticks; 2: Semi-disposable chopsticks packed at the Xuan Duong Chopstick Company	97
<b>Figure 6-8.</b>	Short-term, long-term, and total assets from 2012 -2016	98
<b>Figure 6-9.</b>	Debt-to-equity ratio from 2012 -2016	99
<b>Figure 6-10.</b>	Revenue and profit from 2012- 2016	100
<b>Figure 6-11.</b>	Distribution of value-added across the bamboo chopstick value chain	104
<b>Figure 6-12.</b>	Total assets from 2012-2016	105
<b>Figure 6-13.</b>	1: Fresh bamboo collection; 2: Bamboo waste collection at the Hop Phap Votive Paper Company	106
<b>Figure 6-14.</b>	The number of employees from 2012 to 2016	108
<b>Figure 6-15.</b>	1: Machines repaired by technical staff; 2: Female workers at the paper production line at the Hop Phap Votive Paper Company	108
<b>Figure 6-16.</b>	Votive paper processing at Case-IV	110
<b>Figure 6-17.</b>	1: Semi-finished bamboo panels; 2: Semi-finished votive paper	111
<b>Figure 6-18.</b>	Short-term, long-term, and total assets from 2012 -2016	114
<b>Figure 6-19.</b>	Debt-to-equity ratio from 2012 -2016	114
<b>Figure 6-20.</b>	Revenue and profit from 2012- 2016 of the Hop Phap Votive Paper Company	115
<b>Figure 6-21.</b>	Distribution of value-added across the votive paper value chain	117
<b>Figure 6-22.</b>	Number of employees at both companies from 2012 to 2016	120
<b>Figure 6-23.</b>	Total assets between the two Cases from 2012 -2016	123
<b>Figure 6-24.</b>	Revenue between two Cases from 2012 -2016	124
<b>Figure 6-25.</b>	Net profit margin between the two cases from 2012-2016	124



<b>Figure 6-26.</b>	ROA between the two cases from 2012-2016	125
<b>Figure 7-1.</b>	Direct influence graph, handicraft Case studies	130
<b>Figure 7-2.</b>	Direct influence x dependence map, handicraft Case studies	131
<b>Figure 7-3.</b>	Direct influence graph, semi-industrial Case studies	137
<b>Figure 7-4.</b>	Direct influence x dependence map, semi-industrial Case studies	138
<b>Figure 7-5.</b>	Growth scenarios for the world bamboo market	161

## List of Tables

<b>Table 1.1.</b>	Definitions of SME by Vietnam Enterprise Law	3
<b>Table 3.1.</b>	Summary of main variables and measurement indicators	24
<b>Table 3.2.</b>	Summary of key informant and semi-structured interview	25
<b>Table 3.3.</b>	List of key factors influencing bamboo enterprises upgrading	31
<b>Table 4.1.</b>	List of provinces that have major bamboo distribution	37
<b>Table 4.2.</b>	Means of transportation of harvested culms	39
<b>Table 5.1.</b>	Quality criteria for bamboo at Chuong My, Hanoi 2017	49
<b>Table 5.2.</b>	Cost structure of Case-I in 2016	59
<b>Table 5.3.</b>	Costs, profit margin and value-added at bamboo harvesters	61
<b>Table 5.4.</b>	Costs, profit margin and value-added at bamboo traders	62
<b>Table 5.5.</b>	Costs, profit margin and value-added at handicraft households	63
<b>Table 5.6.</b>	Costs, profit margin and value-added at Case-I	64
<b>Table 5.7.</b>	Value-added in the bamboo bowl value chain	65
<b>Table 5.8.</b>	Cost structure of Case II in 2016	75
<b>Table 5.9.</b>	Costs, profit margin and value-added at handicraft households	77
<b>Table 5.10.</b>	Costs, profit margin and value-added at Case Study II	78
<b>Table 5.11.</b>	Value-added in the bamboo lamp value chain	79
<b>Table 5.12.</b>	Distribution of the value-added by actors of value chains	87
<b>Table 6.1.</b>	Cost structure of Case III in 2016	100
<b>Table 6.2.</b>	Costs, profit margin, and value-added of bamboo farmers	101
<b>Table 6.3.</b>	Costs, profit margin, and value-added of bamboo traders	102
<b>Table 6.4.</b>	Costs, profit margin, and value-added at Case-III	103
<b>Table 6.5.</b>	Value-added in the bamboo chopstick value chain in Thanh Hoa Province	104
<b>Table 6.6.</b>	Cost structure of Case-IV in 2016	115
<b>Table 6.7.</b>	Costs, profit margin, and value-added at Case-IV	116
<b>Table 6.8.</b>	Value-added in the votive paper value chain in Thanh Hoa Province	117
<b>Table 6.9.</b>	Comparison of the machinery of the two companies	121
<b>Table 6.10.</b>	Distribution of value-added by actors of value chains	126
<b>Table 7.1.</b>	Characteristics of the direct impact matrix	129
<b>Table 7.2.</b>	Total strength of direct impact occurring between structural analysis factors	129
<b>Table 7.3.</b>	Characteristics of the direct impact matrix	136
<b>Table 7.4.</b>	Total strength of direct impact occurring between structural analysis factors	136

<b>Table 7.5.</b>	Conditions for upgrading enterprises	146
<b>Table 7.6.</b>	Comparison of constraints and advantages among scenarios	159

## List of Appendices

<b>Appendix 1.</b>	MixMac computer software	184
<b>Appendix 2.</b>	List of key informant interviews	186
<b>Appendix 3.</b>	List of focus group discussion	187
<b>Appendix 4.</b>	Semi-structured questionnaire for interviews with enterprises	188
<b>Appendix 5.</b>	Semi-structured questionnaire for interviews with bamboo traders	196
<b>Appendix 6.</b>	Semi-structured questionnaire for interviews with handicraft households	198
<b>Appendix 7.</b>	Semi-structured questionnaire for interviews with bamboo growers	201
<b>Appendix 8.</b>	Photos	204

## Acronyms

ASEAN	Association of Southeast Asia Nations
BSCI	Business Social Compliance Initiative
BIDV	Bank for Investment and Development of Vietnam
CBI	The Centre for the Promotion of Imports from Developing Countries, Netherlands
DOARD	Department of Agriculture and Rural Development
DOE	Department of Economic
DOFA	Department of Foreign Affairs
DONRE	Department of Natural Resources and Environment
DOSE	Department of Social Economic
EU	European Union
FAO	Food and Agriculture Organization
FSC	Forest Stewardship Council
FTA	The Foreign Trade Association
GDP	Gross Domestic Product
GIZ	German Corporation for International Cooperation GmbH
GRET	French non-governmental organization fighting poverty and inequalities in the field and in policy
IFC	International Finance Corporation
ILO	International Labor Organization
INBAR	The International Bamboo and Rattan Organisation
ISO	The International Organization for Standardization
LFBG	The German Lebensmittel- und Futtermittelgesetzbuch
MOARD	Ministry of Agriculture and Rural Development
MOIT	Ministry of Industry and Trade
NTFP	Non-Timber Forest Product
NGO	Non-Governmental Organization
NPK	Nitrogen, Phosphorus, and Potassium
OXFAM	Oxford Committee for Famine Relief
SME	Small Medium Enterprise
UNIDO	United Nations Industrial Development Organization
USAID	The United States Agency for International Development
USD	United States Dollar (in 2017, 1 USD = 22,700 VND) <sup>1</sup>
VCCI	Vietnam Chamber of Commerce and Industry
VND	Vietnamese Dong
WWF	The World Wide Fund for Nature
WB	World Bank

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<sup>1</sup> <https://www.focus-economics.com/country-indicator/vietnam/exchange-rate>

# CHAPTER 1

## INTRODUCTION

### 1.1. Background

Bamboo is recognized as the fastest growing land plant on earth, reaching a maximum height and diameter of 40 meters and 30 centimeters, respectively, in four months (Chaowana, 2013b; Lobovikov et al., 2007; Benton, 2015; Rao et al., 1998; Koren, 2010; Zhang et al., 2007). The total global bamboo area in 2010 was around 31.5 million hectares, accounting for almost 4% of the total area of the world's forests (Phimmachanh et al., 2015). Asia has around 65% of the total bamboo area in the world, 28% is in the Americas, and only 7% is in Africa (Lobovikov et al., 2007; Liese and Köhl, 2015). China is the country with the largest bamboo area, with nearly 7 million hectares. Vietnam ranks fourth, with around 1.5 million hectares, of which 71,000 hectares are covered with planted bamboo (WWF, 2015; Phimmachanh et al., 2015).

Current studies show that bamboo plays an important role in ecology and the environment, and is one of the most valued and important non-timber forest products (NTFPs) (Ben-Zhi et al., 2005; Bystriakova et al., 2003a; Embaye, 2004; Ram et al., 2010; Song et al., 2011; Tripathi and Khawlhring, 2010; Yiping et al., 2010; d'Oliveira et al., 2013; Foppes and Ketphanh, 1997). Throughout the world, 2.5 billion people rely on bamboo for their livelihood and survival (Lobovikov et al., 2007; Phimmachanh et al., 2015; Hogarth and Belcher, 2013; Lou et al., 2010; Singh, 2008). In particular, the bamboo handicraft industry provides nearly 120 million workdays per annum in India (Adkoli, 1995; Din, 2014). Similarly, the bamboo-rattan industry in Vietnam provides approximately 3.4 million jobs, with an export value in 2018 of \$348 million (MOIT, 2019; MOARD, 2019).

The global value of the bamboo industry production is approximately \$10 billion (Endalamaw, 2015; Borah et al., 2006). Bamboo handicraft products are the highest value products compared to other bamboo-made products, with a market value of roughly \$3 billion worldwide (Oxfam Hong Kong, 2006). These products are mainly exported to developed countries. Europe, America, and Japan are the three biggest bamboo product importers, accounting for 72% of the world's imported bamboo in 2012. China, Vietnam, the Philippines, Singapore, Thailand, Indonesia, Malaysia, and Myanmar are the biggest exporters (Lobovikov et al., 2007).

The bamboo industry in Vietnam is considered to have abundant development potential, with a possible production value of \$1 billion. Because Vietnam has rich resources of bamboo material, the economy is growing quickly, demand for bamboo products is increasing rapidly, and the bamboo industry is receiving much attention from local and central government and international organizations (Ly et al., 2012; Oxfam Hong Kong, 2006). However, 60% of bamboo in Vietnam is used for construction, has low value, and is unprocessed. Indeed, high-value products such as bamboo flooring, decking, and bamboo furniture, have not yet been developed in Vietnam (Marsh and Demestre, 2008a; Sass, 2018).

Bamboo processing enterprises play an important role in upgrading value chains. However, they face many development problems, such as small-scale production, outdated technology, lack of capital, weak innovation, low investment in production and marketing, and lack of practical supporting policies from the government (Fanchette and Nicholas, 2009; Tran, 2010). Therefore, analyzing the current state of bamboo enterprises, and identifying the main factors affecting the development of bamboo enterprises, are essential content to be explained in this study.

## **1.2. The concept of SMEs**

According to an international finance corporation (IFC, 2012), small and medium-sized enterprises (SMEs) are defined as registered businesses with a limited number of employees, total assets, and total annual sales. However, the definition of SME varies according to each country and industry. The United States, China, and Russia define SMEs as enterprises with fewer than 500 employees (Nguyen, 2019; Lucky and Olusegun, 2012), whereas the European Union (EU) defines SMEs as enterprises with fewer than 250 employees, a turnover of not more than €40 million, and total assets of less than €27 million (Allmén Sjöberg and Nordström, 2019; Eikebrokk and Olsen, 2007).

Vietnam's definition of SME has changed over time with advancing economic development. Vietnam Enterprise Law Decree No. 56/2009 and Decree No. 39/2018 illustrate the definition of SME based on indicators: number of employees, total capital, and annual revenue, as detailed in Table 1.1.

**Table 1.1. Definitions of SME by Vietnam Enterprise Law**

Areas	Criteria	SME types under Decree 39/2018			SME types under Decree 56/2009		
		<i>Micro</i>	<i>Small</i>	<i>Medium</i>	<i>Micro</i>	<i>Small</i>	<i>Medium</i>
		Agriculture, forestry, aquaculture, industry, and contraction	No. of employees	≤ 10	≤ 100	≤ 200	≤ 10
	Total capital *	≤ 3	≤ 20	≤ 100			≤ 100
	Annual revenue*	≤ 3	≤ 50	≤ 200			
Trading and services	No. of employees	≤ 10	≤ 50	≤ 100	≤ 10	≤ 50	≤ 100
	Total capital*	≤ 3	≤ 50	≤ 100		≤ 10	≤ 50
	Annual revenue*	≤ 10	≤ 100	≤ 300			

Note: \* Billion Vietnam Dong Source: (Nguyen, 2019)

### 1.3. Problem statement

SMEs account for over 90% of the total number of businesses in most economic sectors in the world, and the role of SMEs is crucial in job creation and economic development (Calza et al., 2019; Higgs and Hill, 2019; Savlovschi and Robu, 2011; Yoshino and Taghizadeh-Hesary, 2019). In South Africa, SMEs account for 91% of all businesses and contribute 57% of gross domestic product (GDP), providing over 60% of total employment in the market (Kongolo, 2010). In East Asia, SMEs account for over 90% of businesses, provide between 40% and 85% of entire employment, and contribute between 30% to 60% of GDP in individual regional economies (Harvie and Lee, 2002). However, only a few SMEs could manage to develop, expand their business scale, and access international markets successfully (Indarti and Langenberg, 2004; Rogerson, 2000). In the meantime, many SMEs have still failed to upgrade their business to the next level of productivity, innovation, number of qualified employees, assets, and business performance due to lack of capital and outdated technology (Cuong et al., 2007a; Islam et al., 2011; Reeg, 2013; Savlovschi and Robu, 2011).

In Vietnam, SMEs make up 97.4% of all businesses nationwide according to the employee criterion and contribute up to 40% of GDP (Tran and Nguyen, 2019; Pham and Matsunaga, 2019; Cuong et al., 2007; Le, 2010). In the bamboo sector, small enterprises play an important role in socio-economic development in rural areas, but their competitiveness is very low compared to firms from China and other countries (Fanchette, 2008; Marsh and Demestre,

2008). This situation puts small bamboo SMEs at high risk of disappearing from the market and may lead to unemployment and increasing poverty among households. On the other hand, a few bamboo SMEs have grown successfully and become well-established in international markets over the last few years. However, a comprehensive analysis of factors determining the upgrade of small bamboo enterprises has been lacking. For this reason, through a study undertaken to close this gap, this research establishes the main characteristics of bamboo SMEs and key factors affecting enterprises upgrading.

#### **1.4. Research objectives**

The overall objective of this research is to analyze small bamboo enterprises and the key determinants of their upgrading in North Vietnam.

To achieve the general objective, specific objectives will be addressed:

- (1) Investigate the current situation of the Vietnam bamboo sector
- (2) Analyze the characteristics of small bamboo enterprises and determine the value added among actors along value chains
- (3) Determine the key factors affecting small bamboo enterprise upgrading
- (4) Propose scenarios for upgrading small bamboo enterprises

#### **1.5. Research questions**

- (1) What is the current situation of the Vietnam bamboo sector?
- (2) What are the characteristics of small bamboo enterprises that affect bamboo enterprise upgrading? How is the value-added among actors along value chains distributed?
- (3) What are the key determinants of upgrading for bamboo enterprises?
- (4) Which scenarios are suitable for bamboo enterprise upgrading?

#### **1.6. Scope of the research**

This research has been conducted to understand the current situation of small bamboo enterprises in North Vietnam and the key determinants of their upgrading. Field data was collected for enterprise case studies in Chuong My district, Hanoi, and Thanh Hoa province. Data collection was conducted from August to October, 2015, and March 2017 to July 2017.



## 1.7. Structure of the dissertation

This dissertation is structured in eight chapters.

**Chapter 1** introduces the research background and states the problems, outlines the research objectives, formulates research questions, and determines the scope of the research.

**Chapter 2** presents the theoretical framework based on a resource-based view and the onion model, discussing the main resources affecting enterprise upgrading.

**Chapter 3** details the research setting and methodology, the selection of the case studies, and also provides detailed information on variables, measures of variables, data collection, and data analysis.

**Chapter 4** outlines the state of the bamboo sector in Vietnam. It reviews bamboo resources, bamboo plantations, and bamboo harvesting. This chapter presents the state of Vietnam's bamboo handicraft production and bamboo semi-industrial production.

**Chapter 5** describes details and compares handicraft bamboo upgrader and non-upgrader based on material supply, institutional conditions, human resources, manufacturing processes, marketing activities, innovation, credit access, and financial statement. Value added among actors along value chains is calculated.

**Chapter 6** describes details and compares semi-industrial bamboo upgrader and non-upgrader based on material supply, institutional conditions, human resources, manufacturing processes, marketing activities, innovation, credit access, and financial statement. Value added among actors along value chains is calculated.

**Chapter 7** determines the key factors affecting bamboo enterprise upgrading and proposes scenarios for small bamboo enterprises.

**Chapter 8** summarizes the lessons learned from the two case studies. Final critical reflections on bamboo enterprise upgrading are highlighted. Limitations of the research, and further recommendations for bamboo enterprise and local governments, are presented.

## CHAPTER 2

### THEORETICAL BACKGROUND

#### 2.1. Introduction

Characteristics of SMEs growth have been analyzed in many empirical studies, which have proved that the growth of SMEs depends on various factors according to the changes in each industry, the conditions, and the business environment of each country (Bouazza et al., 2015; Demirgüç-Kunt et al., 2003; Mbugua et al., 2013). The more SMEs invest in export activities, the better proved to be the enterprises' performance (Phan et al., 2015). Enterprises grow faster than other enterprises if they invest in market research and new product development (Smallbone et al., 1995). Financial resources and capital access are considered as key factors affecting business results and business development in Central Asia and Europe (Allmén Sjöberg and Nordström, 2019; Beck et al., 2007; Chundakkadan and Sasidharan, 2019; Indarti and Langenberg, 2004; Nguyen et al., 2019; Tran and Nguyen, 2019; Ullah, 2019). Innovation is evaluated as one of the crucial factors creating a competitive advantage for enterprises and greatly influencing the upgrading of SMEs in Finland and Spain (Heimonen, 2013; Madrid-Guijarro et al., 2009; Van Auken et al., 2008). The important role of the entrepreneur in upgrading SMEs has been found in recent studies in Thailand and Indonesia such as entrepreneurs have led enterprises through hardships and inspired employees, and thanks to the entrepreneur network, it is easier for enterprises to access capital and different markets (Chittithaworn et al., 2011; Islam et al., 2011; Indarti and Langenberg, 2004). Advanced machinery and technology play an essential role in increasing labor productivity and creating a competitive advantage for enterprises in Pakistan and Indonesia (Jasra et al., 2012; Indarti and Langenberg, 2004). The business environment and government policies greatly affect SMEs in accessing capital, tax policies, training support, and market access (Demirgüç-Kunt et al., 2003; Smallbone and Welter, 2001).

As mentioned above, the factors affecting the growth of SMEs are complex. Its determination and analysis are crucial to streamline operations, improve production, and business decisions. Recently, the resource-based view of the enterprise has been commonly used as a theoretical framework to determine the important resources of an enterprise that affect business development. Furthermore, the resource-based view is used to identify an enterprise's strengths and weaknesses and competitive advantage, and to build a suitable business strategy for the

enterprise (Acedo et al., 2006; Barney, 1991; de Oliveira Wilk and Evaldo Fensterseifer, 2003; Barney and Arikan, 2001; Hadjimanolis, 2000; Helfat and Peteraf, 2003; Vickers, 2001). Based on the resource-based view approach, the internal resources affecting the development of an enterprise are divided into the following six main components (Madhani, 2010; Armstrong and Shimizu, 2007):

- Human resources (entrepreneur and employee characteristics)
- Physical resources (machines, location, and facilities)
- Products and marketing (product quality, marketing activities)
- Innovation (new markets, new designs, innovation capacities)
- Financial resources (cash accounts, capacity to raise equity)
- Business performance (revenue, profit, productivity)

Not only internal factors affect enterprise upgrading; external factors also significantly impact the upgrading of SMEs (Reeg, 2013). Various types of organizations (government, university and R&D institute, agency, financial institution) and environmental factors (legal, and institutional environment, culture, and geographic location) greatly affect Chinese enterprises' growth (Zhang and Si, 2008). Lekhanya and Mason, (2014) demonstrated that business environmental, financial and infrastructural are main factors impacting on SMEs development in rural areas in South Africa. According to Reeg (2013), the external resources affecting enterprise upgrading are considered to be the business environment, social media, and business networks. The business environment includes macroeconomic stability, politics, level of competition, infrastructure, and state policies that have a high impact on enterprise upgrading in both positive and negative directions. Business networks are understood as horizontal and vertical linkages, such as cooperation between enterprises and suppliers, or collaboration among enterprises. Linkages are found to affect enterprise upgrading. A combination of internal and external factors plays an important role in explaining enterprise upgrading (Chau and Turner, 2002; Reeg, 2013; Seetharaman et al., 2016).

In Vietnam, some studies have indicated that the development of SMEs is highly dependent on the entrepreneur, employee quality, innovative products, age of the business, the business environment, and infrastructure (Phan et al., 2015; Tran and Nguyen, 2019; Trang, 2016; Tuan and Yoshi, 2009). However, a comprehensive analysis of the key factors determining the upgrading of small bamboo enterprises is, at present, lacking. This research determines the relevant factors affecting small bamboo enterprise upgrading to close this gap. Based on current

environmental business, state of the bamboo enterprises in Vietnam, and experts' consultations, the external resources determined are material supply and institutional conditions. The internal resources defined are human resources, technology, physical resources, marketing, innovation, and financial resources. These factors and their relevance are further presented in the following sections.

## **2.2. Determinants of SME upgrading**

### **2.2.1. External factors**

#### ***Raw material supply***

Bamboo materials are considered to have good strength, durability, and competitive price, as well as being environmentally friendly compared to other traditional materials. Bamboo is, therefore, attracting the attention of many industries (Xing et al., 2018). The total bamboo area worldwide covers almost 31.5 million hectares, with more than 1,200 species. The bamboo area accounts for approximately 4% of the world's total forest area (Phimmachanh et al., 2015).

Despite the enormous bamboo resources, there are many problems in the sustainable exploitation and management of bamboo resources. Unregulated exploitation is a primary reason for the degradation and unsustainable development of global bamboo resources (Kleinhenz and Midmore, 2001). With the rapid growth of the population and increasing demand for bamboo products, along with over-exploitation of bamboo resources and slow expansion of bamboo plantations, bamboo resources are likely to be in short supply in the future (Poschen et al., 2014; Kleinhenz and Midmore, 2001).

Vietnam has huge bamboo resources. However, they are being reduced and overexploited under the pressure of rapid population growth and high demand for bamboo (Oxfam Hong Kong, 2006). Climate change and lack of fertilizers have greatly affected the growth and quality of bamboo (Kleinhenz and Midmore, 2001). So far no international standards for bamboo materials have been published (Sass, 2018), which affects the development and usage of bamboo products (Xing et al., 2018). Similarly, Vietnam has no national standards for bamboo quality. Therefore, there is a lack of formal guidance on the plantation, exploitation, and sustainable development of bamboo areas in the localities. As a result, this may negatively impact the sustainable development of the bamboo sector and threaten the security of bamboo supply for businesses.

The cost of bamboo raw materials is considered to account for a large proportion of the total production cost; for example, the cost of bamboo scaffolding waste used in active carbon production accounts for 33% of the total production cost (Choy et al., 2005). The research also indicates that the cost of bamboo raw materials to produce bamboo products by small bamboo processors in Vietnam makes up about 60% of total production costs. The price of bamboo material has increased by around 20% compared to five years ago (Mohns et al., 2017), while the national inflation rate in the five years was only over 5%<sup>2</sup>. The increase in bamboo raw material price leads to higher production costs. Bamboo raw material is one of the most important cost components influencing the selling price.

As mentioned above, the supply of bamboo material greatly impacts the production strategy of bamboo enterprises. This study shows the current situation of bamboo resources, the quality of bamboo materials, bamboo pricing, competition in the purchase of bamboo materials, and their combined impact on bamboo enterprise upgrading.

### ***Institutional conditions***

Institutional conditions are categorized as business environment, government policies, and support from domestic and foreign organizations for the development of business enterprise. Many recent studies indicate that institutional conditions facilitate enterprise upgrading (Chundakkadan and Sasidharan, 2019; Park et al., 2019; Belke, 2013).

China has the most developed bamboo industry in the world, because the Chinese central government had implemented a national strategy to develop the bamboo industry (Endalamaw, 2015). Moreover, active cooperation between research institutes, universities, and bamboo enterprises has made a significant contribution to improving product quality, technology transfer, and product design innovation (Wang, 2006).

Taiwanese craft institutes have collaborated with artisans to create many new bamboo products that combine modern design and traditional culture (Wang and Yin, 2014). State institutions play a vital role in connecting bamboo SMEs in India and Ethiopia with international organizations such as German Corporation for International Cooperation GmbH (GIZ), United Nations Industrial Development Organization (UNIDO), World Bank (WB), and International Bamboo and Rattan Organization (INBAR), in training, financial support, market access and knowledge, and technology transfer (Endalamaw, 2015; Kindu, 2010; Ranjan, 2000). The role of government is essential in providing training services, loan policies, and linking bamboo

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<sup>2</sup> <https://cafef.vn/kinh-te-viet-nam-10-nam-thang-tram-2019010910072395.chn>

enterprises, which is well documented for markets in Nepal and Ghana (Appiah-Kubi et al., 2014; Karki and Karki, 1996).

In Vietnam, the central and provincial governments play a crucial role in developing the bamboo industry (Oxfam Hong Kong, 2006). The central authority has issued supportive policies to promote the bamboo sector, namely by developing a strategy for the bamboo material area, training human resources, and supporting enterprises in exporting bamboo products (WWF, 2015b). Also, the local authorities have supporting activities to encourage bamboo SMEs. For example, Thanh Hoa province has favorable policies for bamboo companies such as preferential interest rates and free lease land for the first 15 years, as well as subsidized fertilizers for bamboo farmers. In addition, the province has connected with international organizations, including the United States Agency for International Development (USAID), French Non-Governmental Organisation (GRET), and INBAR to support companies in technology transfer, human resource training, technical assistance for plantations, and exploitation (Nguyen and Martin, 2016; DOFA, 2015).

Some studies have shown that it is difficult for enterprises to access policies due to complicated procedures (Kyophilavong et al., 2007). Or, the policies fail to be implemented because of a big gap between the policies and actual implementation; for example, tax burden, unfair competition, inadequate financing, corruption, high inflation, unstable exchange, and weak land policies hinder the growth of small enterprises (Krasniqi, 2007; Nguyen and Wongsurawat, 2012). All hinder the growth of small enterprises (Kyophilavong et al., 2007; Okpara, 2011). This evidence collectively proves that institutional conditions are one of the most critical elements affecting enterprise upgrading. This study analyzes the state policies, business environment, and support from domestic and international organizations to the bamboo enterprises and their effect on enterprise upgrading.

### **2.2.2. Internal factors**

#### ***Human resource***

The characteristics of an entrepreneur and firm's employees are analyzed to show their influence on enterprise upgrading. Entrepreneur characteristics, namely formal education, international exposure, experience, motivation, risk-taking ability, work experience and training, have a great influence on enterprise development (Narkhede et al., 2014; Zahra and Covin, 1995; Naldi et al., 2007; Dyer, 2006; Stuart and Abetti, 1990). These entrepreneur characteristics are considered to increase the ability of an owner to solve business barriers and

capture the opportunities that are vital to creating SME innovation as well as to develop SMEs (Hampel-Milagrosa, 2014; ILO, 2011; Burki and Terrell, 1998). The (generally) higher education level of entrepreneurs is found to increase the ability of an entrepreneur to solve problems and capture opportunities, which contributes to enterprise development. This higher education and work experience of entrepreneurs also improves the innovation ability of enterprises (Pham and Matsunaga, 2019; Reeg, 2013a).

An entrepreneur's personal network can help an enterprise approach financial resources, business opportunities, and market information (Bratkovic et al., 2009; Narkhede et al., 2014). The entrepreneur's previous accumulated experience can provide them with the advantage of being able to develop relationships with suppliers, potential business partners, governments, and financial institutions (Muda and Rahman, 2016). The entrepreneur's knowledge and leadership style are crucial in improving the communication environment for employees, building a positive business culture that helps create a good working environment (Zalesna, 2012; Chen et al., 2012).

However, low quality of entrepreneurs in developing countries is also found, which negatively affects enterprise upgrading; for example, an entrepreneur of low education negatively affects labor management (Hampel-Milagrosa et al., 2015; De Mel et al., 2008).

Employees are said to be one of the most important production factors of the business, as employees are the drivers that increase productivity, create innovation and competitive advantage, and have the most significant impact on the business performance of SMEs compared to other sub-elements of intellectual capital (Muda and Rahman, 2016). Employees are considered to be a crucial factor positively impacting sales growth performance (Carlson et al., 2006). Innovation, improvement in labor productivity, business network, development of customer capital, and business performances of SMEs depend greatly on employee quality (Alipour, 2012; Kamaluddin and Abdul Rahman, 2009; Bontis et al., 2000; Daou et al., 2014; Abdullah and Sofian, 2012; Mention and Bontis, 2013; Wang and Chang, 2005). However, a low level of worker skills, along with outdated technology and limited marketing strategies, are the causes of failure of enterprises (Hampel-Milagrosa, 2014).

In the bamboo sector, several recent studies indicate a relationship between human resources and the development of bamboo enterprises. A lack of availability of trained labor is one of the major obstacles to modernizing the bamboo industry in India (Baksy, 2013a). Education and skills of the employees are the most important factors influencing the growth of bamboo processors in Ethiopia, and training employees was found to be a key factor affecting the ability of the bamboo enterprises to innovate (Endalamaw, 2015). Due to the lack of trained labor,

bamboo enterprises in Vietnam face many difficulties in implementing business plans and expanding production (WWF, 2015b).

The evidence has also shown that human resources are an important factor affecting SME upgrading. Thus, this study analyzes characteristics of entrepreneurs, working conditions and working skills of workers of small bamboo enterprises and their effect on SME upgrading.

### ***Production technology***

Current studies indicate the correlation between technology and equipment and labor productivity, business performance, and growth of businesses. Enterprises that invest in modern machinery can generate higher labor productivity and improve business performance compared to companies with less-advanced technology (Le, 2010; Tambunan, 2007). New technology greatly influences an enterprise's production and marketing activities (Sandee, 1994). Technology support from institutions can help businesses improve production and innovation (Ivarsson and Alvstam, 2010). Enterprises employing the latest technology can create a competitive advantage and capture more customers than their competitors. Indeed, technology is considered the foundation to realize the success of enterprises (Jasra et al., 2012). In the case of China, being the leader in bamboo processing technology has led the country's bamboo industry to grow far from its regional peers (Wang, 2006).

However, it is difficult for SMEs in third world countries to install new technologies because of the high technology investment cost (Jasra et al., 2012). Older technology and equipment lessen productivity and increase the difficulties in accessing markets. Thus, a low level of technology is one of the barriers to upgrading SMEs. In fact, the lack of modern technology makes it impossible for SMEs to compete on price and mass production with rivals who have modern technology (Hampel-Milagrosa, 2014; Le, 2010).

In African countries, most of the bamboo material is not processed, and the bamboo industry has outdated manufacturing technology, so SMEs face considerable development challenges (Wang, 2006). Similarly, bamboo SMEs in Vietnam use outdated technology and machines; thus, they face many difficulties in development. For example, chopsticks businesses use outdated machines, so the utilization rate of the material is low at less than 20%, and most companies find it difficult to meet norms and safety standards from international markets, as well as large orders in a short period (Sass, 2018; DOFA, 2015; Tran, 2010; Fanchette and Nicholas, 2009).



Regarding the location of enterprises, this directly affects services access and the export capability of SMEs (Li et al., 2016; Buczkowska and de Lapparent, 2014; Arauzo-Carod, 2013; Freeman et al., 2012; Sridhar and Wan, 2010; Sridhar and Wan, 2010; Stearns et al., 1995). SMEs located in urban and commercial areas have a 25% higher chance of survival, and can expand their markets faster than their competitors in rural areas (Liedholm, 2002; Mead and Liedholm, 1998; Stearns et al., 1995).

This study analyzes technology, machines, and the location of small bamboo enterprises as factors that influences the upgrading of SMEs.

### ***Marketing***

Marketing is understood as a business function that offers a plan, price, promotion, and distribution of goods and services to existing and potential customers to satisfy their needs (Maro'ah et al., 2018; Kotler et al., 2015).

The relationship between marketing and business growth is given across different sectors. Marketing management makes a significant contribution to increasing market share and promoting the development of SMEs (Liu, 2019). Marketing capabilities are evaluated as an essential resource of the business which can have a positive relationship with business outcomes and play an important role in determining export performance and business direction (Liu et al., 2015; Nalcaci and Yagci, 2014; Khurshid et al., 2013; Nath et al., 2010; Weerawardena, 2003). Marketing resource and capabilities are main factors contributing to the competitive advantage of businesses in the global market (Afriyie et al., 2018; Kozlenkova et al., 2014; Moorman and Rust, 1999; Rust et al., 2004; Srivastava and Reibstein, 2005; Vorhies and Morgan, 2005).

Currently, many businesses use social media like Facebook, Twitter, Instagram, Google+, Pinterest, LinkedIn, and other social platforms. These are useful marketing tools to support enterprises in spreading information about products and services to customers, as well as receiving feedback from customers to make suitable adjustments to their respective business plans (Becić et al., 2018). However, in developing countries, SMEs are limited in experience, resources, and finance to invest in marketing activities. Some businesses do not even fully realize the importance of marketing in business development (Liu, 2019; Maro'ah et al., 2018; O'Dwyer et al., 2009).

Although several bamboo enterprises in Vietnam have successfully implemented marketing activities, many enterprises still experience difficulties in investing in marketing actions.

Indeed, some businesses do not carry out any marketing activities due to financial and resource limitations (DOFA, 2015a). Scholars have demonstrated that marketing plays an important role in the upgrading of enterprises. This study analyzes the marketing situation at small bamboo enterprises and illustrates the impact that marketing has on enterprise upgrading.

### ***Innovation***

Innovation can be interpreted as the introduction of new products, new technologies, new markets, new services, organizational innovation, and new combinations to meet customer demand (Ndesaulwa and Kikula, 2016; Martin and Namusonge, 2014; Diaconu, 2011; Baregheh et al., 2009). According to Plessis (2007, p. 21), innovation can be described as “the creation of new knowledge and ideas to facilitate new business outcomes, aimed at improving internal business processes and structures to create market driven products and services.”

The link between innovation and enterprise upgrading has been analyzed for different industries (Ndesaulwa and Kikula, 2016; Hajar, 2015; Martin and Namusonge, 2014; Weiss, 2011). Innovation is one of the key drivers that offers sustainable competitive advantage to SMEs in China (Xie et al., 2010). A statistically significant positive correlation between innovation sales and sales growth was shown in electronics and machinery SMEs in India (Subrahmanya et al., 2010). Innovation in products, processes, and organization improved labor productivity in SMEs in Vietnam (Pham and Matsunaga, 2019).

In recent years, thanks to the development of technology, many innovative bamboo products have been introduced to the market such as bamboo furniture, bamboo houses, bamboo computer keyboards, bamboo bikes, bamboo panels, and bamboo textiles (Huang and Wang, 2014; Sharma and van der Vegte, 2020; Wang and Chen, 2017). The success of China's bamboo industry over other countries is thanks to technological innovation, investment in new product research, and innovation in bamboo raw material processing. China established thousands of bamboo research centers at all stages of the bamboo production process and consumption system to upgrade the bamboo sector (Endalamaw, 2015). Bamboo businesses in Ethiopia show that innovation affects business performance and can help businesses to increase sales, have more competitive pricing, and attract customers (Endalamaw, 2015). Innovation in products and organizations plays an important role in developing the bamboo handicraft sector in Indonesia (Brata, 2009a).

However, innovation in small and medium enterprises in developing countries is weak for many reasons, such as a low level of economic development, which limits investment in innovative

capacities. Limited financial resources and capabilities of firms are also major barriers affecting enterprise innovation (Chundakkadan and Sasidharan, 2019); for example, bamboo handicraft enterprises in Indonesia have a poor innovation level that affects the improvement of their business performances (Brata, 2009a). Bamboo SMEs in Ethiopia are not aware that innovation is an integral part of their business strategy (Endalamaw, 2015). Proactive innovation in the bamboo handicraft sector in Ghana is described as rather poor. Bamboo producers rely mostly just on customer suggestions for designing new products (Tekpetey et al., 2015).

In recent years, the bamboo processing industry in Vietnam has begun to develop; however, 70% of the bamboo product is low-added value, namely bamboo culm for construction and paper factories (Nguyen and Martin, 2016). The utilization rate of raw materials in chopstick companies is low at less than 20% due to outdated machines (Renard and GRET, 2009). Harvesting, raw material process, and production stages of semi-products are mainly made manually (Tuong Trang and Eiligmann, 2010). As a result, this poor innovation hinders the upgrading of bamboo enterprises in Vietnam.

All the above arguments have shown the importance of innovation in upgrading bamboo enterprises. This research examines the level of innovation at bamboo enterprises, including innovation in technology and machinery, product and product design, marketing activities, production organization, and the effect of innovation on bamboo enterprise upgrading.

### ***Financial resources***

Financial resources include cash accounts, the capacity to raise equity, and the borrowing capacity of enterprises. The availability of financial means are considered as one of the most important resources affecting the success of small and medium enterprises (Jasra et al., 2012). Current studies point to the relationship between financial capital and enterprise upgrading. This directly affects the investment in production, marketing activities, and production expansion of SMEs in Vietnam (Cuong et al., 2007a). Adequate microfinance access is associated with increased sales and profits of SMEs in Tanzania (Makorere, 2014). An exemplary case study from Iraq demonstrates that financial resources are crucial to improve business results, and permit competitive advantage in SMEs (Harash et al., 2014).

However, SMEs in developing countries are facing a financing gap due to the difficulty of finance access. Although financial institutions are willing to provide funds for SMEs, they often cannot fulfil the loan requirements of financial institutions. For example, SMEs are not able to provide collateral, which is the biggest barrier to capital access (Nguyen et al., 2019; Yang et

al., 2019; Harash et al., 2014; Beck et al., 2007). Unfavorable access to capital, and lack of capital, makes it difficult for SMEs in developing countries to make long-term investments in production (Abor and Quartey, 2010; Parker et al., 1995; Shah, 2017; Pietrovito and Pozzolo, 2019; Ullah, 2019). The lack of capital to invest in production is also described as one of the most serious problems facing bamboo family enterprises in Nepal (Karki and Karki, 1996).

Mostly, bamboo enterprises in Vietnam are small scale, and lack capital to invest in modern machinery, marketing, and production expansion (Nguyen and Martin, 2016). The loan procedure is complex, and small bamboo enterprises are not able to meet requirements of banks (DOFA, 2015a). The literature has pointed out the direct connection between financial resource and enterprise upgrading. The present study investigates how enterprises deal with difficulties in capital access and how these difficulties affect their investment in production and business performance. The relevant factors that affect enterprise upgrading are further integrated in the conceptual framework in the chapter 3.

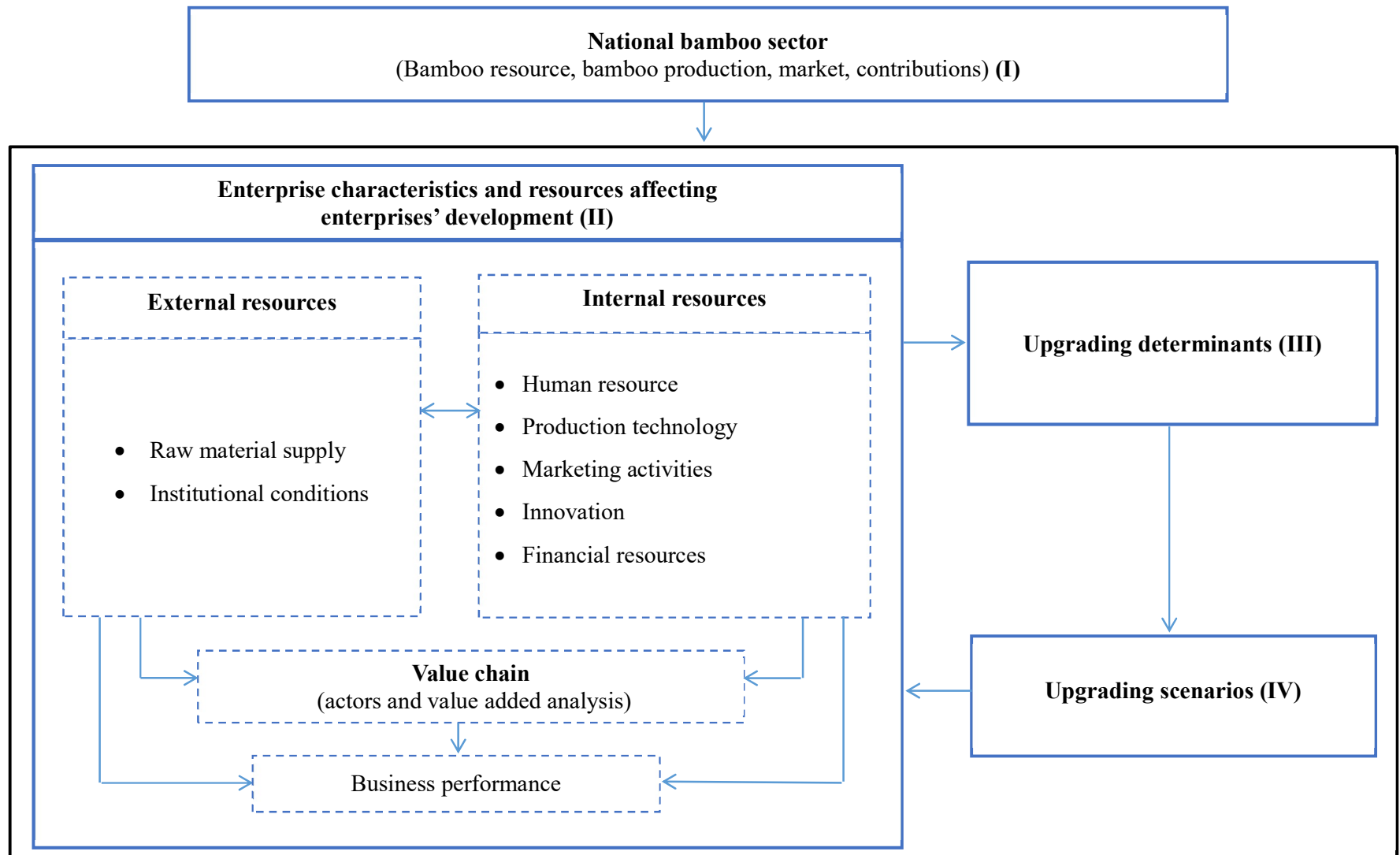
## CHAPTER 3

### RESEARCH METHODOLOGY

#### 3.1. Conceptual framework

As shown in the previous sections, enterprise upgrading requires a multidimensional concept that describes qualitative and quantitative improvements in the operation of an enterprise; covering technological, social, economic, environmental, and other aspects. According to Reeg, (2013), the quantitative concept of enterprise upgrading is understood as a transition from stagnant business production, reduced sales, descending labor productivity, and decreasing number of employees, to a new stage with a growth in revenue, profits, assets, and number of employees. On the other hand, the qualitative concept of enterprise upgrading is considered as the improvement of product quality, product innovation, machinery and technology upgrading, and management process innovation. Studies on competitiveness have introduced the concept of enterprise upgrading such as making better products, making them more efficiently, or moving into more skilled activities (Humphrey and Schmitz, 2002; Porter, 1990). According to Giuliani et al., (2005) and Humphrey and Schmitz, (2000), the concept of enterprise upgrading is referred to following four types: (1) processing upgrading: transforming input into outputs more efficiently by reorganizing the production system or introducing advanced technology, (2) product upgrading: moving into more sophisticated product lines, (3) functional upgrading: acquiring new functions in the chain, (4) intersectional upgrading: firms move into new productive sector. For the purposes of this study, enterprise understanding is understood as the growth of an enterprise for a period in terms of the growth of assets, the number of employees, revenue, profits, market expansion, and innovation.

To understand the business development process, the enterprise needs to identify factors affecting its development as well as select and arrange the factors to achieve business targets. Based on the concept of the resource-based view (Madhani, 2010), onion model (Reeg, 2013), expert opinions, and adapted for the realities of bamboo enterprises in Vietnam, a theoretical framework was developed to explain both internal and external factors affecting bamboo enterprise upgrading (Figure 3.1). With an enterprise case study approach, this study's conceptual framework is composed of four main thematic complexes, as follows.



**Figure 3-1. The conceptual framework for determining the key factors affecting small bamboo enterprise upgrading in Vietnam, adopted and modified from a resource-based view and onion model (Madhani, 2010; Reeg, 2013).**

**Complex I** refers to the main characteristics of the bamboo sector, namely bamboo resources, bamboo production, market, value chain, and contribution. In particular, how bamboo harvesting techniques and means of transport affect the quality of bamboo and harvesting costs. The aspects of bamboo resources like purchasing mechanism, quality, quantity, and price are discussed. In addition, handicraft and semi-industrial processing are analyzed to reveal their difficulties. The important role of the bamboo sector in contributing to socio-economic development and opportunities for developing high value-added products are investigated.

**Complex II** focuses on the analysis of resources affecting enterprise upgrading. Internal resources include human resources, manufacturing and equipment, products and marketing, innovation, financial resources, and business performance. In particular, we explore how the quality of employees and modernization of machinery affect the utilization rate of bamboo material and productivity. We also analyze how marketing activities, and innovation in design, impact access to the markets. In addition, this section examines why some enterprises succeed in gaining credit from banks, while others fail.

Separately, the external factors, namely material supply from bamboo farmers, traders, households, and institutional conditions, are examined. In particular, how the price and quality of bamboo relate to production costs. Competition in purchasing bamboo materials impact production from enterprises, and the way enterprises handle challenges in cooperating with households to produce semi-finished handicraft products are considered.

These factors are analyzed and compared among bamboo enterprise case studies to understand why enterprises achieve different business performance, and why some enterprises succeed in upgrading their business while others do not. Furthermore, although there are existing supportive policies from the state, enterprises still complain that state support is ambiguous. Business performance among enterprises is also measured, to evaluate business efficiency. Value-added along the value chain is evaluated to compare benefit sharing among chain actors.

**Complex III** refers to the determinant of key factors affecting enterprise upgrading through the application of structural analysis and MicMac methods. These methods allow identification of factor groups named key factors, aim factors, results factors, supplementary factors, determinant factors, and autonomous factors that influence enterprise upgrading. As a result, enterprises can clarify which major factors they have at their disposal and what they still need to acquire.

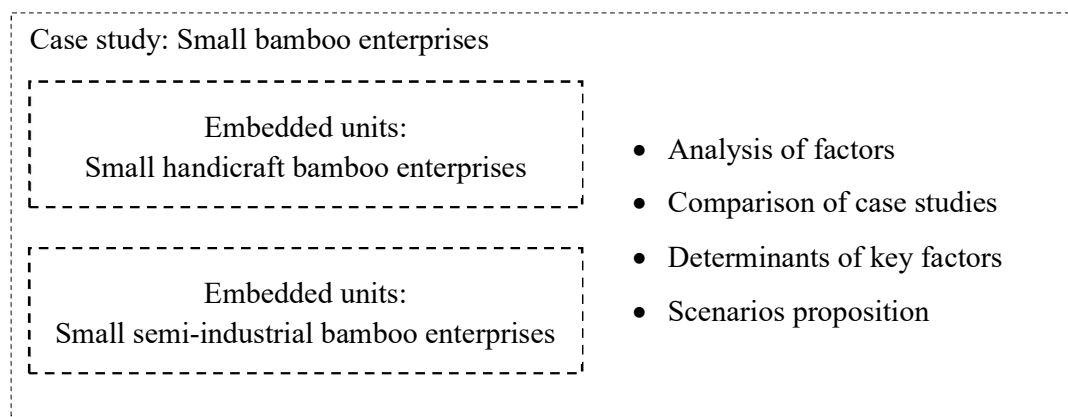
**Complex IV** refers to three upgrading scenarios of the small bamboo enterprise, which focuses on problems solving and creating strategies to archive future goals. Conditions for upgrading

enterprises are rooted in six key factors: (1) bamboo resources, (2) financial resources, (3) entrepreneur, (4) marketing, (5) innovation, (6) cooperation. In the first scenario, there will be no changes in the production capacity of enterprises in the future. In the second scenario, the enterprises continue to produce traditional bamboo products. Production capacity and competitiveness will improve. To achieve this scenario, the quality of bamboo resources will be improved by training the farmers on harvesting techniques and bamboo resource management. Enterprises will have favorable access to long-term loans from external finances to invest in new machines, innovation in product design, and marketing activities. In the third scenario, the enterprises will produce high-value industrial products with advanced technology and machines. To obtain this scenario, the bamboo plantation area needs to be expanded to accommodate the increasing industrial production. The enterprises invest in advanced machinery, the technology of bamboo processing, and new product development to improve production capacity. Actors along the value chain will cooperate to increase the utilization rate of raw material and facilitate the transformation from a traditional business model to an industrial one. Furthermore, the important role of government and organizations in technology transfer and trade promotion is addressed.

### 3.2. Data collection

#### 3.2.1. Case study design

There are various research methods, namely experiments, participant observation, documents, and case studies. Research methods selected highly depend on the research topics, research questions, and types of research data. Following an exploratory design, this research applies the case study approach to analyze a current situation related to production activities, organization, managerial processes, and business performance of small bamboo companies, as well as to understand more about the resources influencing enterprise development.



**Figure 3-2. Case study design with embedded units (adopted from Yin (2013))**



The reason to use the case study approach is that enterprises' production activities and the relationship between resources affecting enterprises upgrading are complex and context-specific so that it requires in-depth analysis rather than general assessment. According to Yin (2013), a case study allows a contemporary phenomenon to be investigated in-depth with comprehensive detail. Due to the significant number of companies and lack of time and sources, a case study was used as the model to be exemplary for other enterprises in the study areas.

In this research, the small bamboo enterprise was chosen as the primary case study with embedded small handicraft enterprises and semi-industrial enterprises (Figure 3-2). The reason for choosing small processors was because most bamboo processors have a small scale of production in Vietnam. In addition, bamboo harvested from the natural forest is primarily used for producing handicraft products by small handicraft enterprises, while cultivated bamboo is mainly employed to produce semi-industrial products by small semi-industrial enterprises. Hence, both handicraft and semi-industrial bamboo enterprises are chosen to understand bamboo processing in Vietnam fully

### **3.2.2. Selection of case studies**

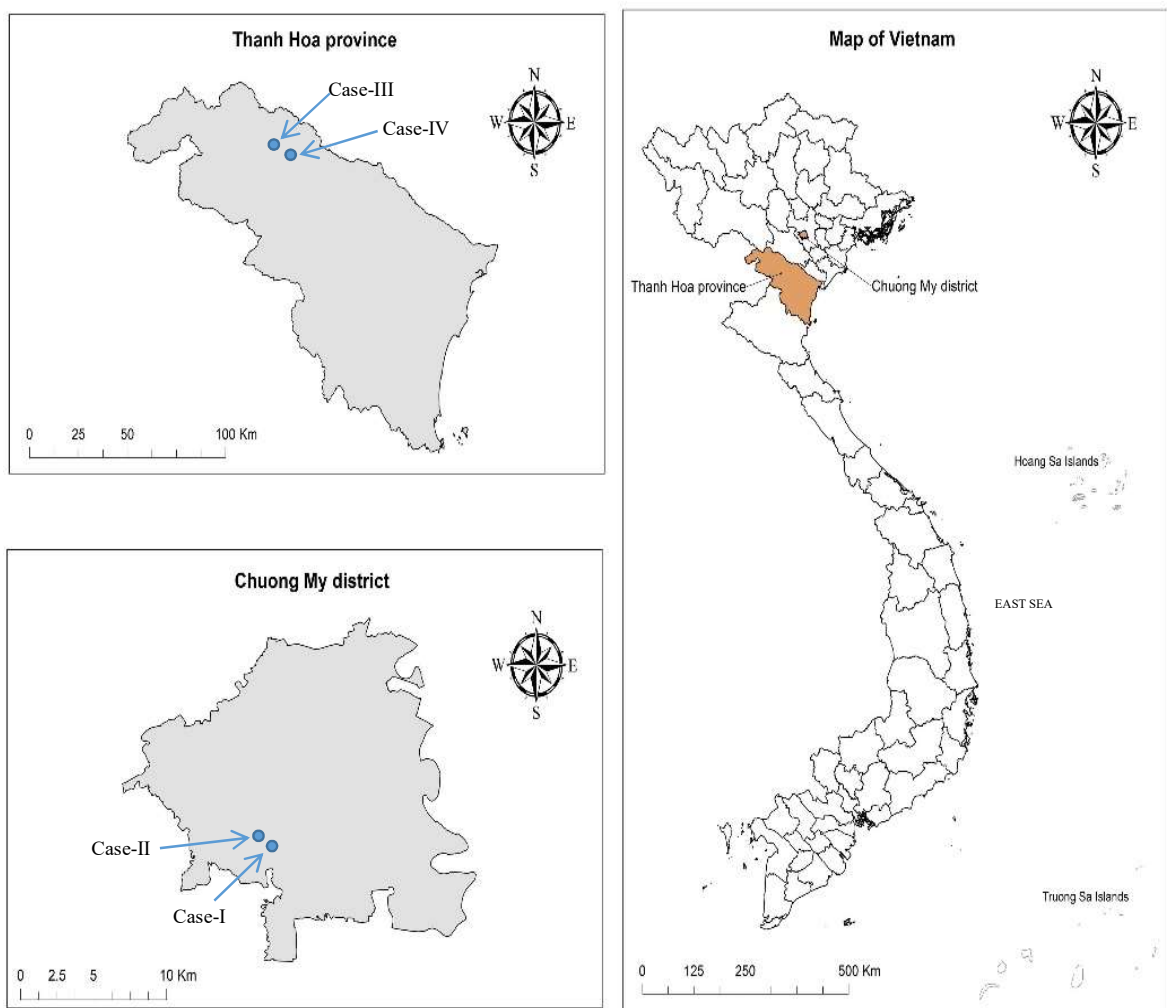
#### **Case studies: Small handicraft bamboo enterprises in Chuong My, Hanoi**

Chuong My is one of the most famous districts in Vietnam (Figure 3-3) for bamboo and rattan handicraft production (DONRE, 2017). It is recorded that there are 27 bamboo and rattan handicraft villages out of 35 handicraft villages in Chuong My district. Also, there are 36 bamboo and rattan enterprises, which are small-sized, with limited capital and outdated technology, and encountering significant barriers to international market access. However, some enterprises manage their business effectively and succeed in accessing credit, expanding production and the market, and innovating in marketing and production (DOARD, 2018a).

The small handicraft bamboo enterprises in Chuong My, Hanoi have subcontracts with handicraft households to manually produce semi-finished products in their homes. The enterprises only provide artisans with seasonal work. Artisans who are usually women must carry on housework and farming while also doing production, so it is difficult to separate the homes from the workshop (DOE, 2015; Fanchette and Nicholas, 2009). Enterprises collect semi-finished products from families to perform some final stages, such as gluing, painting, labeling, and packaging. Most of the handicraft products are exported to international markets such as the EU, USA, Japan, and China.

Case-I was selected as a case study representing a group of successful businesses, because its production scale, total assets, revenue, and profits have steadily increased in recent years. Moreover, this enterprise has been established for more than 20 years, providing innovative products to Asian, European, and US markets. This enterprise has also had access to favorable loans from banks and has invested professionally in marketing and innovation.

In contrast, Case-II was employed as a case study characterizing the difficulty of upgrading business to the next level of productivity, innovation, assets, and business performance. Although this enterprise has provided products to markets since 2008, it has experienced difficulties in expanding production. The enterprise has faced difficulties in accessing credit and distributing its products, and thus business revenue and profit are unsteady.



**Figure 3-3. Location of the case studies**

*Source: MOARD; produced by Vu Xuan Dinh*

### **Case studies: Small semi-industrial bamboo enterprises in Thanh Hoa province**

Thanh Hoa has the largest bamboo forest of 150,000 hectares (Figure 3-3), in which 71,000 hectares are cultivated Luồng bamboo. The province provides markets with around 550,000 tons of bamboo each year (USAID, 2014; DOARD, 2018b). With this large and abundant material area, many processors have established in this province. In 2015, there were 126 bamboo producers, mainly producing disposable chopsticks and votive paper. Almost all the bamboo enterprises have experienced difficulties in developing, such as outdated facilities, poor raw material utilization, and shortage of capital; however, some of the enterprises have successfully expanded their production and overcome the challenges. The bamboo processing enterprises produce semi-industrial finished products, which are then used as material inputs in the production of the final products (DOFA, 2015a).

Case-III was chosen as a case study representing a group of unsuccessful chopstick producers because it has operated since 2005, mainly providing disposable chopsticks to both domestic and international markets. However, its production scale has not been expanded. Moreover, the enterprise has witnessed many difficulties in obtaining credit from banks, investing in machinery, implementing marketing activities, and selling products. Therefore, its revenue and profit are unstable.

In contrast, Case-IV was selected as a case study representing a group of upgrading votive paper companies. Case-IV has produced votive paper since 2007 and has succeeded in expanding its production and distributing its products to both domestic and international markets. Also, this enterprise can afford to invest in production and innovative machinery, and its business performance is steady.

#### **3.2.3. Process of data collection**

Data collection was conducted in two phases. The first phase, preliminary exploration, was carried out from August to October, 2015. The primary purpose was to help the researcher gain a fundamental understanding of the Vietnam bamboo industry by focusing on the practical situation of bamboo enterprises. The second phase, empirical data collection, was conducted from March 2017 to July 2017. The purpose was to collect empirical data from small bamboo enterprises and chain actors in the two research areas.

Variables for this research are addressed from research objectives and questions, and the conceptual framework. Relevant indicators of each variable are drawn from the study problems and views of the literature. The list of variables, measurement indicators, and data collection techniques are presented in Table 3.1.

**Table 3.1. Summary of main variables and measurement indicators**

Block		Main variables	Measurement indicators	Data collection techniques
Internal factors	Enterprises	Human resource	Staff size, qualifications, working experience, income, working conditions	Review of secondary data Key informant interview In-deep interviews Group discussion Direct observation
		Production technology	Machines, equipment, factory area, values, depreciation, location distance	
		Marketing activities	Type of products, quality, volume, selling price, marketing budget, distribution.	
		Innovation	New design, new material, new machines, improved product	
		Financial resources	Cash accounts, debt, interest rate, capacity to raise equity, borrowing capacity, loan conditions, cost structure	
		Business performances	Financial reports, market expansion	
External factors	Bamboo farmers	Bamboo area	Hectare	Key informant interview Group discussion In-deep interviews Direct observation
		Harvesting	Tools, harvesting period, cost	
		Quality bamboo	Length, diameter, disease	
		Transportation	Means, cost	
		Production cost	\$/year; hectare; tons	
		Production	Tons/hectare	
		Income	\$/year; hectare	
	Bamboo traders	Bamboo collection	Suppliers, buyers, volume,	Key informant interview Group discussion in-deep interviews Direct observation
		Pricing	Price/kg and culm	
		Quality bamboo	Length, diameter, disease	
		Transportation	Means, cost	
		Cost production	\$/tons	
		Sales volume	Tons/month	
		Income	\$/month	
	Handicraft households	Family size	No.	Key informant interview Group discussion In-deep interviews Direct observation
		Cooperation with enterprise	Volume and values/month	
		Production cost	\$/units	
		Income	\$/units; hours or month	
	Institutional conditions	Business environment	State policies, provincial legalities, infrastructure	Review of secondary data Group discussion Key informant interview
		Support of NGOs	Type of support (finance, training, technology transfer)	

Source: Own elaboration

### 3.2.4. Methods of data collection

The qualitative method is rooted in various research approaches, including anthropology, sociology, philosophy, social psychology, and linguistics (Moriarty, 2011). This permits an increased degree of flexibility in the research design and provides a holistic view of the phenomena under investigation, as well as depth and detail on research findings (Griffin, 2004; Matveev, 2002). Therefore, data collection for the case studies was conducted by using a qualitative approach to describe enterprises' characteristics and explore the relationship among factors and their impact on enterprise upgrading. The qualitative methods employed in this research include key informant interviews, focus group discussion, and field observations. The data collection instruments used to collect qualitative and quantitative data are discussed below:

#### *Key informant interviews/ in-depth interview*

Key informant interviews aim to collect information based on determined topics; this is one of the most important methods to acquire data in case studies (Yin, 2013). Twenty-three key informants from different organization types and administration levels were interviewed during field data collection (Table 3.2; Appendix 2). These informants included village leaders, master artisans, association staff, and government staff. In-depth interviews aim to explore main characteristics of enterprises and chain actors for the details. A total of fifty in-depth interviews were carried out with actors along bamboo value chains (Table 3.2).

**Table 3.2. Summary of key informant and semi-structured interview**

Level	Data resources	Key informants	Gender	Year
Chuong My, Hanoi	Government	7	f: 1/ m: 6	2015, 2017
	Associations	2	f: 0/ m: 2	2017
	Enterprises	12	f: 3/ m: 9	2015, 2017
	Bamboo traders	5	f: 1/ m: 4	2015, 2017
	Bamboo artisans	8	f: 6/ m: 2	2015, 2017
	Master artisans	3	f: 0/ m: 3	2015, 2017
Thanh Hoa province	Government	9	f: 1/ m: 8	2015, 2017
	Associations	2	f: 0/ m: 2	2017
	Enterprises	12	f: 2/ m: 10	2015, 2017
	Bamboo traders	5	f: 2/ m: 3	2015, 2017
	Bamboo growers	8	f: 2/ m: 6	2015, 2017
<b>Sub-total</b>		<b>73</b>	<b>f: 18/ m: 55</b>	

*Source: Author's field research*

The respondents have a professional linkage to topics on innovation, credit access, market access, human resource, production technology, bamboo collection, bamboo plantation, bamboo harvesting, and cooperation among actors along value chains. They were purposively selected based on consultations with local governments and experts. Face-to-face open interviews were carried out with entrepreneurs, managers, and employees, traders, farmers, experts, and governmental staff members to discern problems of enterprise and chain actors as well as address those that enterprises encounter in the development process. Each interview took from thirty to ninety minutes.

### ***Focus group discussion (FGD)***

Twelve FGD were conducted not only with business owners but also with chain actors. Discussants selected are knowledgeable about enterprises' business activities, bamboo harvesting, bamboo plantation, and bamboo processing technologies. Four business owners, four bamboo traders, six bamboo farmers, six bamboo artisans, two governmental staff were selected in two research areas for the discussion. FGD examined the problems that companies had in the development process as well as how stakeholders directly or indirectly influenced business upgrading. To initiate a smooth discussion, the moderator introduced the topic and supported participants so that they naturally joined in. Also, the moderator was in charge of managing the topics so that the discussion stayed close to the research topic.

At the enterprise level, FGD were carried out among small enterprise owners and managers to discuss innovation, credit access, the technology of bamboo processing, market access. Moreover, the discussion between entrepreneurs played an important role in providing a deep understanding about issues facing enterprises, and about solutions to handle the problems in manufacturing and business such as enhancing competitiveness, accessing markets, bamboo collection, working conditions, ability to access capital, cost structure, business performance, and the role of technology and innovation in business upgrading. At value chain level, FGD were conducted among entrepreneurs, traders, farmers, and governmental staff to identify the role of chain actors in enterprise upgrading, benefit-sharing, the collaboration of actors in the bamboo value chain, and the role of authorities in personnel training, financial support, support to access markets, to provide information and solutions to mobilize capital for production.

The discussion encountered a small problem, in that companies were not willing to share their difficulties and finance-related issues with their competitors. However, the discussion took place effectively as the entrepreneurs put forward their viewpoints on problems in the production business, and solutions to improve business performance. Each FGD was conducted with four to eight participants depending on the topic of discussion and the value chain. It took

around 2.5 hours for the discussion, with the chosen protocol as a transcription procedure to further analysis.

### ***Direct observations***

Direct observations were implemented in both first and second fieldworks to monitor the current situation of companies and activities along bamboo value chains. Direct observation was applied to collect information that the methods above did not fully collect, or the interviewees did not give accurate information. In other words, this method fills the gap between what interviewees say they do and their actual behavior (Bryman, 2016). This method was also used to crosscheck data collected from interviews in order to increase data validity (Yin, 2013).

### ***Secondary data collection***

Secondary resources could be an important source of data that cannot achieve by interviewing, discussion, and observation. Key secondary resources used in this research include bamboo source, supporting policies of local government and international organization to enterprises, business environment, technology, innovation, and socio-economic contexts. Many sources (published and unpublished) were taken, such as reports from authorities and organizations, reports from enterprises, and international articles related to the bamboo sector and small bamboo enterprises.

The researcher also visited the Hanoi trade village association, Thanh Hoa Foreign Affairs department, and agriculture department of Lang Chanh District and Quan Hoa to collect materials involving the bamboo sector and bamboo enterprises.

## **3.3. Analytical approaches**

### **3.3.1. Prospective structural analysis and MicMac computer software**

There are various methods to determine the factors and their impact on the development of a firm. The chosen method depends on the study's objectives, the scope of the study, and the type of data. Econometric models are commonly used to determine and measure the impact of key factors on SMEs performance (Cicea et al., 2019; Krasniqi, 2007; Phan et al., 2015). Statistical models in SPSS or R are frequently used to test hypotheses about the relationship between main influence factors and SMEs development (Chittithaworn et al., 2011; Jasra et al., 2011; Philip, 2011). However, quantitative methods above require a large sample size, structured research instruments, and numerical outcome. In addition, an enterprise case study approach with a small

sample size in this research is required to analyze in-depth with comprehensive detail (Yin, 2013). The development of bamboo enterprises depends on many factors, and the relationship between the factors is complex; thus, clarification of the key factors and influencing relationships that affect bamboo enterprise upgrading is required. Therefore, prospective structural analysis and MicMac (Matrix Cross- Reference Multiplication Applied to a Classification) method are considered because they allow to analyze the complexity of elements and facilitate the systematic analysis of current and future factors affecting firms upgrading (Godet and Durance, 2011). According to Del Mar Delgado-Serrano et al., (2016), the structural analysis and MicMac method support enterprises in coping with uncertain conditions and evaluating alternative future options.

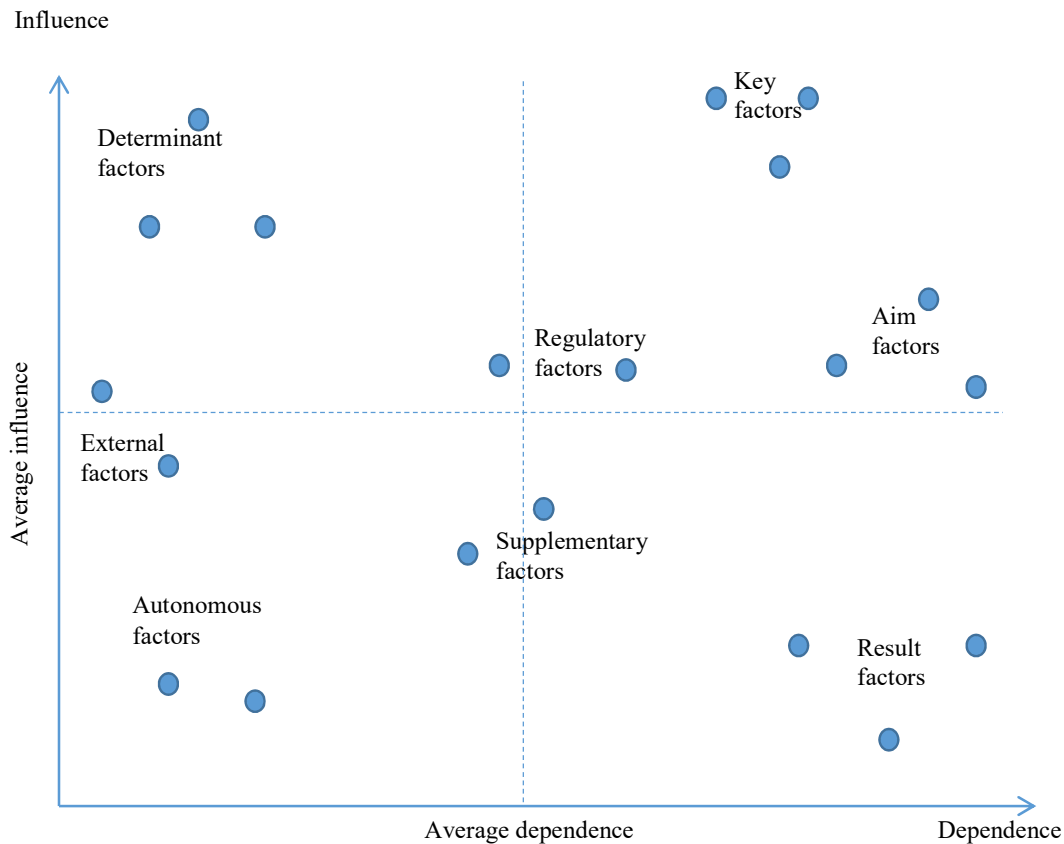
Michel Gode developed prospective structural analysis and the MicMac method in 1971 (Nader Zali et al., 2015). These methods are popularly used to determine the most important factors in a system from a matrix in which factors connect (Villacorta et al., 2012). Structural analysis is a tool that shows the mutual effects and links between drivers of study systems (instead of cause-effect relations) (Nazarko et al., 2017; Ambrosio-Albala et al., 2009). The prospective structural analysis employs a matrix and charts as tools of representation and visualization; the major advantage of this method is finding the web of interrelations between factors and eventually determining the key factors.

Prospective structural analysis and the MicMac method are widely applied in different fields, from business to society. Examples include determining key factors in future development in a city (Nader Zali et al., 2015), rural development strategies based on determining socio-economic factors (Ambrosio-Albala et al., 2009), analysis of success factors to implement sustainable supply chain management (Yang et al., 2017), the relationship between innovation and sustainable supply chains (Dubey et al., 2017), and determination of critical drivers for technology development (Nazarko et al., 2017).

Figure 3.4 demonstrates the result of structural analysis and the MicMac method by arranging factors affecting enterprise development. First, key factors have a strong influence and dependence on other factors. Because of instability, any action involving these factors will significantly influence the rest of the system. Second, aim factors are highly dependent on other factors but slightly influential on the other factors. Third, result factors are characterized by high dependency and low influence on other factors, so their change comes from the impact of other factors, particularly key and determinant factors. Fourth, determinant factors have a strong influence on the system and high independence from other factors. Fifth, external factors have a smaller influence on the system than determinant factors but a larger influence than autonomic



factors and strong independence from other factors. Sixth, regulatory and supplementary factors are those that are not sufficiently dependent and influential on the rest of the system; thus, it is difficult to consider these factors and their impact on the system. Seventh, autonomous factors have the least influence and dependence on the system (Ambrosio-Albala et al., 2009; Godet and Durance, 2011; Nazarko et al., 2017).



**Figure 3-4. Arrangement of factors having an impact on a given research area in influence-dependence plane**

*Source: (Ambrosio-Albala et al., 2009; Godet and Durance, 2011)*

The structural analysis and MicMac method consist of three primary stages (Figure 3-5.):

1. Stage 1: Collecting the list of factors
2. Stage 2: Specifying the relations between factors
3. Stage 3: Identifying key factors

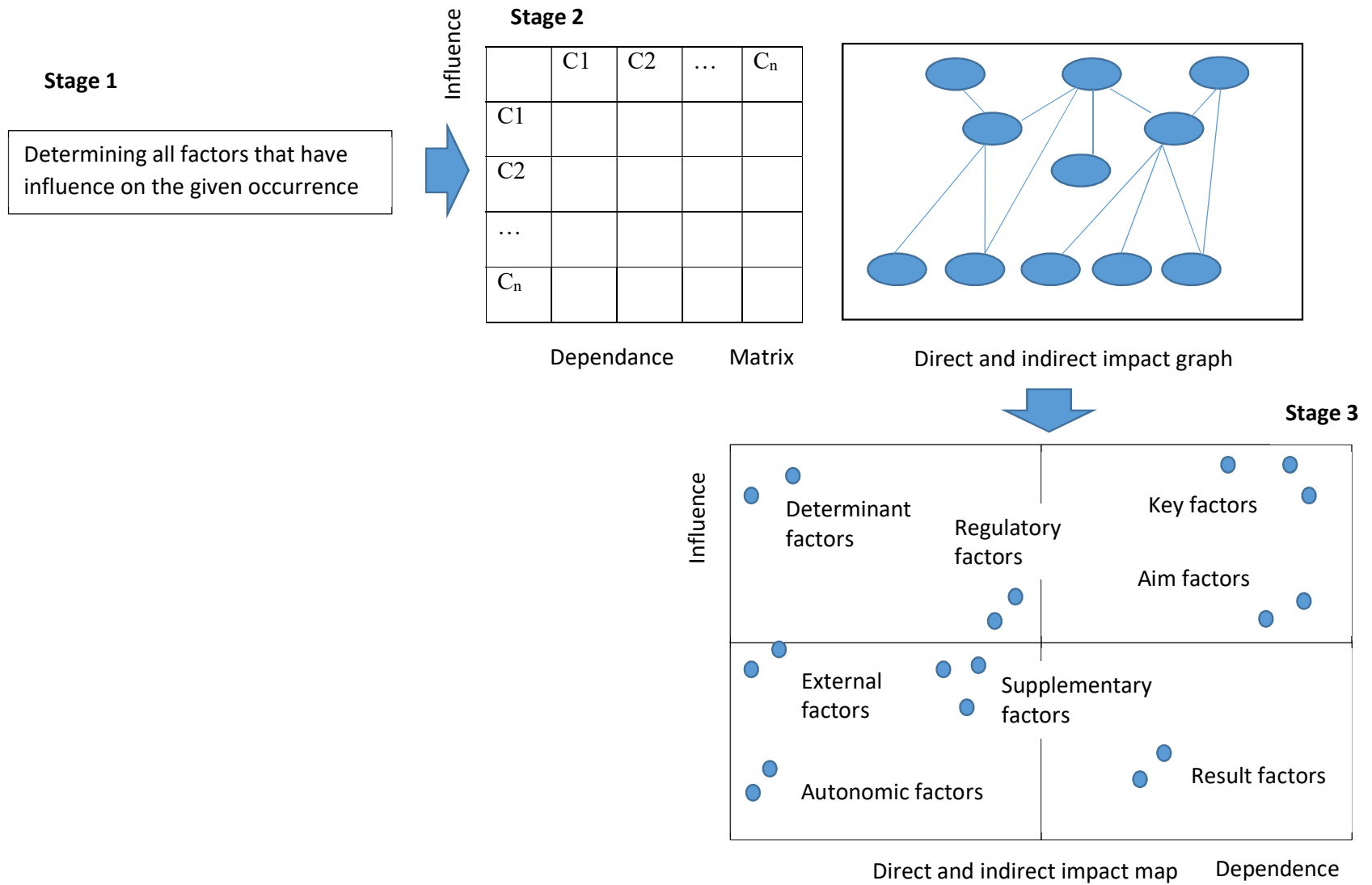


Figure 3-5. Flow diagram of the structure analysis process

Source: (Ejdys et al., 2016)

### Stage 1: Collecting the list of factors

Detecting the factors that influence bamboo enterprise upgrading relies on case studies analyzed in Chapters 5 and 6 and literature review. In addition, two focus group discussions were held in August 2019 as part of the handicraft and semi-industrial case studies to identify the list of variables and interactions between factors (cf. Appendix 3). Participants selected were knowledgeable about the bamboo business as well as having rich practical experience in the bamboo sector.

**Table 3.3. List of key factors influencing bamboo enterprises upgrading**

Factors	Variables	Short label	Description
<b>Internal factors</b>	Entrepreneur	EN	Education, work experience, personal network, motivation, decision-making, leadership skills
	Employee	EM	Education, working skills, working condition, gender, salary, turnover, labor market
	Technology and equipment	TE	Quality, number of machines, machine application, productivity, investment, depreciation, technology transfer
	Location	LO	Preferable accessing of material, cheap labor, transportation cost, market access, cooperation with households, infrastructure
	Product	PR	Design, quality, catalog, price, quality control, product warranty
	Marketing	MA	Trade fairs, certificate, social media, showroom, website development, sale activities, marketing expenses, customer relations, market access
	Innovation	IN	New designs, new material, new products, new market, organizational innovation, new machinery
	Capital	CA	Cash accounts, capacity to raise equity, borrowing capacity, loan conditions
	Business performance	BP	Revenue, net profit, ROA, debt, market expansion
<b>External factors</b>	Raw material supply	RM	Quality, price, supply, transportation cost, bamboo growers, competition, material processing
	Households	HH	Collaboration, cost structure, qualified labor, training, completed orders, income, technology, and machine application
	Institutional conditions	IC	Financial support, preferable policies, technology transfer, training services, barriers

*Source: Author's own elaboration*

As the first step in identifying the variables and their impact on the handicraft enterprises of Chuong My, Hanoi, enterprise owners and two production managers from Case-I and Case-II were selected. These individuals operate and manage their business directly, and they have a deep understanding of the current situation and the challenges enterprises face. Next, as the

development of the enterprises depends on bamboo suppliers and handicraft households, two bamboo traders and three households were also invited. Therefore, a group of nine participants took part to define the list of factors and their interactions. Similarly, to identify the variables affecting small semi-industrial bamboo enterprises in Thanh Hoa Province, enterprise owners and two production managers from Case-III and Case-IV, two local bamboo traders, and three bamboo growers were invited for the discussion.

For the discussion to work smoothly, the researcher played the role of moderator, to introduce a list of discussed topics and variables as well as help participants join in the discussion quite naturally. The discussion was well-managed and stayed closely on topic, and each discussion took nearly three hours. As a result, internal and external factors affecting enterprise upgrading are listed in Table 3.3.

### **Stage 2: Specifying the relations between factors**

To ensure the objectivity and accuracy of the evaluation, the moderator instructed discussants on the structure of the matrix, factors in the matrix, and ranking method on influence level between pairs of factors in the matrix. The total score in each row and column indicates the influence level of each factor in the whole system. The structural analysis puts the factors in rows and columns (called matrix of direct influence), and participants (business owners, managers, traders, households) in focus group discussions from each study area are required to fulfill the matrix based on the influence level for each pair of variables. To rank the influence level for each pair of variables, the participants answered and discussed the following questions from the moderator:

Is there a relationship of direct influence between variable  $i$  and variable  $j$ ?

If none, put zero and discuss why.

If yes, participants should discuss the influencing relationship among factors, and estimate the influence level on the scale, as follows:

- 0: factor  $i$  has no influence on factor  $j$
- 1: factor  $i$  has limited influence on factor  $j$
- 2: factor  $i$  has strong influence on factor  $j$
- 3: factor  $i$  has crucial influence on factor  $j$

The nine participants in each focus group discussion came from different stakeholder groups along value chains, with their own perceptions, and were careful to discuss the sensitive issues raised for discussion, such as financial indicators, selling price, and benefit-sharing among

stakeholders. The discussion was well-organized and achieved the objectives. The whole meeting took around three hours, with the chosen protocol of the transcription procedure.

### **Stage 3: Identifying key factors**

MICMAC software is employed with a view to structuring factors based on their paths number and intensity. According to Ambrosio-Albala et al., (2009), this software is designed to structure collective reflection and is a tool that allowed this study to distinguish the factors that influence enterprise upgrading. It is employed to measure the degree of influence and dependency among factors in a system from a matrix (Pablo J et al., 2014). The total score of each row of the matrix shows the importance of influence of a variable on the whole system while the total score in each column of the matrix indicates how dependent one variable is to the other. The advantage of this method is to identify the web of interrelations among factors and eventually surface the key factors through charts.

### **3.3.2. Scenario approach**

Many SMEs have grown successfully and well established themselves in international markets, and they have made important contributions to socio-economic development, the creation of employment opportunities and improved work conditions, increased product quality and customer satisfaction (Harvie and Lee, 2005; Ndubisi et al., 2020; Savlovschi and Robu, 2011). However, the fast and unstable change of business environment, namely politics, state policies, innovation speeds, customer behaviors, and technology development, leads to serious challenges and uncertain future. Enterprises need be able to adapt to these changes (Ghazinoory et al., 2018). To examine the future pathways of enterprises, the scenario method is considered a valuable tool that helps enterprises test development strategies and prepares for possible eventualities (Hiltunen, 2009). Scenarios are descriptions of a possible future situation and course of events that facilitate adaptation to environmental changes (Godet, 2000). The scenario method is applied to reduce uncertainty and evaluate the possible development of a firm in the future (Bielińska-Dusza, 2013). Scenarios are used to obtain different objectives, namely explorative, communicative function, decision-making, strategy formation function, business risk management (Kosow and Gaßner, 2008). Recent studies show that it should probably be more than two and less than ten, and the number of scenarios depends on the situation, clarity, possible time, and effort (Durance and Godet, 2010; Pillkahn, 2008).

Studies propose different techniques to develop scenarios based on different application contexts. Quantitative scenarios are commonly utilized in economic, natural, and technology

fields to determine plausible combinations of factors and understand the causal relationship by running mathematical models. But the development of the scenarios highly depends on the availability of historical data (Amer et al., 2013; Döll, 2004). On the other hand, qualitative scenarios have been applied in numerous applications in different domains such as environment, social, and politics. The qualitative scenario method is used to describe how the future may develop and play an important role in understanding the causal relationships in the quantitative scenarios (Rounsevell and Metzger, 2010). As mentioned above, the development of SMEs greatly depends on many factors that vary widely according to change in the global and local economies, politics, technologies, society. Therefore, the enterprises need to prepare a strategy to cope with this change (Pillkahn, 2008; Sohrabi et al., 2018). In this study, an enterprise case study approach and the qualitative method are applied, so the qualitative scenario method is employed to propose possible alternative futures for enterprises.

### **3.4. Data analysis**

This study focuses on explaining, arguing, proving, and comparing research problems at enterprises; therefore, both quantitative and qualitative methods are adopted for the research. Moreover, these two methods are applied to support one another to explain research problems. The qualitative method provides context to understand quantitative findings fully, or qualitative findings illustrate quantitative findings (Bryman, 2016).

Various data collected by the methods mentioned above were analyzed to answer the research questions. A qualitative method can be considered the main approach to explain research problems, as collected materials were mostly in text. Additionally, the financial reports of companies over a period of five years contained data in numbers; therefore, a quantitative method was applied to analyze financial data. Both methods are briefly described below.

#### **3.4.1. Qualitative analysis**

A qualitative method was used to describe, explain, compare, and analyze research questions related to enterprises. The qualitative methods used in this research are comparative analysis, narrative analysis, trend analysis, content analysis, and thematic analysis.

Comparative analysis was to compare upgraders and non-upgraders based on selected indicators. Thematic analysis was used with a comparative analysis to analyze main subjects between companies, such as entrepreneurs, market approach, bamboo collection, capital approach, cost structure, business performance, production technology, and innovation

(Bryman, 2016). These two methods helped the researcher define success factors and constraints affecting the development of upgraders and non-upgraders. Moreover, narrative analysis was practiced to present a chronological link between different development periods. Furthermore, the narrative analysis explains the stories of upgraders and non-upgraders (Djamba and Neuman, 2002).

Because financial data, human resources, and production costs were collected over five years, trend analysis was applied to observe the changing tendency of variables in a period. Moreover, based on the data of the past and present, this method can predict the effect of variables on the upgrading ability of companies, such as government policies, material price, labor cost, and change of business environment.

### **3.4.2. Financial analysis**

The data collected from financial reports, literature, interviews, and group discussions were transferred into sheets for calculating the economic and financial indicators, namely ROA, average annual growth of revenue, assets, debt ratios, net profit, cost structure analysis, and value -added. Financial indicators over five years are employed to compare efficiency in production and business between upgraders and non-upgraders. Distribution of value-added across the bamboo value chains is presented. However, all prices are given/calculated without considering the annual inflation rate.

- **Return on Assets (ROA)**

The ROA ratio indicates the net income created by total assets during a period. The ROA formula is estimated by dividing net income by average total assets. ROA over 2% is generally considered good (Ichsani and Suhardi, 2015; Khadafi et al., 2014).

$$\text{Return on Assets} = \frac{\text{Net profit}}{\text{Average total assets}} * 100\%$$

- **Net profit margin**

The net profit margin ratio is the percentage of revenue that is turned into profit. The net profit margin is calculated by dividing by the net profit by total revenue (Delen et al., 2013)

$$\text{Net profit margin} = \frac{\text{Net profit}}{\text{Total revenue}} * 100\%$$

- **Debt to equity ratio**

The debt to equity ratio presents the relative proportion of a company's equity and its debt. It shows the percentage of company financing that comes from bank loans and owner equity (Delen et al., 2013).

$$\text{Debt to equity ratio} = \frac{\text{Liabilities}}{\text{Total equity}} * 100\%$$

- **Determination of the value added**

Value chain analysis is becoming popular in recent decades and has been employed in various fields, and the concept of value chain analysis varies according to industry clusters as well as specific systems within firms (Zamora, 2016). The value chain analysis indicates vertical and horizontal integration among chain actors, mapping structure of value chains, and value distribution of each step in the production process (Nang'ole et al., 2011; Zamora, 2016).

Value added is understood as the increase in value at each stage of its production. The calculation of value added plays an important role in determining the financial and economic performance of the value chain. Furthermore, value added is used to measure the creation of wealth, and the contribution of each chain actors to economic development. According to Klemperer (1996), value added is defined as the difference between the total revenue from goods sold and all expenses used in the production. Alternatively, the value added is estimated by three components: net profit, labour costs, and taxes, as the following equation (Tallec and Bockel, 2005; Vedeld et al., 2004).

$$VA_i = \text{Net profit} + \text{Labour costs} + \text{Taxes}$$

Where  $VA_i$ : value added is created at  $i$  stage of its production. The value added of the chain is computed by summarizing the value added at each stage of its production. In this research, the value added is calculated in tons of final product to facilitate the comparison of the value added between different case studies.



## CHAPTER 4

### THE BAMBOO SECTOR IN VIETNAM

#### 4.1. Primary production of bamboo

##### 4.1.1. Bamboo resources

Vietnam has 1,489,000 hectares of bamboo forest, out of which 1,415,000 hectares are natural, and approximately 74,000 hectares cultivated bamboo (FSIV, 2009). The country ranks after China, India, and Myanmar. The total bamboo area accounts for around 15% of natural forest, with 216 bamboo species in 25 genera (Oxfam Hong Kong, 2006).

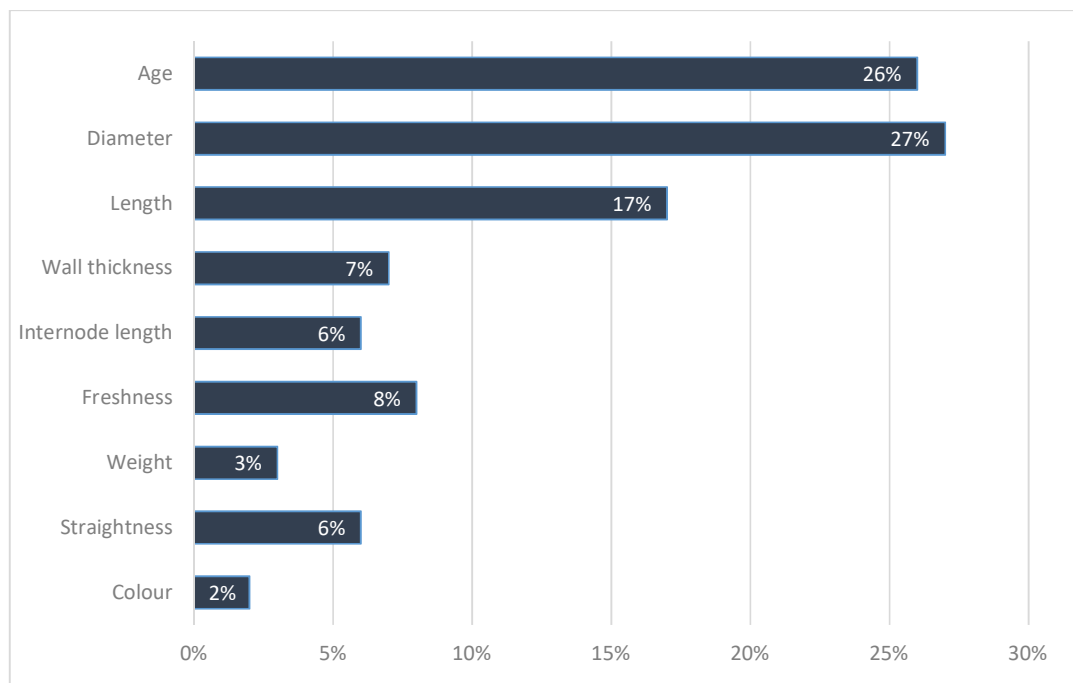
**Table 4.1. List of provinces that have major bamboo distribution**

No	Province	Natural bamboo forest areas (ha)	Mono bamboo forest (ha)	Mixed bamboo and timber forest (ha)	Bamboo plantation (ha)	Total area (ha)
1	Thanh Hoa	139,126.86	87,947.39	51,179.47	69,458.60	208,585.46
2	Lam Dong	201,750.41	58,332.03	143,418.38	0.00	201,750.41
3	Kon Tum	126,443.60	80,318.40	46,125.20	0.00	126,443.60
4	Nghe An	109,786.67	77,328.69	32,457.98	3,009.40	112,796.07
5	Tuyen Quang	110,952.00	24,782.70	86,169.30	1,533.80	112,485.80
6	Dak Nong	77,916.68	37,812.12	40,104.56	0.00	77,916.68
7	Binh Phuoc	58,324.27	26,159.23	32,165.04	0.00	58,324.27
8	Lai Chau	56,472.20	26,068.90	30,403.30	638.20	57,110.40
9	Son La	53,481.15	42,544.27	10,936.88	1,686.39	55,167.54
10	Yen Bai	46,137.82	14,549.28	31,588.54	7,131.85	53,269.67
11	Bac Kan	40,158.03	7,917.56	32,240.47	1,036.13	41,194.16
12	Binh Thuan	38,429.00	2,940.00	35,489.00	0.00	38,429.00
13	Dong Lai	30,679.80	7,681.40	22,998.40	31.30	30,711.10
14	Ha Giang	30,259.64	5,687.00	24,572.64	0.00	30,259.64
15	Lao Cai	27,735.37	19,134.82	8,600.55	0.00	27,735.37
16	Phu Tho	24,060.90	20,475.00	3,585.90	58.00	24,118.90
17	Dak Lak	20,146.10	18,134.60	2,011.50	716.40	20,862.50
18	Ninh Thuan	18,551.70	1,381.20	17,170.50	0.00	18,551.70
19	Đien Bien	18,351.20	9,133.10	9,218.10	148.70	18,499.90
20	Quang Ninh	16,612.59	7,923.93	8,688.66	4.60	16,617.19
21	Khanh Hoa	14,915.00	12,452.90	2,462.10	0.00	14,915.00
22	Hoa Binh	14,260.30	6,798.80	7,461.50	454.20	14,714.50
23	Lang Son	11,216.45	10,110.35	1,106.10	177.70	11,394.15

*Source: cited in WWF, 2015*

Thirty-seven provinces have bamboo areas, of which 23 have a large bamboo area of more than 10,000 hectares. These provinces are mostly in the north of Vietnam (Vu and Le, 2005, cited in Tran, 2010). Table 4.1 indicates that Thanh Hoa and Lam Dong provinces have a bamboo area of 208,585.46 hectares and 251,750.41 hectares, respectively; Kon Tum, Nghe An, and Tuyen Quang provinces have areas of more than 100,000 hectares.

Annually, Vietnam consumes approximately 400-500 million bamboo culms for different purposes, and Vietnam's harvesting quantity reaches 5.2 million tons of raw bamboo, of which 1.7 million tons is provided by northern provinces and 1.1 million tons by the central provinces of the North. The Central Highlands region provides 1 million tons, and the Western-Southern region provides around 1.4 million tons every year (WWF, 2015a).



**Figure 4-1. Cumulative frequencies of criteria for high-quality raw material**

*Source: (Sass, 2018)*

Bamboo resources are being overexploited and mismanaged due to the rapid increase in population and high demand of the market (Nguyen and Eiligmann, 2010; Tran, 2010). Awareness among local people about sustainable exploitation of bamboo is still limited, and the management of cultivation and harvest is weak. Bamboo is being harvested under one-year-old, and the quality has quickly declined (Oxfam Hong Kong, 2006). Even though bamboo has been collected for years, the soil is not fertilized by bamboo growers, leading to a decrease in soil quality and of bamboo shoot production, and shorter bamboo length and diameter (Sass, 2018; DOFA, 2015; Trieu, 2014). Bamboo growers, bamboo processors, and bamboo traders

access quality Luồng bamboo in Thanh Hoa province based on nine criteria, of which diameter, age, and length are more important than other criteria (Figure 4.1). Quality Luồng bamboo must be more than two years of age, more than 8 cm in diameter and 8 meters in length (Sass, 2018; Liese and Köhl, 2015).

#### 4.1.2. Bamboo harvesting

Harvesting and extraction of bamboo from dense clumps are done manually; the cost is high and productivity is low. According to a survey of the Department of Foreign Affairs of Thanh Hoa province (2015), in the five districts with the largest area of Luồng bamboo (Ba Thuoc, Lang Chanh, Ngoc Lac, Quan Hoa, and Quan Son), almost all bamboo growers use machetes to cut bamboo and hire local laborers at a high fixed price. Bamboo growers receive only 50% of the value of bamboo sales; the remainder goes to the people who are hired for the harvest.

Bamboo is mostly distributed in mountainous areas with under-developed infrastructure. Bamboo gardens are a long way from roadsides, so harvesting and transportation face great difficulties. Bamboo transportation is done manually, by carrying, using carts or floating the bamboo on rivers (Tuong Trang and Eiligmann, 2010). As shown in Table 4.2, after harvesting, most bamboo is transported to the market carried by people (87.2%) or by floating (8.46%).

**Table 4.2. Means of transportation of harvested culms**

Means of transport	Number of farmers	Percent
Carried on shoulders	143	87.2
Carry then float	14	8.46
Cart	5	3.05
Boat	1	0.61
Cart then float	1	0.61
Total	164	100

*Source: (Baulch et al., 2009)*

According to the agriculture department of Lang Chanh commune, in 2017, bamboo growers did not use machinery in their harvesting because of barriers in investment costs and mountainous terrain. In fact, the long distance from home to bamboo gardens and the hilly terrain make it harder to carry a chainsaw than to bring convenient manual equipment. However, Mohns et al., (2017) contended that there is potential to apply machinery in harvesting; for example, using tractors to extract bamboo from dense clumps, which would improve productivity by 8-10 times compared to manual operations, or using a chainsaw to cut bamboo down to improve productivity and reduce the cost of harvesting.

The price of bamboo depends on factors such as quality, season, and even the relationship between bamboo suppliers and growers, as well as enterprises. In the monsoon season or bamboo shoots season, the price can increase by 200 VND per kilogram because of the difficult transportation in the hilly terrain; in the bamboo shoots season, growers avoid harvesting bamboo to protect the bamboo shoots from rain and wind. According to a report by Baulch et al., (2009), the price of Luồng bamboo in 2008 was considered to have risen by at least 29% compared to the previous two years. This price increase did not take into account the annual inflation rate of nearly 13% in these years<sup>3</sup>, which means that Luồng bamboo price increased steadily during 2006-2008. Nevertheless, the agriculture department of Lang Chanh commune reported that the price of Luồng bamboo in 2017 increased by 40% compared to five years previously, while the national inflation rate in the five years was over 5%<sup>4</sup>. For instance, Case-III said they bought quality Luồng bamboo for 1,100 VND per kilogram in 2017, while in 2012, they could buy Luồng bamboo at 700 VND per kilogram.

In short, Vietnam's bamboo resource is rich and abundant. However, manual harvesting and over-exploitation of bamboo, together with weak management, have resulted in limited bamboo quality, low productivity, and high harvesting costs.

## 4.2. The bamboo processing industry in Vietnam

Bamboo can be used for diverse purposes, such as a simple construction material for housing or fencing, and also for agriculture purposes. In recent years, thanks to the development of technology and science, bamboo has been used in various industries of high value, such as bamboo-activated charcoal, furniture, flooring, panels, and handicraft. However, most of Vietnam's bamboo has not been intensively processed to create high value. In fact, 68% of the bamboo is used for low-value purposes such as construction, making disposable chopsticks, or making paper (Marsh and Demestre, 2008b).

*Dendrocalamus babatus*, known as Luồng bamboo in Vietnam, is popularly grown in northern provinces, including Thanh Hoa, Hoa Binh, and Nghe An, of which Thanh Hoa has about 71,000 hectares (Trieu, 2014). Luồng bamboo is commonly used to produce industrial products such as furniture, flooring, disposable chopsticks, and votive papers. Meanwhile, the craft industry mostly uses *Schizostachyum sp* and *Maclurochloa tonkinensis*, whose Vietnamese

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<sup>3</sup> <https://sungroupvn.com.vn/lam-phat-cua-viet-nam/>

<sup>4</sup> <https://cafef.vn/kinh-te-viet-nam-10-nam-thang-tram-2019010910072395.chn>

names are Nứa and Giang, respectively. These species are collected from a natural forest in the northern provinces, namely, Hoa Binh, Thanh Hoa, Son La, and Bac Can.

#### **4.2.1. Handicraft processing**

Bamboo and rattan handicraft is the largest handicraft industry in Vietnam with around 700 bamboo and rattan handicraft villages nationwide. With its longstanding history, Vietnam has a good reputation for numerous traditional bamboo and rattan handicraft products such as kitchen utensils, home décor objects, storage bins, trays, and baskets (Fanchette and Nicholas, 2009). These products are not only exchanged commercially but also represent Vietnamese cultural and historical values. The handicraft villages are mostly located in the region of the Red River Delta, accounting for 47% of the total number of handicraft villages nationwide. The North-Central region is in second place, with 17% of the handicraft villages; the North-East region is in third place with 11%. The number of handicraft villages in the Mekong Delta makes up only 10%, which is the lowest of all regions (Oxfam Hong Kong, 2006; Smith et al., 2006).

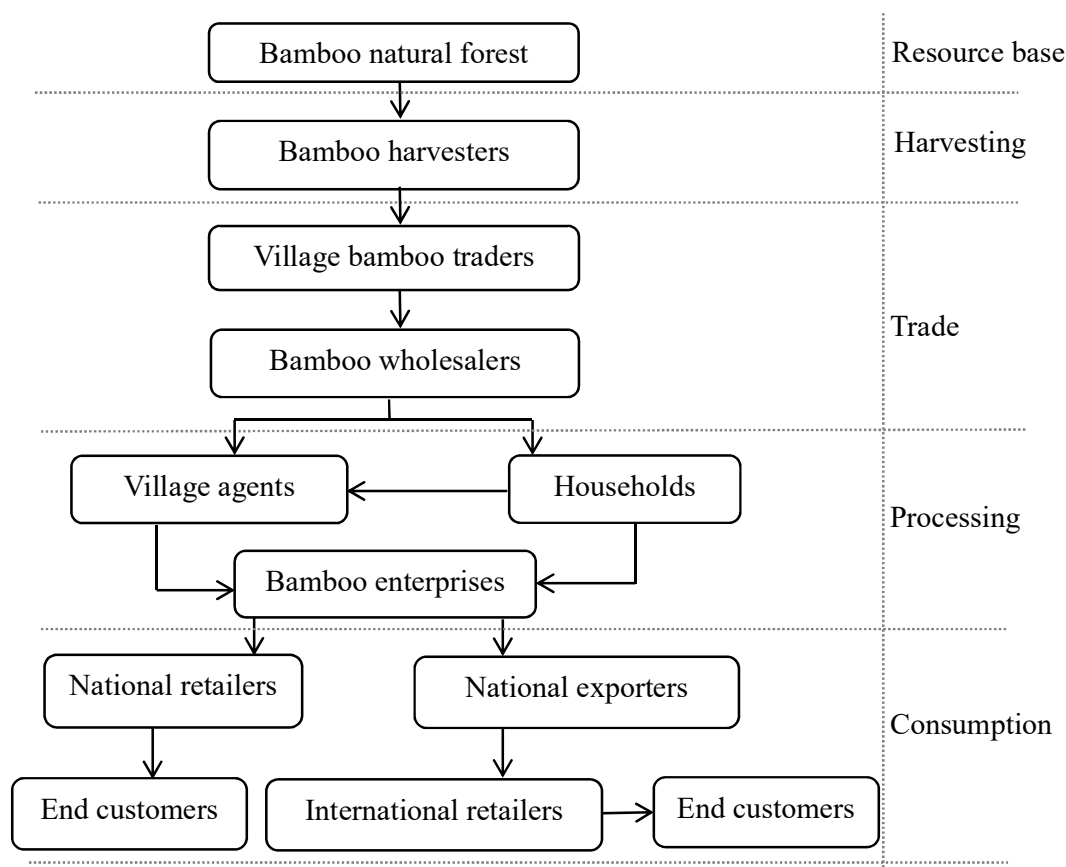
The bamboo handicraft industry is challenging to approach international markets because of the small production scale, lack of innovation in products, and lack of capital to promote marketing. Moreover, Vietnam's handicraft products encounter difficulties meeting the safety standards of the EU, USA, and Japanese markets, and this is one of the biggest obstacles when entering these markets (Fanchette and Nicholas, 2009).

In recent years, urbanization, the rapid development of industrial areas, and unstable income from handicraft production have made many workers quit traditional production to find new, more stable jobs with higher incomes. Those who stay with traditional production are mostly women and senior citizens who remain in the villages to take care of their families. Based on a report on Mekong Bamboo (2006), women account for more than 60% of labor in bamboo and rattan handicraft villages, and these women are trained on the job as children, learning from their parents or relatives. Artisans migrate from villages to urban areas to find more stable jobs, so bamboo enterprises face labor shortage to complete orders in a short timeframe.

In the handicraft bamboo value chain (Figure 4.2), the materials are harvested by locals from the villages in the natural forests in Hoa Binh and Thanh Hoa province. Each commune in the harvest areas has up to three local bamboo collectors to collect the fresh bamboo from the harvesters. After that, the material is brought to Dong Yen Phuong market in Chuong My district by wholesale traders to distribute to handicraft households, bamboo pre-processors, and bamboo handicraft enterprises. Dong Phuong Yen is the only market trading bamboo material

in the district. The market is open daily, and the distance from households to the market is less than three kilometers, so artisans can easily travel to the market as well as transport bamboo by private motorbike.

Since the bamboo price can vary and depends significantly on material quality as well as quantity and time of purchase, households need to negotiate the price with wholesale traders every time. Moreover, the bamboo material is processed manually by cutting it into sticks with knives, then drying it under the sun. Most of the steps in producing bamboo handicrafts are done in households. Bamboo enterprises then collect the semi-finished products from the households to complete the last stages, such as painting, labeling, and packing.



**Figure 4-2. Handicraft bamboo value chain structure in Chuong My district, Hanoi**

*Source: Own elaboration*

Because the production scale is small and bamboo handicraft enterprises have not been able to build-up their distribution networks, they must rely on traders to distribute their products in domestic and international markets. Most enterprises have difficulty accessing capital and are not able to implement business plans and expand production.

In summary, rattan and bamboo products in Vietnam are handmade, and enterprises cooperate closely with households in handicraft villages to make the products. More than 90% of products are exported to international markets. However, poor product innovation, small production scale, and lack of capital have led to various difficulties in long-term investment, marketing promotion activities, and approaches to new markets.

#### **4.2.2. Bamboo semi-industrial processing**

The bamboo industry of Vietnam is considered to be sizable and growing fast. The total output of the Vietnam bamboo industry in 2005 was estimated at between \$200-250 million, of which the export value reached \$179 million, increasing by 28% compared to 2004 (Oxfam Hong Kong, 2006). By 2010, rattan and bamboo production was expected to reach 120,000 tons per year; however, the exact number has not yet been updated.

The characteristics of bamboo can be compared to those of hardwoods, and it may be even tougher. Therefore, bamboo is considered a replacement for wooden materials, with equal or even better quality (Hunter, 2003; Chaowana, 2013). One example is bamboo flooring, which is firmer and more durable than timber flooring (Sass, 2018). Its characteristics explain why bamboo is used in various high-value industries, such as paper, fabric, bamboo mat boards, bamboo-wood composites, and bamboo-activated carbon (Lobovikov et al., 2007; Nayak and Mishra, 2016; Shen-xue et al., 2002; Waite, 2009).

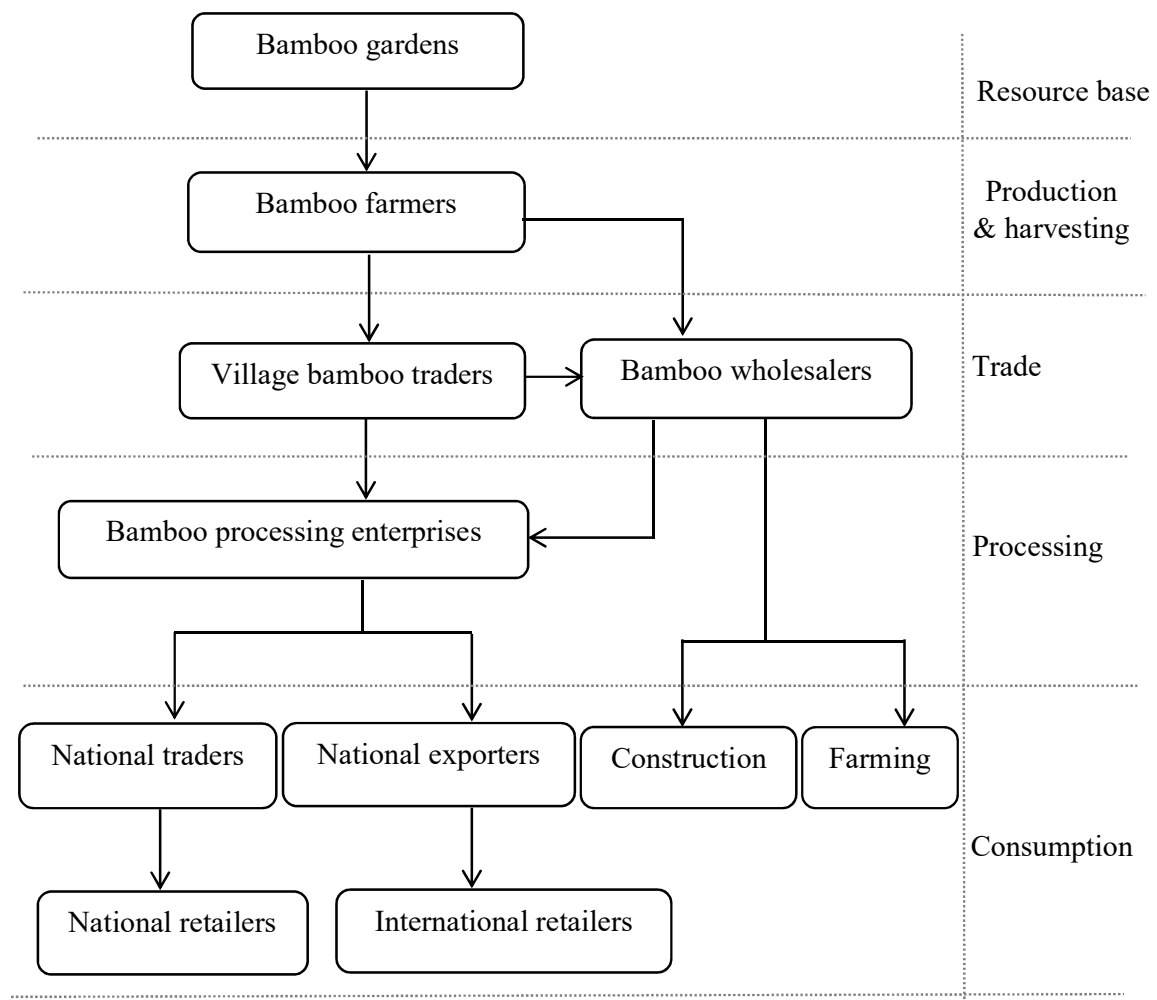
However, low-added-value products, such as construction, chopsticks, and pulp for paper, still dominate the bamboo industry of Vietnam, and most of the enterprises still run at a small scale, with outdated technology and machinery resulting in low productivity and quality (Sass, 2018). For example, of 88 enterprises processing bamboo in the north-west of Vietnam, less than one-third earn revenue of more than \$500,000 per year (Marsh and Demestre, 2008b; Tran, 2010). According to Thanh Hoa's Department of Foreign Affairs (2017), more than 80% of 47 Luồng processors make disposable chopsticks and votive paper with old machinery. The utilization rate of the raw material for disposable chopstick production is only around 17%, and more than 80% of the material becomes production waste. Meanwhile, advanced bamboo processing machines from China can increase the utilization rate to 40% (Renard et al., 2012 cited in Nguyen and Martin, 2016).

High-value products such as bamboo flooring, bamboo pressed board, and bamboo-activated charcoal have not yet been developed since these require modern technology and sources of capital investment. There are only a few enterprises (less than five) producing products of high

value, such as flooring and panels, in the north-west of Vietnam (Marsh and Demestre, 2008b). According to Thanh Hoa’s Department of Foreign Affairs, for example, only two companies in the province have a contract with IKEA to produce high-value products like bamboo flooring and bamboo-activated charcoal.

Approaching capital investment is a big challenge since loan procedures are complicated, and enterprises lack collateral assets to get loans (WWF, 2015a). Hence, companies are not able to conduct marketing activities and encounter numerous difficulties in entering new markets and accessing market information (Renard and GRET, 2009).

Labor quality is another obstacle to development; for example, laborers working in bamboo enterprises in Thanh Hoa province are mostly local inhabitants, and 75-85% of them are people from ethnic minorities, such as Thai and Muong, with low education and lack of skills since they graduated only from secondary or high school, and are not trained (Nguyen and Martin, 2016; Oxfam Hong Kong, 2006).



**Figure 4-3. Luồng bamboo value chain structure in Thanh Hoa province**

Source: Own elaboration



Luồng bamboo is a species commonly used in the bamboo industry of Vietnam. This species is mostly grown in the provinces of Thanh Hoa, Nghe An, and Hoa Binh. According to the Luồng bamboo value chain in Thanh Hoa province (Figure 4-3), bamboo growers harvest Luồng from bamboo gardens, then sell it to local bamboo traders in the village. Bamboo processors do not buy the bamboo material directly from the growers because traders not only have good relationships with the growers, but they also have special transport vehicles for the hilly terrain, to collect Luồng bamboo from the gardens (Baulch et al., 2009). Hence, the enterprises are dependent on the traders for purchasing the bamboo materials. Most of Luồng bamboo is used for the primary purposes of construction and agriculture with low value, and only one-third of the quantity of Luồng is employed for producing semi-industrial products (Renard and GRET, 2009). Bamboo companies are not able to produce the final products due to a lack of advanced technology and machines, and they highly depend on commercial companies distributing their products to retailers.

#### **4.2.3. Contribution of bamboo production to the national economy and society and opportunities for the bamboo sector development in Vietnam**

Bamboo has a short rotation cycle of 2-5 years and can be harvested every year. It is a vital income resource for poor households in mountainous provinces in Vietnam like Thanh Hoa, Nghe An, Hoa Binh (Vogel et al., 2009). According to Baulch et al. (2009), the total income of farmers engaged in planting Luồng bamboo is USD 231 per annum, higher than that of farmers without income from Luồng bamboo. The poverty rate decreases by eight percentage points among farmers engaged in Luồng bamboo production, whereas this figure remains unchanged for farmers without Luồng income. Luồng bamboo farming is considered the third most important economic activity after irrigated rice and poultry, and Luồng bamboo provides 56% and 87% higher average return to labor compared to cassava and rice, respectively (Baulch et al., 2009; Ly et al., 2012a).

Vietnam has around 350 bamboo processing enterprises, mainly providing products such as disposable chopsticks, traditional furniture, paper, and handicraft products (Đặng Đình, 2012). These enterprises not only create jobs for local workers but also greatly contribute to bamboo farmers' income through the purchase of bamboo culms from farmers. For instance, 24 million mountainous ethnic people in Vietnam depend on rattan and bamboo (Bourne, 2017; Nguyen and Usha, 2011; Marsh and Demestre, 2008). According to the evaluation of Prosperity Initiative, a production line of pressed bamboo lumber with an annual production capacity of 5,000 m<sup>3</sup> consumes 150,000 tons of bamboo culms per year, which generates VND 12 billion

revenue for farmers through selling the bamboo culms, 150 full-time jobs at the factory, and approximately 200 jobs from other chain actors (Đặng Đình, 2012).

Moreover, enterprises cooperate with handicraft households to produce semi-finished products. This business model generates jobs for local artisans, enhances their living standards, preserves ancient traditions, and attracts many tourists each year (Tuong Trang and Eiligmann, 2010). As indicated by Oxfam Hong Kong (2006), bamboo and rattan handicraft villages in Vietnam create jobs for approximately 3.4 million people. For instance, the average household income in the handicraft villages is 25% higher than the national average. Furthermore, the rate of poor households in these villages is only 3.7%, which is one-third of the overall rate in the country.

The total export value of the Vietnam rattan and bamboo industry in 2018 was estimated at \$348 million (MOARD, 2019). More than 90% of bamboo and rattan products are exported to international markets such as the EU, USA, Japan, and Taiwan. In the domestic market, the products are mostly sold to foreign tourists in tourist sites. Although the export value of the bamboo industry is modest compared to other sectors and accounts for nearly 4% of the total export value of the wood industry and 0.14% of GDP (MOARD, 2019), this sector contributes greatly to job creation and income improvement for local people in rural and mountainous areas.

Vietnam's bamboo industry has great potential to develop, namely large areas of bamboo, the bamboo price is 50% cheaper than that of China, and the labor cost is one-third of that in China (Nguyen and Martin, 2016; Oxfam Hong Kong, 2006). According to Marsh and Smith (2007), this sector should be divided into four types of production, as follows

- Premium processing: flooring, laminated furniture
- Medium-value processing: chopsticks, mat board
- Low-value and bulk processing: charcoal, paper, and pulp
- Unprocessed culms: scaffolding and traditional construction

For a bamboo industry to succeed, there must be vision at a high level of government, to offer inspiration, subsidies, business services, trade promotion, training services, and research support (Bourne, 2017; Nguyen and Martin, 2016; Zhaohua and Wei, 2018). The Vietnamese government issued three outstanding decisions to support the development of bamboo enterprises (WWF, 2015), as follows:

***Decision 11/2011/QĐ-TTg of the Prime Minister dated 18/02/2011 to encourage the development of rattan and bamboo production***

This decision indicates that: (1) enterprises enjoy preferential conditions on land use fee exemption or reduction; (2) bamboo and rattan manufacturers are entitled to 0% import tax on specialized machinery and equipment to produce rattan and bamboo products not made domestically.

***Decree No. 66/2006/NĐ-CP dated 07/7/2006 of the government on rural industry development***

This decision shows that: (1) the state budget is in support of training, transferring technology, and applying advanced machines to production; (2) enterprises are supported with interest rates for investment loans for businesses, and the state has credit guarantee funds for small and medium enterprises to guarantee loans at credit institutions.

***Decree No. 45/2012/NĐ-CP dated 21/5/2012 on Industrial Promotion Policy***

This decision demonstrates: (1) support for companies to join in fairs, exhibitions and to build and register trademarks; (2) supporting capacity building of bamboo enterprises through consultants, training activities, and study trips inside and outside the country; (3) supporting enterprises to develop business networks as well as connecting enterprises with domestic and foreign investors.

Furthermore, priority policies from provincial authorities should be announced towards actors along the bamboo value chain. Thanh Hoa province, for example, promulgated a strategy for developing the bamboo industry to 2020 and a vision to 2030, subsidizing farmers to buy seedlings and fertilizers, and providing the enterprise with a free land lease for the first 15 years, and preferential loans (Đặng, 2014; DOFA, 2015a). However, the transformation from traditional business model to industrial model is a great challenge, because favorable conditions for developing industrial bamboo production in Vietnam are uncertain; such as shortage of quality of bamboo materials, the advanced technology required for bamboo processing, cooperation among chain actors, investment capital, and practical policies.

## CHAPTER 5

### SMALL HANDICRAFT ENTERPRISES

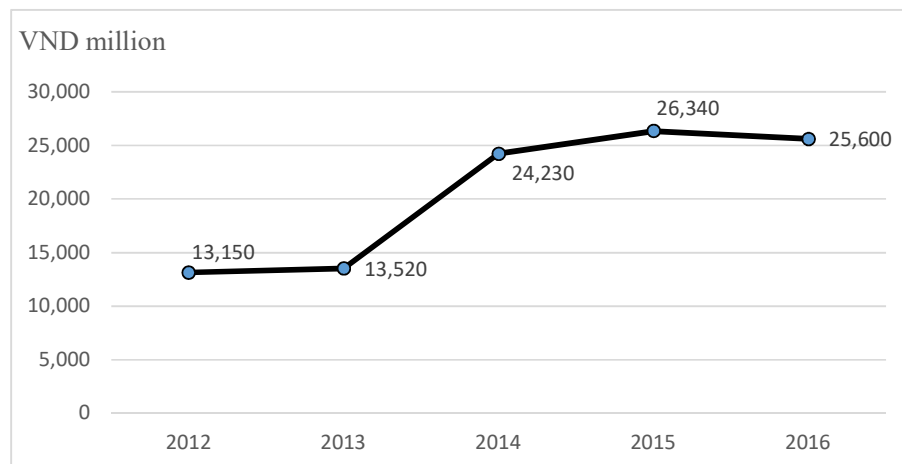
#### 5.1. Introduction

The handicraft enterprises are mostly micro and small-sized homestead factories. They are private companies and have subcontracts with handicraft households to produce semi-finished products like trays, storage bins and baskets in their home. Most of the handicraft products are exported to international markets such as the EU, USA, Japan, and China. The main characteristics of the small handicraft enterprises and the selection of handicraft case studies are further described in Chapter 3 (cf. section 3.2.2).

#### 5.2. Case Study-I

##### 5.2.1. History of development

Case Study-I (Case-I) was established as a family business in Chuong My district, Hanoi, in 1996. It provides handicraft bamboo and rattan products, namely trays, bamboo bowls, storage bins and baskets, and gifts. In the early stage of operation, Case -I manufactured on a small scale, with limited capital investment, and its production area was only 200 m<sup>2</sup>. To meet the fast-growing production scale, in 2002, the enterprise hired five hectares of land in Phu Nghia Industrial Zone, for a period of 50 years, to expand production.



**Figure 5-1. Total assets from 2012-2016**

*Source: Own calculation based on financial data of Case-I (2012-2016)*

The production scale of Case-I has increased rapidly in recent years. For example, the number of workers rose from 35 in 2012 to 48 in 2016, total assets increased significantly from VND 13,150 million in 2012 to VND 25,600 million in 2016 (Figure 5-1), and revenue climbed to over VND 47 billion in 2016. The enterprise has accessed the international market.

### 5.2.2. Raw material supply

*Maclurochloa tonkinensis sp.nov.* (“Giang” in Vietnamese) and *Schizostachyum aciculare* (“Núa” in Vietnamese) are two common bamboo species used to produce bamboo handicraft products. Giang and Núa bamboo are harvested in natural forests in, Tuyen Quang, Phu Tho, Hoa Binh and Thanh Hoa provinces by local harvesters. Local collectors then gather the Núa and Giang bamboo from the harvesters to distribute to traders in Chuong My district. In this district, there is only one wholesale market, named Dong Phuong Yen, where households in the handicraft village can choose the most suitable materials for their production. The price can fluctuate monthly and is based on the quality, diameter, and length of the bamboo. Bamboo prices vary widely among chain actors; for example, local harvesters sell bamboo Núa at garden gates to traders for VND 1.3 thousand per culm, this price at wholesale market gates was VND 2.5 thousand per culm for handicraft households (Table 5.1.). It is reported that price has risen by 20% compared to that of five years ago.

**Table 5.1. Quality criteria and prices for bamboo at Chuong My, Hanoi 2017**

Bamboo species	Diameter (centimeter)	Length (meter)	Price per culm (thousand VND)
<i>Bamboo Luồng</i>	30	9	40
	27	9	33
	24	8	25
	21	7	17
	15	5	12
	10	4	8
<i>Bamboo Giang</i>	4	0.5	1.3
<i>Bamboo Núa</i>	5	0.6	2.5

Source: Fieldwork (2017).

The transactions between the households and bamboo traders are not based on any written contracts. Instead, the households select appropriate bamboo at the bamboo wholesale market and directly negotiate the price with the traders. Usually, households transport the materials by

their personal means of transport, such as bikes or motorbikes, since the average distance from the wholesale market to their houses is less three kilometers.



**Figure 5-2. 1: Giang bamboo at the wholesale market, Chuong My district; 2: Raw material processing at a handicraft household, Chuong My district**

*Source: Fieldwork (2017).*

Bamboo material is in short supply during the rainy season. Price is inflated by 15% compared to other seasons because it is difficult to harvest and transport Giang and Núra bamboo from natural forests in the rainy season, due to sloping hills and distance from the residential areas.

According to the households in the handicraft village, the quality of Giang and Núra bamboo is classified based on several criteria. The bamboo must be fresh, the diameter of the pole must be bigger than four centimeters, length of the pole section must be at least 0.5 meters, and the bamboo must have been grown for at least one year. If all criteria are met, then Giang and Núra are soft enough to be easily split, and they give a high utilization rate. Bamboo Giang and Núra are processed by handicraft households using the following steps. The bamboo is split by knives into thin and straight sticks, with size based on each type of product. Then, the sticks are dried by sun or by electric dryers in the rainy season to ensure the humidity level of the material is always below 17%. Furthermore, due to the habit of using knives to process the raw material and limited financial ability, most households are not willing to invest in machinery for processing raw materials; this is a barrier to improving their productivity. Besides, supplementary materials, for example, plastic sticks, rattan, bamboo straps, are difficult for households to process and purchase; hence these materials are provided to households by the company.

In summary, handicraft households do not find difficulty in purchasing bamboo raw material, but bamboo price increases every year, leading to rising production costs and affecting household's income.

### **5.2.3. Institutional conditions**

Case study-I successfully used some supportive policies (cf. section 4.2.3). The enterprise was exempted from export tax and received a preferential interest rate of 3.5% instead of the standard rate of 7% per year. This support encourages enterprises to invest in production and promote the export. The handicraft association had selected the enterprise to participate in trade fairs in 2011 and 2015. The director was sent for training courses in 2010 and 2015, covering marketing, international trade, and leadership skills. These training courses were organized by Vietnam Chamber of Commerce and Industry (VCCI) and the Centre for the Promotion of Imports from Developing Countries, Netherlands (CBI). 30% of the course cost was sponsored by VCCI and CBI. The director stated that the training courses provided new knowledge about import and export procedures, trade regulations, and preparation for trade fairs, which play an important role in training his employees and developing the business.

Although some policies mentioned above have made a positive impact on the development of the company, other policies remain impractical, and it is hard for an enterprise to obtain this policy support. In particular, there is still a lack of cooperation between research institutes and enterprises in product research and development as well as technology transfer.

### **5.2.4. Human resources**

The Case study-I is located in handicraft villages, so most of the employees are local people. Furthermore, since it is a family business, all important positions such as director, deputy director, and manager are occupied by family members or their relatives. For example, the father is the director, his wife holds the deputy director position, and their daughter is the marketing manager.

The entrepreneur-owner graduated from the University of Foreign Languages, which enables him to communicate and negotiate directly with foreign customers. To update new business knowledge, e-commerce, and brand development, since 2009, the entrepreneur has participated in business training courses organized by VCCI, such as brand building, marketing, and international trade. The knowledge and skills he obtained at university and during these courses are very necessary and useful for him to explore business opportunities, build an effective business strategy, and transfer knowledge to his employees. However, the entrepreneur was not born into a family with a tradition of making bamboo and rattan products. As a result, he has acquired less production experience, and this is why he had certain difficulties in operating his business and working with households in the village when he newly founded the enterprise.

Regarding employee quality, in 2016, 50% of Case-I's employees graduated from university, 25% were trained at vocational schools, and the rest graduated from secondary or high school. The average age of employees is 45, and the number of female employees outweighs the number of male employees. 75% of the workforce is women. Employee working conditions are considered to meet a standard of Vietnam's labor laws, such as the employees receive protective clothing and social insurance, and the company also provides free lunches for their employees in the company's canteen. Employee income depends largely on job responsibilities and business performance. For example, managers get paid VND 9 million per month, while the average salary of employees is VND 5.5 million per month.

Case study-I has applied ISO 9001 certification since 2012. Therefore, to meet ISO labor management requirements, as well as keep pace with the fast-growing rate of the company, the enterprise is now organized into functional departments. In particular, indirect employees are arranged into an accounting department (two employees), a sales and marketing department (three employees), and an administrative department (two employees). As a result, the business runs more smoothly. Direct employees are divided into three teams, including a technical team, a finishing team, and a packaging team. For example, the technical team, with nine workers, is in charge of ensuring the quality of semi-finished products bought from households. The finishing team, with fifteen members, applies glue and then paints and dries the products. After that, products are labeled and packaged by ten members of the packaging team before being transported to the warehouse for export.



**Figure 5-3. 1: Workers of the finishing team; 2: Workers of the packaging team**

*Source: Fieldwork (2017).*

Furthermore, the application of ISO 9001 requires Case-I to set up advanced and professional labor management. To illustrate, all roles in the company must be presented with job descriptions, with details such as working hours, responsibilities, and job fulfillment criteria. Thus, the director has asked that employees themselves fully understand their rights and



obligations, and this brings advantages in labor management. Furthermore, in December 2016, Case-I succeeded in getting BSCI certification, which means that the company does not use child labor, adopts the fair payment scheme for all employees, provides employees with safe working conditions, and abides by the law of national minimum wage. These certifications not only bring benefits to the Case-I but also demonstrates to its customers that the company is moving toward international standards of production and products.

As revealed during the enterprise interviews, Case-I professionally manages its employees, and its working conditions are better than that of its counterparts. As a result, the annual turnover rate of Case-I is recorded at less than 10%, and over 80% of employees have been with the company for more than five years; this is considered to be an important factor impacting enterprise development.

### **5.2.5. Production technology**

This section presents how companies and households collaborate in producing semi-finished products, as well as some final phases of production that are completed by the companies.

Households in the handicraft villages have a subcontract with the enterprise to manufacture products in their own houses. They ask the enterprise to pay from 60-80% of the contract value in advance so that they can buy materials. The enterprise cooperates with approximately 800 handicraft households in Chuong My (Hanoi), Y Yen (Nam Dinh), and Kin Son (Ninh Binh) to produce the semi-finished products. Each village has a wholesale collector who works directly with households on behalf of the enterprise. For example, when the enterprise receives an order from its customers, the wholesale collector negotiates with households the quantity, price, advance payments, and delivery date of the semi-finished products. Furthermore, the wholesale collector is responsible for supervising product quality to make sure there is no mistake in the size, material, and color of the products. Then, the collector gathers the semi-finished products from the households and hands them over to the enterprise.

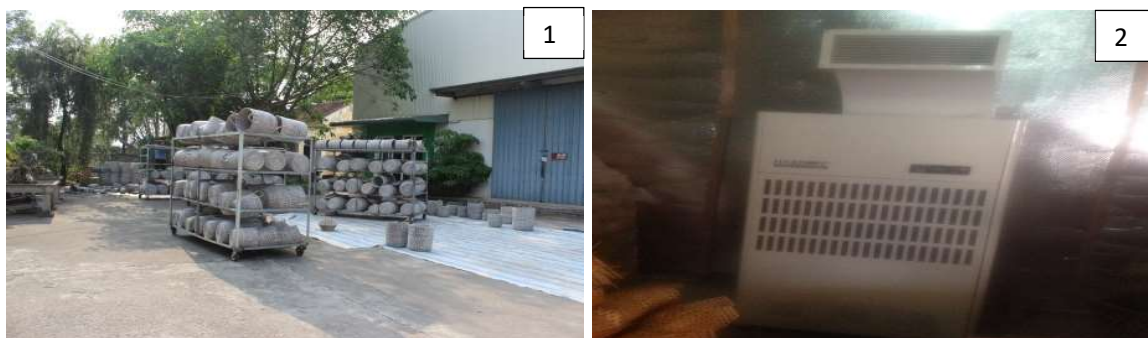
The typical characteristic of the handicraft villages in Chuong My district is that each household is trained to produce one part of the product. For example, to produce bamboo baskets, one household makes the handle, one household produces the body of the basket, and another household weaves the bottom of the basket. Then, another household assembles all of the discrete parts. If there is a new design, the households are instructed by technical staff on how to weave the new products with the correct standards.

The enterprise performs some final tasks to complete the products, and these are fulfilled by three teams, as follows:

**Technical team:** This team tests each semi-finished product carefully before the products are transferred to the enterprise’s warehouse. For instance, a member of the technical team checks the product size using a ruler, checks the quality of the bamboo sticks, and the product color. If the products have any flaws, they are given back to the households to repair. Furthermore, the enterprises ask a technical officer to work with the wholesale collectors to monitor the production progress and quality of materials at the households weekly. If the material and product quality are not as good as requested, the technical officer will ask the households to improve their quality. One production manager said that quality control performed at an early stage of production at the household level helps households to avoid mistakes, and enterprises can then provide products of the best quality to their customers.

**Finishing team:** This team is in charge of cutting scratch pieces of products, applying glue to products to stabilize the frame, and drying them to make sure the glue perfectly covers the whole product. The products are then painted based on a design and put into the drying room to ensure optimum fixing of colors as well as to keep the humidity level below 17%. If it is sunny, products can be dried naturally in the sunlight.

**Packaging team:** This team carefully checks the product quality a final time. If products meet all requirements, they are fitted with additional accessories such as straps and a brand name, packaged, and transferred to the warehouse to preserve them before export.



**Figure 5-4. 1: Products carried by trolleys and dried in the sunshine; 2: An electric drier**  
*Source: Fieldwork (2017).*

Regarding machinery and equipment, in the early years of establishment, an enterprise’s lack of capital prevented them from drying products using modern driers, so they had to depend on the weather. When it is sunny, products are dried in the sun, but in the rainy season, it is hard to dry products, and they can quickly become moldy. To be independent of the weather, in 2010, the enterprise invested in an electric drying system at a total cost of almost VND 250

million. This investment demonstrates that the production output of the enterprise is not affected by the rainy season, and the enterprise can complete orders on time.

Most of the production stages are performed by the households, and the enterprise carries out only the final stages to complete the products. Hence, the enterprise has only small machinery, such as five paint sprayers, fifteen trolleys, five electric driers, and six packaging machines. Most machines are purchased domestically, except for the electric driers imported from Taiwan. According to the company's financial statements, the value of the company's machinery was recorded at around VND 500 million in 2016, and almost 70% of investment in new machinery is financed from bank credit; the remaining 30% is from cash income.

The handicraft production process highly depends on households, and the enterprise must prepare financial resources to pay in advance for households to produce semi-finished products. The handicraft products are created manually, so large investment in machinery is not seen in this case study. Investment in machinery is not considered an important factor affecting the development of the enterprise.

#### 5.2.6. Marketing activities

The company has introduced three major handicraft product categories made from bamboo, rattan, and seagrass: kitchen utensils, home décor items, and storage bins and baskets. Bamboo and rattan products account for 60% of the sales volume, followed by seagrass products at 40%. The company offers a 6-month warranty for all its products in the event of a fault, namely vermin, blue stain, or mold. The company will exchange these products and send new products to its customers.



**Figure 5-5. 1: Seagrass laundry baskets; 2: Bamboo fiber products**

*Source: Fieldwork (2017).*

International markets make up over 95% of the enterprise's revenue. From 1996 to 2000, Case-I exported 90% of its total sales volume to Taiwan, and, since 2013, export to European, US, and Japanese markets has become increasingly important for the company. The enterprise has 30 distributors that are national exporters and international importers, delivering the products to retailers.

Director of Case-I stated that marketing plays an important role in accessing markets, so the company has focused on investment in marketing activities. For example, the company has participated in the Ambiente Trade Fair in Frankfurt, Germany, for home and giftware, since 2010. According to the company's 2017 business report, the enterprise spent around VND 800 million on the Ambiente Trade Fair in Frankfurt, Germany, and the Fair attracted 136,000 visitors from 143 countries, and 4,000 exhibitors from 95 countries. Therefore, the company has a great opportunity to introduce its latest and innovative products to potential customers. In October 2016, the Case-I was selected by Hanoi authorities as one of the 30 most favored customer brands. The criteria for selection of these favored brands included the use of domestic materials, material saving, timely tax payment, obedience to laws and regulations on business and investment, and incentive packages for workers, as well as an active contribution to society and the community.

The enterprise's customers are mainly foreign customers, who live far away from the enterprise's location, so a company's website is a bridge between enterprise and its customers, which enables customers to have quick and effective access to the enterprise's information. The Case-I website has been developed professionally since 2000. The company's website is professionally designed and full of information to impress potential customers and increase trustworthiness. In addition, to attract more foreign customers, the website has been created in nine languages; English, German, Japanese, French, Korean, Spanish, Portuguese, Russian, and Chinese. This demonstrates that the enterprise has diversified its marketing activities, which provides an advantage in approaching international markets in comparison to its competitors.

Furthermore, since 2013, the company has employed a marketing executive from France to work full-time on the company's website advertising activities and promote its brand on social networks such as YouTube, Facebook, Twitter, LinkedIn, and Instagram. Customer relationship management has also been developed; for example, the marketing department is in charge of contacting customers to get feedback about product delivery and quality as well as sending new product designs to customers. Hence, good relationships with customers help the enterprise to communicate with them more effectively and understand them better.

### **5.2.7. Innovation**

In contrast to most of its local competitors, since 2012, the company has successfully diversified its production by using a new raw material, seagrass, to manufacture laundry baskets, wall décor, and food trays. The products are made by hand, and as a natural and eco-friendly material, the products are welcomed by international customers. For example, seagrass products helped the company to succeed in the US market in 2015, and revenue from seagrass products accounts for 40% of the company's total revenue.

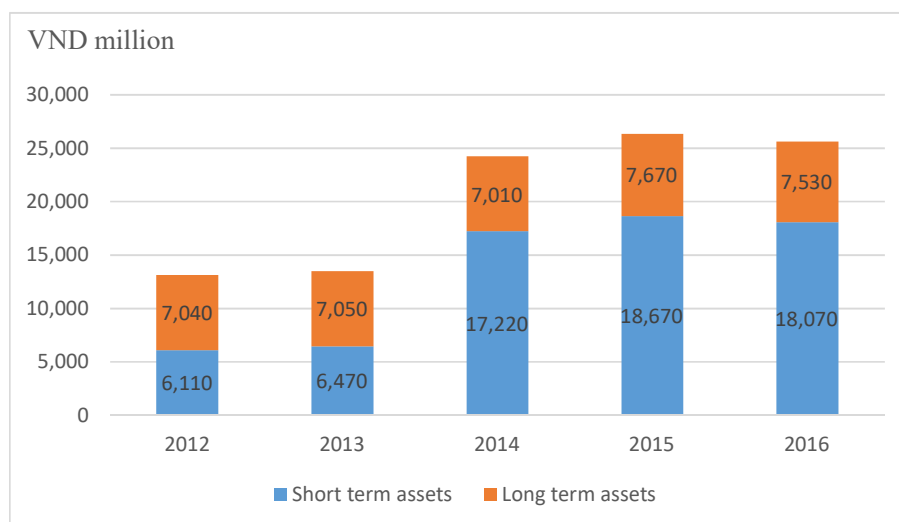
In diversifying a product range, the company has cooperated with an embroidery craft village in Hoa Lu District, Ninh Binh Province since 2017 to make a new product brand called Baconta Embroidery, including bed linen, table linen, bath linen, home décor (pillows and napkins) and accessories (bags and scarves). These products are made from fabric and embroidered by hand by artisans in the village and were introduced at Trade Fairs in Paris, France, at the beginning of 2018.

The company established a design team of three members, to regularly develop new designs. The team generally has a meeting with the director twice a month, and meets monthly with master artisans in the village to exchange and generate ideas about new designs and improving previous products. These international customers also ask the design team to produce particular designs that the customers suggest themselves, and then send them to the customers to get their feedback. The company also encourages its employees to show their new product ideas, enhancing the company's production activities. If an employee's ideas are accepted by the design team or board of directors, they will be awarded an amount of money equivalent to their wage for three working days, or, if a product model based on their idea is chosen by customers, the employee will be awarded more than 30% of their monthly salary. As a result, each year, Case-I introduces to the market ten new designs and 15 new products improved from previous items, and then presents them to customers in the EU, US, and Japan at trade fairs, on the website, and via social media.

### **5.2.8. Financial resources and business performances**

According to the enterprise's balance sheet, short-term assets are mainly composed of the money required to pay households in the handicraft villages, employee salaries, and customer receivables, while long-term assets are primarily related to investments in the factory and machinery.

Figure 5-6 shows that the short-term assets of the company increased substantially from VND 6,110 million in 2012 to VND 18,070 million in 2016, due to the company expanding its business. In 2012, the company was cooperating with 350 households in the handicraft village, and by 2017, this number had gradually risen to 800 households.



**Figure 5-6. Short-term and long-term assets from 2012-2016**

*Source: Own calculation based on financial data of Case-I (2012-2016)*

The enterprise has not invested in new machinery in recent years, so the long-term assets of the company rose only slightly, from VND 7,040 million in 2012 to VND 7,530 million in 2016 (Figure 5-6). The value of the short-term assets outweighed the value of the long-term assets because handicraft products are produced manually, and the enterprise has not invested in machinery. The short term assets of the enterprise are mainly created by the amount of money required to pay the households in the handicraft villages, and the salaries of the employees.

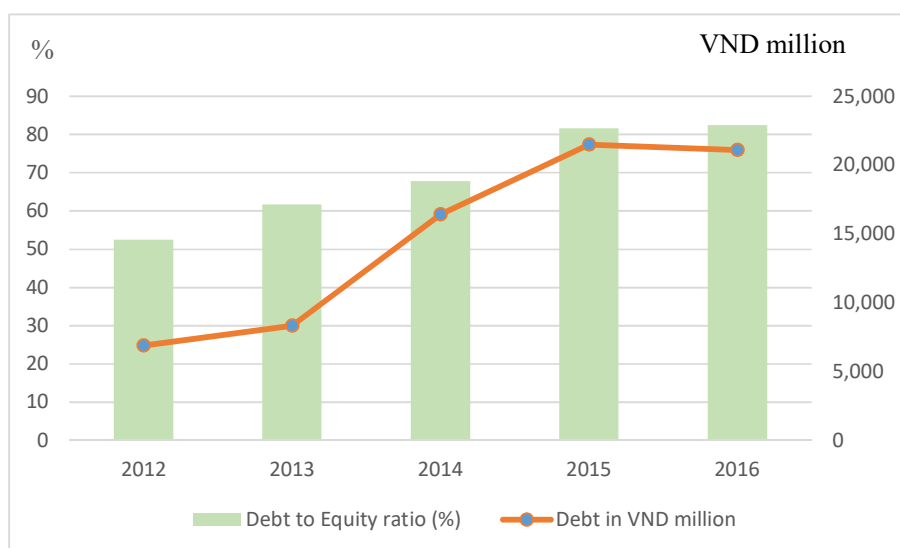
Case-I was able to approach credit from banks thanks to profitable business performance, collateral, and good relationships between the chairman, banks, and authorities.

*Box 5-1: Accessing credit from banks*

*A loan officer at the branch of the Bank for Investment and Development of Vietnam in Chuong My district said that the Case-I submitted completed loan documents such as collateral and a potential regular income from sales revenues to pay monthly interest rate. Hence, the loan procedures took only five working days to complete. (BIDV, Chuong My, Ha Noi, Thuy, June 26<sup>th</sup>, 2017)*

Also, according to a policy of the State Bank, because Case-I has a business in the handicrafts sector, located in the handicraft villages, and creates employment opportunities for the local people, it has received a preferential interest rate for its working capital from banks. For

example, the company pays only a 4% interest rate per year compared with the bank's standard interest rate at 8% per year.



**Figure 5-7. Debt to equity ratio from 2012-2016**

*Source: Own calculation based on financial data of Case-I (2012-2016)*

Figure 5-7 shows that the debt to equity ratio was 52.49% in 2012, and increased significantly to 82.43% in 2016. However, a high debt to equity ratio can bring potential risks to an enterprise, such as a company being under pressure to pay interest monthly and to remain solvent.

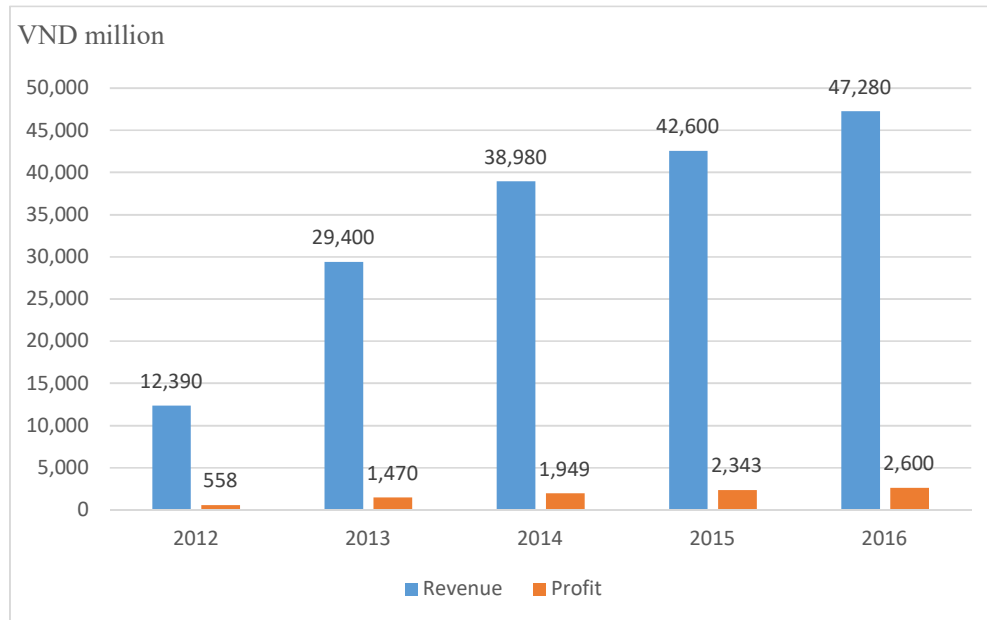
It is worth noting that Case-I chooses to outsource its main production stages, so payment to households accounts for nearly 80% of total production costs, followed by labor and selling expenses at 6% and 4.4%, respectively (Table: 5.2.).

**Table 5.2. Cost structure of Case-I in 2016**

Cost structure	VND million/year	Percentage
Depreciation of fixed assets	386	0.9
Interest expenses	1,095	2.5
Payments to suppliers	35,655	79.8
Labor cost	2,700	6
Raw material expense	1,536	3.4
Selling expenses	1,962	4.4
Administration Expenses	825	1.8
Income tax expense	520	1.2
Total	44,680	100

*Source: Own calculation based on financial data of Case-I (2016)*

Figure 5-8 shows that the revenue of the company increased rapidly from 2012 to 2016, because the company expanded its market successfully with new products. For example, in 2012, the revenue of the company was VND 12,390 million, then this number rose gradually over the years and reached VND 47,280 million in 2016. The company successfully entered the US market to sell seagrass products since 2013, and revenue from these products has accounted for 40% of total revenue since 2015.



**Figure 5-8. Revenue and profit from 2012-2016**

*Source: Own calculation based on financial data of Case-I (2012-2016)*

The company's net profit has increased rapidly over the years. In 2012, profit was VND 558 million, and in 2016, profit reached VND 2,600 million (Figure 5-8.). The profitable business performance of the enterprise demonstrates that the enterprise expanded effectively and invested successfully in production.

### **5.2.9. Distribution of value-added along the bamboo bowl value chain**

Bamboo Nua is the main material for producing bamboo bowls. This bamboo is manually harvested with knives in the natural forests and then transported on the shoulders of harvesters to roadsides. Harvesting greatly relies on weather conditions, the harvest season, and the permission of the local authority. Before harvesting, the community leader must ask for a license from the commune. Harvesters do not have to pay any fees or taxes to the local authority. The price of Nua bamboo used to calculate in this section is the average price annually. In reality, the price of Nua bamboo can change monthly, depending on the quality of the bamboo



and the production season. For example, in the rainy season, and when the bamboo shoots are growing, the raw material price increases by approximately 15% to 20%.

The bamboo harvesters interviewed stated that the manual harvesting of bamboo, and a long distance of more than one kilometer from the harvesting area to the roadside, are the two main reasons for low productivity. In detail, a farmer, on average, can harvest 70 kilograms of Nua bamboo per day which means that it takes a farmer nearly 15 days to harvest one ton of Nua bamboo. The opportunity cost of labor at the locality is VND 110,000 daily, and the price of Nua bamboo is VND 3,750,000 per ton. After deducting all expenses, harvesters have a net profit of VND 2,065,000 per ton, and the total value-added per one ton is VND 3,715,000 (Table 5.3.).

**Table 5.3. Costs, profit margin and value-added at bamboo harvesters**

No	Cost items, price, and income	VND/ton
<b>1</b>	<b>Average farm gate price (VND/ton)</b>	<b>3,750,000</b>
2	Production materials (knife, rope)	35,000
3	Depreciation	0
4	Labor cost (opportunity cost)	1,650,000
5	Land tax and duties	0
<b>6</b>	<b>Total cost (2+3+4+5+6)</b>	<b>1,685,000</b>
7	Net profit (1-6)	2,065,000
8	Profit margin (7/1)	55.1
<b>9</b>	<b>Value-added (4+5+7)</b>	<b>3,715,000</b>

*Source: Field data (2015-2017)*

Bamboo traders must bear many different costs. Traders have to hire the transportation service to ship bamboo from the farm gates in Hoa Binh province to Dong Phuong Yen wholesale market in Chuong My district, Hanoi, with an estimated distance of around 130 kilometers. Thus, the transportation fee is quite costly at VND 250,000 per ton (Table 5.4).

Moreover, traders have to bear a cost of VND 25,000 per ton for storage and security services in the market. Also, the cost of loading and unloading is estimated at VND 150,000 per ton. All in all, after deducting the total cost, the net profit that traders receive is VND 2,062,269 per ton, and the value-added is equivalent to VND 2,214,120 per ton (Table 5.4.).

**Table 5.4. Costs, profit margin and value-added at bamboo traders**

No	Cost items, price, and income	VND/ton
1	<b>Wholesale market gate price</b>	<b>6,250,000</b>
2	<b>Material cost</b>	<b>3,750,000</b>
-	Purchase of bamboo	3,750,000
3	<b>Costs for services</b>	<b>285,880</b>
-	Transportation cost	250,000
-	Interest	8,102
-	Storage and security cost	25,000
-	Informal fees (Facilitation)	2,778
4	Depreciation	0
5	Labor cost (Loading and unloading)	150,000
6	Taxes and local duties	1,852
7	<b>Total cost (2+3+4+5+6)</b>	<b>4,187,731</b>
8	<b>Net profit (1-7)</b>	<b>2,062,269</b>
9	Profit margin (8/1)	33.00
10	<b>Value-added (5+6+8)</b>	<b>2,214,120</b>

*Source: Field data (2015-2017)*

Since the production of bamboo bowls is done by hand, the costs of raw materials and labor are the main expenses of production. The cost of the raw material relies on product size and quality of the material. The handicraft households interviewed stated that to make a bamboo bowl with a diameter of 31 centimeters and a height of 2.5 centimeters, producers have to use over 1.5 kilograms of fresh Nua bamboo. Therefore, the total material cost is estimated at VND 15,922, including the cost of Nua bamboo, auxiliary material, and material processing (Table 5.5).

Regarding labor costs, households do not pay for labor because it is family labor. Thus, the research estimates the labor cost per unit in line with the opportunity cost of daily labor in the region. It takes many stages to produce a final bamboo bowl, and each stage is handled by a different artisan. As a matter of fact, to precisely estimate the labor cost, it is necessary to estimate the finishing time of each stage and then the whole production process of a bamboo bowl. However, the amount of time to finish a product greatly depends on the skill of the artisan as well as the production facilities. The handicraft households interviewed stated that one artisan needs at least 50 minutes to make a bamboo bowl, and can earn an average daily income of VND 120,000. Thus, the unit labor cost is estimated at VND 10,650. Since households do

not have to pay any taxes or fees, after deducting total unit cost, the unit net profit stands at VND 7,224, and the value-added is equivalent to VND 11,655,093 per ton (Table 5.5.).

**Table 5.5. Costs, profit margin and value-added at handicraft households**

No	Cost items, price, and income	VND/bowl	VND/ton
1	<b>Semi-finished product price</b>	<b>35,500</b>	<b>23,148,148</b>
2	<b>Material cost</b>	<b>15,922</b>	<b>10,381,944</b>
-	Bamboo	9,585	6,250,000
-	Accessories	5,272	3,437,500
-	Processing material cost	1,065	694,444
3	<b>Costs for services</b>	<b>994</b>	<b>648,148</b>
-	Payments to suppliers (water, electric)	675	439,815
-	Interest	0	0
-	Transportation cost (fuel)	320	208,333
4	Labor cost (opportunity cost)	10,650	6,944,444
5	Depreciation	710	462,963
6	Taxes and local duties	0	0
7	<b>Total cost (2+3+4+5+6)</b>	<b>28,276</b>	<b>18,437,500</b>
8	<b>Net profit (1-7)</b>	<b>7,224</b>	<b>4,710,648</b>
9	Profit margin % (8/1)	20.4	20.4
10	<b>Value-added (4+6+8)</b>	<b>17,874</b>	<b>11,655,093</b>

*Source: Field data (2015-2017)*

Regarding the Case-I, the bamboo bowl is not their sole product; they indeed make other handicraft products in which much intermediate inputs and labor are used. Bamboo bowls are popular products favored in international markets; hence, this product is used to estimate the value-added. The production cost data of the bamboo bowl relied on the interviews with directors, production managers, and workers, as well as investigation of the enterprise's cost distribution reports.

Table 5.6 shows that the cost of a semi-finished bamboo bowl is VND 35,500; this is the biggest cost in the unit production, followed by the labor cost of VND 15,180 per bowl. The bamboo bowls are transported 150 kilometers from the company to Hai Phong Port, with transportation cost of VND 1,518 per bowl. After deducting all costs from the average selling price of VND 75,900 per bowl, the unit net profit is estimated at VND 13,115. The enterprise contributes

VND 3,279 per bowl to the state budget in the form of taxes and duties, and the value-added is equivalent to VND 20,587,702 per ton.

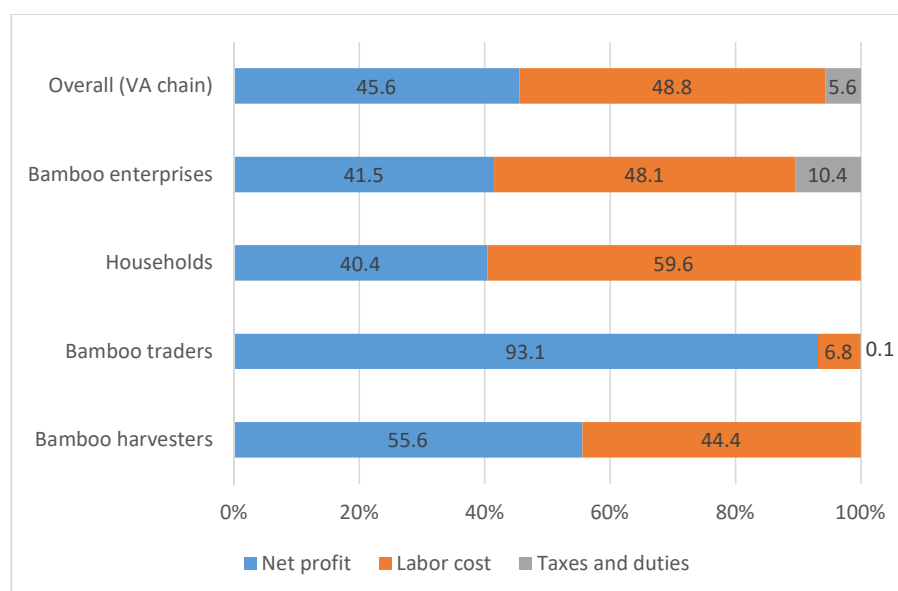
**Table 5.6. Costs, profit margin and value-added at Case-I**

No	Cost items and income	VND/bowl	VND/ton
<b>1</b>	<b>Export-FOB price</b>	<b>75,900</b>	<b>49,491,393</b>
<b>2</b>	<b>Material cost</b>	<b>40,509</b>	<b>26,414,580</b>
-	Semi-finished product	35,500	23,148,148
-	Accessories	5,009	3,266,432
<b>3</b>	<b>Costs for services</b>	<b>3,514</b>	<b>2,291,145</b>
-	Payments to suppliers	2,125	1,385,759
-	Selling expenses (excluding labor cost)	607	395,931
-	Administration cost (excluding labor cost)	380	247,457
-	Interest	152	98,983
-	Transportation from households to factory	250	163,015
-	Transportation from factory to port	1,518	989,828
4	Depreciation	304	197,966
<b>5</b>	<b>Labor cost</b>	<b>15,180</b>	<b>9,898,279</b>
6	Taxes and duties	3,279	2,137,885
<b>7</b>	<b>Total cost (2+3+4+5+6)</b>	<b>62,785</b>	<b>40,939,854</b>
<b>8</b>	<b>Net profit (1-7)</b>	<b>13,115</b>	<b>8,551,539</b>
9	Profit margin % (8/1)	17.28	17.28
<b>10</b>	<b>Value-added (5+6+8)</b>	<b>31,573</b>	<b>20,587,702</b>

*Source: Field data (2015-2017)*

### 5.2.10. Value-added and appropriation

Figure 5-9 indicates that the contribution of the value-added is created by different stages of the bamboo bowl value chain. The net profit at the bamboo trader level constitutes over 93% of the value-added, while labor cost makes up a small proportion because bamboo traders only use labor in loading and unloading bamboo. In contrast, labor cost at the household level contributes nearly 60% to the value-added since the products are made manually. Taxes and duties at enterprise level account for over 10% of the value-added to the local authority's budget, whereas labor cost comprises over 48% of the value-added. In short, taxes and duties have a minor contribution (6%) to the total value-added, while labor cost and net profit account for nearly 49% and over 45% of total value-added, respectively.



**Figure 5-9. Distribution of value-added across the bamboo bowl value chain**  
*Source: Extracted from Tables 5.3-5.6*

Table 5.7. represents the contribution of each actor along the value chain to the total value-added. The total value-added stands at VND 38,171,915 per ton, in which nearly 54% is constituted by bamboo enterprises. Although households take part in almost all production processes, they only contribute around 31% of the total value-added. Bamboo traders and harvesters make up nearly 6% and 10% of the total value-added, respectively; this clearly proves that benefit sharing between stakeholders along the value chain is not well balanced.

**Table 5.7. Value-added in the bamboo bowl value chain**

Actors	Net profit (VND/ton)	Labor cost (VND/ton)	Taxes and duties (VND/ton)	Value added (VND/ton)	Percentage
Bamboo harvesters	2,065,000	1,650,000	0	3,715,000	9.73
Bamboo traders	2,062,269	150,000	1,851.9	2,214,120	5.80
Households	4,710,648	6,944,444	0	11,655,093	30.53
Bamboo enterprises	8,551,539	9,898,279	2,137,885	20,587,702	53.93
<b>Total</b>	<b>17,389,456</b>	<b>18,642,723</b>	<b>2,139,737</b>	<b>38,171,915</b>	<b>100</b>

*Source: Extracted from Tables 5.3-5.6*

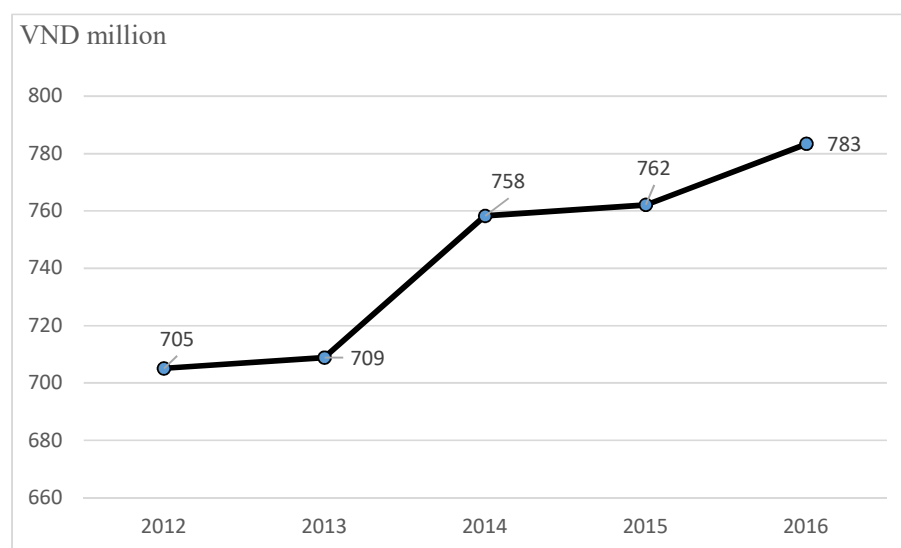
Appropriation among the different stakeholders could be improved if bamboo harvesters and traders paid more attention to the pre-processing of raw materials before distributing them to households. This pre-processing of raw materials can create more job opportunities for local labor and increases the value of raw materials. However, these actors have no finance and facilities to pre-process raw materials.

## 5.3. Case Study-II

### 5.3.1. History of development

Established in 2008 at Phu Vinh, Chuong My, Hanoi, the Case Study-II (Case-II) produces bamboo and rattan handicraft products such as bamboo-rattan trays, bamboo-rattan lamps, bamboo-rattan storage bins and baskets, and bamboo toys. The company operates as a family business, where the father is the director, his son is the vice director, and his relatives are key staff, namely accountants and production managers. As a master artisan, the director is responsible for guiding the technical staff, production processes, and product design; while his son is in charge of financial management, cooperation with handicraft households, and employee management.

In the first years, Case-II operated as a subcontractor depending on other bamboo enterprises in the district to receive shared orders; however, the company has been an independent business since 2012.



**Figure 5-10. Total assets from 2012-2016**

*Source: Own calculation based on the financial statement of Case-II (2012-2016)*

The production scale of the enterprise has increased slightly over the years; for example, total assets increased from VND 705 million in 2012 to VND 783 million in 2016. The number of employees grew from 5 in 2008 to 15 in 2017, and total revenue also rose from VND 116 million in 2012 to VND 638 million in 2016 (Figure 5-10.).

### 5.3.2. Raw material supply

The enterprise cooperates with households in producing semi-finished products, and bamboo is the main material collected by the households. The cooperation between enterprise and households as well as the characteristics of bamboo, namely purchasing mechanism, quality, price, and processing, are similar to that of Case-I (cf. section 5.2.2 and 5.2.5). Some bamboo handicraft products are produced by a combination with rattan. Rattan is a supplementary material that is collected from Thai Binh and Quang Nam provinces by village traders. Rattan is primarily processed with steps as follows: rattan is boiled in water and oil for over two hours, which is an important step to eliminate glucose to prevent fungi, mold, and wood eaters. After that, the rattan is split by knives or small machines into thin sticks, and dried by the sun or electric dryers before being delivered to the households.

The households interviewed said that the rattan is required to have three major quality criteria: minimum length of 2.5 meters, two years old, and white in color. The rattan price often changes monthly and is based on the quality, quantity, and relationship between buyers and sellers. Therefore, households must negotiate with the traders in each transaction to reach a satisfactory price. The price of rattan in June 2017 was VND 60,000 per kg if the diameter of the rattan stick was four to six millimeters.



**Figure 5-11. 1: Rattan is split by artisans; 2: Rattan stored at village traders**  
*Source: Fieldwork (2017)*

### 5.3.3 Institutional conditions

Case-II receive assistance from the authority, including export tax exemption. Also, in 2010 and 2013, the authority gave financial aid to enterprises to attend the domestic Arts and Crafts Trade fairs. In fact, it is difficult for the company to access support policies. If the company wants to receive support from an authority, it needs to establish a good and close relationship

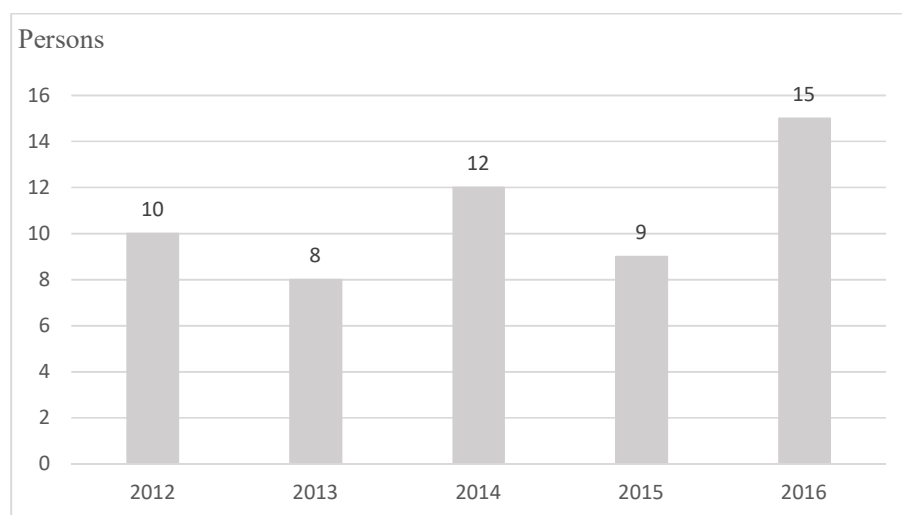
with the authority; however, the company cannot invest in building up such a relationship because of the lack of finance and differences in mission.

There are existing research and development centers of both state and private sector, but the bamboo handicrafts enterprises have received no support from these centers in terms of designs, human resource training, and technology transfer, since the bamboo enterprises do not seem to consider support to be a priority compared to other sectors.

Although the enterprises face many difficulties in further development such as lack of capital, market information, and modern processing technology, the role of local authorities in supporting enterprises is ambiguous. These problems, which indeed have been repeatedly raised by the company and proposed to local authorities to find solutions, remain unresolved.

#### 5.3.4. Human resources

The company's employees are local people, and the number of workers has fluctuated over the years (Figure 5-12.). Due to the small production scale, the company has not recruited the positions of accountants, salespersons, and marketing. Family members are fully responsible for these positions; for example, the director's son is vice director, in charge of finance, human management, and cooperation with handicraft households; and the director's daughter manages the sales activities. The family members did not graduate from training courses and university and thus have had some difficulties in running the business.



**Figure 5-12. Number of employees from 2012-2016**

*Source: Own synthesis based on fieldwork 2015-2017*

The average age of employees is 43, and the number of female employees outweighs that of male employees. 90% of the workforce is women. The reason for this situation is that men have



left the handicraft village to work in industrial zones with higher income compared to what they get paid from enterprises in the village. Women are traditionally expected to do household chores and take care of their families, so they decide to stay in the village and work in enterprises.

Most of the employees have low educational qualifications since they only graduated from secondary or high school and did not go to the vocational center. For example, in 2016, 80% of employees graduated from high or secondary school, 20% were trained at vocational school, and none of them obtained a university degree.



**Figure 5-13. 1: Quality control section; 2: Dipping glue section**

*Source: Fieldwork (2017).*

The workers do not have signed labor contracts with the company, so they are deprived of their legitimate rights like social insurance. Figure 5-13 shows that the working conditions of the labor are so poor, and workers' income is low with only VND 3.6 million per month. As a result, annual labor turnover is high at 70%, and the company has difficulties in filling its positions.

Entrepreneur did not go to university, so he is not equipped with academic knowledge of business administration, international trade, and production management; this is why the entrepreneur has difficulties in making long-term business strategies and analyzing business opportunities. The entrepreneur cannot speak foreign languages, nor use a computer or the Internet, which prevents him from communicating with foreign customers and searching for market information.

Although the entrepreneur did not pursue higher education, he has practical experience in production since he was born into a family that has made bamboo and rattan handicraft products for many years. He learned lots of practical lessons from the previous generations of processing, weaving and designing products, as well as managing, cooperating with households in the village, and building good relationships with partners. He is also recognized as a master artisan by the local authority. These factors have helped a lot in running the business.

The director said that people in the village gradually abandon traditional work to for employment in garment and footwear factories because they are offered good incentives, high job security, protective clothing, and social insurance, as well as a higher salary than working in the bamboo and rattan enterprises. For example, if artisans work for footwear companies in industrial zones, they earn nearly twice the amount compared to the Case-II's payment, especially with the inclusion of social insurance. Furthermore, it is very difficult for bamboo enterprises to ensure stable jobs for the artisans all year round because of seasonal production. The enterprise has encountered many difficulties in completing orders on time in recent years due to a shortage of labor. The enterprise often has to negotiate with customers to prolong the delivery time, which causes them to lose competitive advantage to Chinese competitors who can finish orders in a shorter timeframe.

### **5.3.5. Production technology**

The fabrication of semi-finished products is subcontracted to the households. The coordination mechanism between the enterprise and households in producing the products is similar to that of Case-I (cf. section 5.2.5).

The director said that 90% of products are made to customers' own designs; for example, customers ask the company to produce samples based on their own designs, and if the samples are accepted by the customer with an agreement on quality and selling price, mass production will be implemented at the households.

The enterprise cooperates with approximately 300 households at handicraft villages in Chuong My, Hanoi, to produce the semi-finished products. There are no written contracts between households and the enterprise. The interviewed households said that the contracts are complex, and unnecessary between the two parties since they have known each other for a long time and live in the same commune, so mutual trust is based on verbal consent. One household also works for two or three competitors at the same time, as they do not want to rely solely on one enterprise.

To control the quality of products, the technical staff, the so-called "supervisory team," are sent to the handicraft households once a week to inspect the progress of the orders, the production processes, and the quality of the raw materials. If the supervisors find any mistakes, such as incorrect product color, incorrect product size, and fungi found in the raw material, the handicraft households will be asked to fix these mistakes before delivery to the factory. One production manager said that although the enterprise implements quality control, customers still

claim that its products have some problems; for example, some Chinese customers stated to the company that some products were broken, or the shape of some products was changed, or some products appeared blue-stained and moldy, with an error rate of approximately 0.05%.

In the first years, the vice director said that the enterprise had to depend on the weather because a lack of capital prevented them from drying products using drying machines. To be independent of the weather, enterprises invested in a coal drying system (Figure 5-14.); however, this system also presented some drawbacks. In detail, the gas emissions from the system cause pollution, and the heat is released unevenly so that products get moldy easily. Thus, the enterprise invested in the electric drying system to solve the disadvantages of the coal drying system. The company bought an electric drying system in 2012 at a total cost of nearly VND 50 million, and these investments were financed from their cash income.



**Figure 5-14. 1: Coal-heating oven; 2: Products dried in the sunshine**

*Source: Fieldwork (2017).*

The company has some small machines, such as two painting machines, one electric drier, and two packing machines. All machines were bought in the domestic market. However, most of the enterprise machinery comprises small machines, purchased almost ten years ago, so the value is almost depreciated. Therefore, the total value of machines in 2016 was VND 8.8 million.

### **5.3.6. Marketing activities**

The enterprise provides bamboo and rattan handicraft products, namely, bamboo trays, bamboo lamps, bamboo storage bins and baskets, and bamboo toys (Figure 5-15.). China, Taiwan, and Italy are the enterprise's international markets, in which revenue from Chinese customers makes up 80% of total revenue, followed by Taiwan and Italy with 15%. The domestic market takes only 5% of the total revenue. Its domestic customers are hotels and restaurants, namely

Hanoi Metropol hotel, Halong Novotel hotel, Kimino Japanese restaurant, and handicraft shops in Hanoi capital.



**Figure 5-15. 1: Semi-finished products stored in the workshop; 2: Final products at the workshop**

*Source: Fieldwork (2017).*

The customers actively contact the company by phone or e-mail to investigate information on products and services, and, if they are interested, they will visit the company to audit the company's capacity and negotiate a business contract based on selling price, quality, quantity, and distribution terms. Some traditional customers usually visit the company once a year to audit the production processes, quality of products, exchange new ideas about designs, and extend the business contract. In 2017, the company cooperated with five domestic distributors and three international distributors to deliver products to retailers. However, the company rarely interacts with its clients to ask for feedback on the quality of its products and after-sales service because of language barriers. This is a constraint in the communication with customers.

Taking part in international trade fairs is a good opportunity for enterprises to present themselves to the bamboo and rattan weaving manufacturing industry globally, as well as to introduce new products to potential customers, observe foreign competitors, and gain inspiration for new products and designs. However, the cost to participate in trade fairs is an amount of money beyond the financial capability of the Case-II. According to the Hanoi Bamboo and Rattan Association, an enterprise must pay at least VND 80 million for attending a handicraft trade fair in Hanoi, Vietnam, for four days, and the fee to take part in an international trade fair is much more elevated than a domestic trade fair.

The company has not provided quality certifications such as ISO 9001, because their production scales are too small, and the application procedure is complex and costly. To examine the quality of the products, the customers send a representative to the company for inspecting product quality before delivering. The enterprise has not developed a professional website, nor does it promote its products on social networks because of limited capital. As a result, the

enterprise has had difficulty accessing the markets and simply waits passively for customers to give their orders.

### **5.3.7. Innovation**

Director is a famous master artisan, receiving many prestigious awards from the national and provincial government for the best bamboo handicraft designs. He is therefore a key person to carry out innovation activities such as creating new designs, improving the quality of products, and adopting customers' designs. He regularly organizes meetings with other master artisans in the villages to exchange innovative ideas about products and production management.

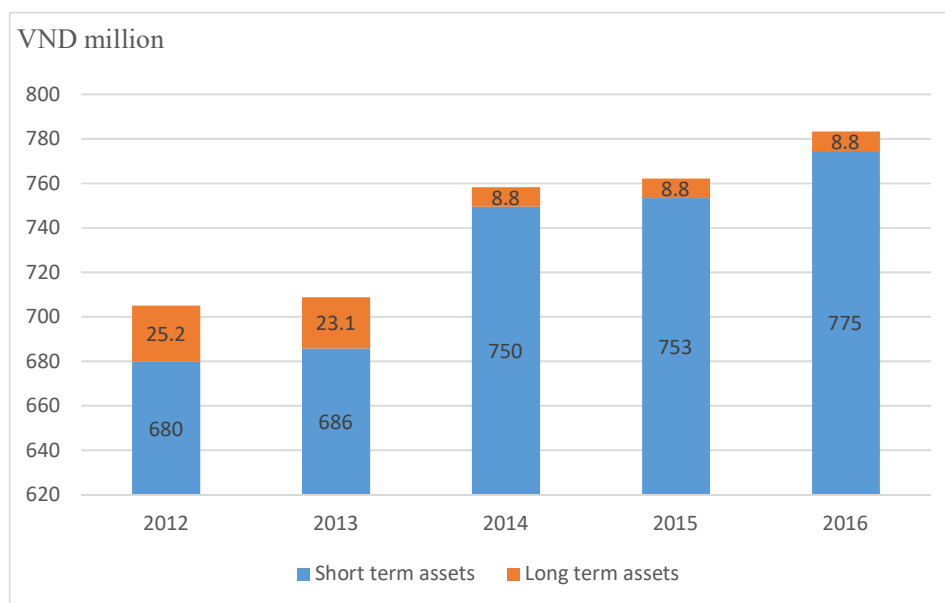
Annually, the company introduces approximately 15 new designs and 20 improved products. The quality of designs is limited because the company lacks professional designers, and most of the designs are monotonous and unprogressive. Therefore, its new designs do not fit with international customer concepts and culture, and most products made annually are based on designs provided by the customers.

When the enterprise receives a new design from a customer, the director is responsible for making a sample product and then sending it to the customer to gain their feedback. If the customer accepts the sample, he will train the households for mass production. Sample production plays a very important role in not only testing the feasibility of the products but also calculating the pre-production costs for a product to estimate the selling price.

The enterprise faces many difficulties in testing new materials, namely seagrass and cotton, because it has a small scale of production and does not have enough capital and human resources to invest in product research and development.

### **5.3.8. Financial resources and business performances**

The Case-II outsources the semi-finished products from handicraft households, and the main production stages are made by hand, so the company has not invested much in its long-term assets, namely factory and machines. Therefore, there is a considerable difference in ratio between long-term and short-term assets, in which the value of the short-term assets makes up more than 97% of the total assets. Figure 5-16 shows that short-term asset value increased slightly from VND 680 million in 2012 to VND 775 million in 2016, while long-term asset value stood at a small value of VND 25.2 million in 2012, and reduced to VND 8.8 million in 2016.



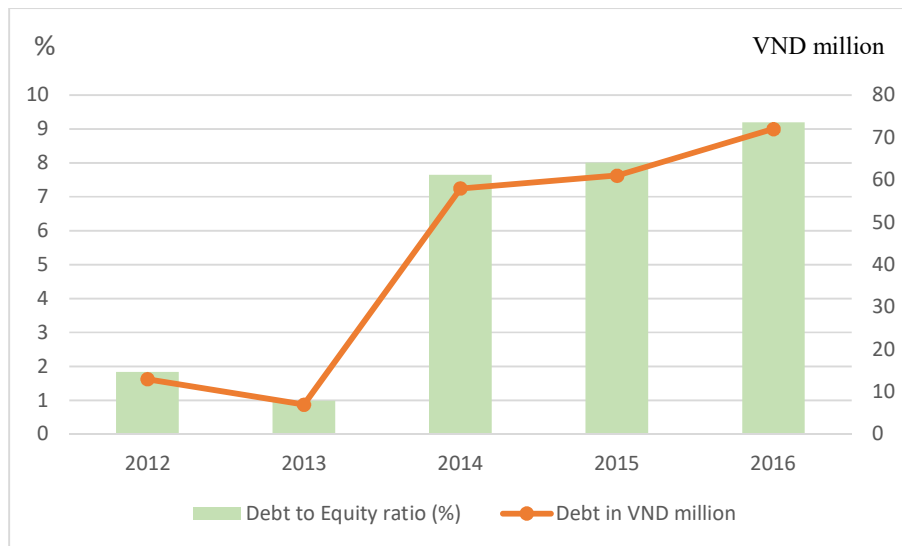
**Figure 5-16. Short-term and long-term assets from 2012-2016**

*Source: Own calculation based on financial data of Case-II (2012-2016)*

The company has a high demand for loans to pay funds in advance to households. Approaching capital from banks is difficult due to the complex loan procedures. To obtain loans, the enterprise must provide banks with collateral, business plans, and sources of monthly interest payment (Box 5-10). Due to small-scale production, the enterprise finds it hard to meet banks' requirements for loans. As a result, the company's debt is short-term, created by payables to households and tax debts at an average rate of 1.84% in 2012 and 9.19% in 2016 (Figure 5-17.).

*Box 5-10: Complicated procedures for borrowing credit from banks.*

*Director said that his company borrowed 200 million VND from a bank in March 2017. However, to get 200 million VND from the bank, his company suffered from working papers such as he submitted his land use right certificate (the so-called "red book") as collateral. In addition, when all borrowing documents are submitted completely, a bank clerk asked him to pay 5% of value of the loan as a bribe to access the capital. (Director, Case-II, April 23<sup>rd</sup>, 2017)*



**Figure 5-17. Debt to equity ratio from 2012 -2016**

*Source: Own calculation based on financial data of Case-II (2012-2016)*

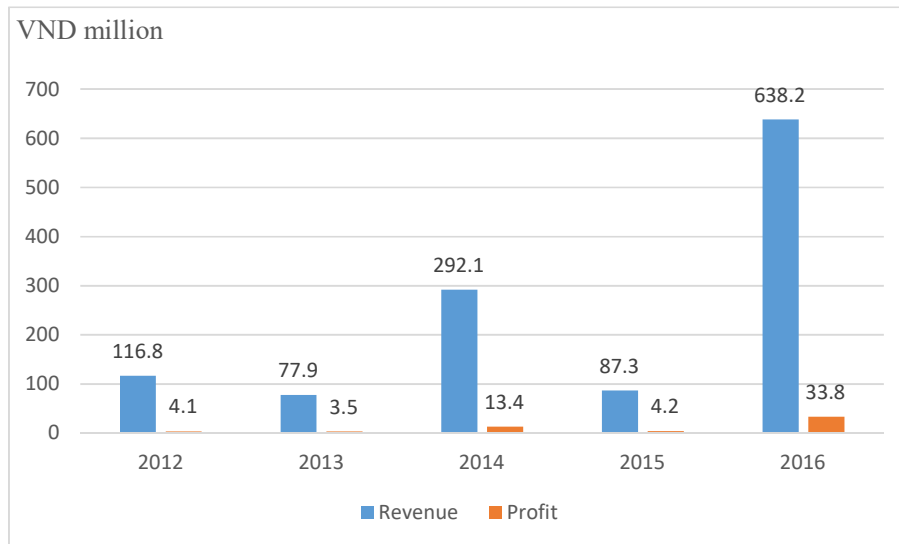
The Case-II cooperates with the households to produce semi-finished products, and the biggest expenditure is payable to households, with over 60% of total production cost, followed by labor and selling costs at over 11% and less than 10% of total production cost, respectively (Table 5.8.).

**Table 5.8. Cost structure of Case II in 2016**

Cost structure	VND million/year	Percentage
Depreciation of fixed assets	3	0,5
Interest expenses	3	0,5
Payable to households	365	60,4
Labor cost	68	11,2
Raw material expense	47	7,9
Selling expenses	59	9,7
Administration Expenses	53	8,7
Income tax expense	7	1,1
Total	604	100

*Source: Own calculation based on financial data of Case-II (2016)*

The enterprise is under competitive pressure from both domestic and international rivals in the form of the selling price because the production capacity of the enterprise is limited. Sales activities are not implemented, so the enterprise is highly passive in selling its products. Therefore, the enterprise does not have regular customers, and revenue fluctuated between 2012 to 2016 (Figure 5-18.).



**Figure 5-18. Revenue and profit from 2012-2016**

*Source: Own calculation based on financial data of Case-II (2012-2016)*

Figure 5-18 presents that the revenue of the enterprise in 2012 was recorded at VND 116.8 million, but decreased considerably to VND 77.9 million in 2013 and then rose sharply to VND 638.2 million in 2016. Due to unstable revenue, profit has also fluctuated over the years; the enterprise’s earnings in 2014 were VND 13.4 million and decreased to VND 4.2 million in 2015, then increased again to VND 33.8 million in 2016.

### **5.3.9. Distribution of value-added along the bamboo lamp value chain**

Bamboo Nua is also the main material in the production of the bamboo lamp. The supply, harvesting, and distribution processes of Nua bamboo from harvesters to traders to make bamboo lamps are the same as those for the bamboo bowl value chain. Similarly, the value-added per ton for harvesters and traders was estimated in Case-I (cf. section 5.2.9). Therefore, this section merely presents the estimate of the value-added for households and enterprise levels.

The bamboo lamp is one of the most popular products, so it has been chosen to estimate the value-added in this case study. The amount of Nua bamboo used to produce a bamboo lamp depends heavily on the size and design of the lamp, the quality of the raw material, and the craft of the artisans. The price of Nua bamboo often fluctuates according to the month and production season. The households interviewed said that to produce a bamboo lamp with dimensions of 20cm in diameter and 40cm in height, required an average of 3.5 kilograms of fresh Nua bamboo.



**Table 5.9 Costs, profit margin and value-added at handicraft households**

No	Cost items, price, and income	VND/lamp	VND/ton
1	<b>Semi-finished product price</b>	<b>80,000</b>	<b>21,551,724</b>
2	<b>Material cost</b>	<b>26,160</b>	<b>7,047,414</b>
-	Bamboo	23,200	6,250,000
-	Accessories	1,280	344,828
-	Processing material cost	1,680	452,586
3	<b>Costs for services</b>	<b>600</b>	<b>161,638</b>
-	Payments to suppliers (water, electric)	400	107,759
-	Interest	0	0
-	Transportation cost (fuel)	200	53,879
4	Labor cost (opportunity cost)	24,000	6,465,517
5	Depreciation	240	64,655
6	Taxes and local duties	0	0
7	<b>Total cost (2+3+4+5+6)</b>	<b>51,000</b>	<b>13,739,224</b>
8	<b>Net profit (1-7)</b>	<b>29,000</b>	<b>7,812,500</b>
9	Profit margin % (8/1)	36.3	36.3
10	<b>Value-added (4+6+8)</b>	<b>53,000</b>	<b>14,278,017</b>

Source: Field data (2015-2017)

Bamboo lamps are produced manually by artisans, so labor cost is the biggest contribution at VND 24,000 per lamp. The material cost stands in second place at VND 23,200 per lamp. In fact, households do not have to get bank loans, since they receive payment in advance from enterprises, and they do not have to pay any taxes or duties. After deducting all costs, the net profit is estimated at VND 29,000 per lamp, and the value-added is equivalent to VND 14,278,017 per ton (Table 5.9.).

In addition to bamboo lamps, enterprises produce several different handicraft products. Thus, a lot of intermediate inputs and labor are used in the production of the bamboo lamp. Most of the intermediate inputs and costs were thoroughly observed and documented by in-depth interviews with directors, managers, workers, and investigation of the enterprise's distribution cost reports.

The enterprise hired households to make the semi-finished products, so the cost of making a semi-finished product constitutes the biggest proportion in the whole production process, at VND 80,000 per lamp. The labor cost and transportation cost from the factory to the port stands at VND 10,800 and VND 2,240 per lamp, respectively. The enterprise contributes VND 3,782

per lamp to the state budget in the form of taxes and duties. Thus, net profit is estimated at VND 15,129 per lamp, and value-added is equivalent to VND 8,004,095 per ton (Table 5.10.).

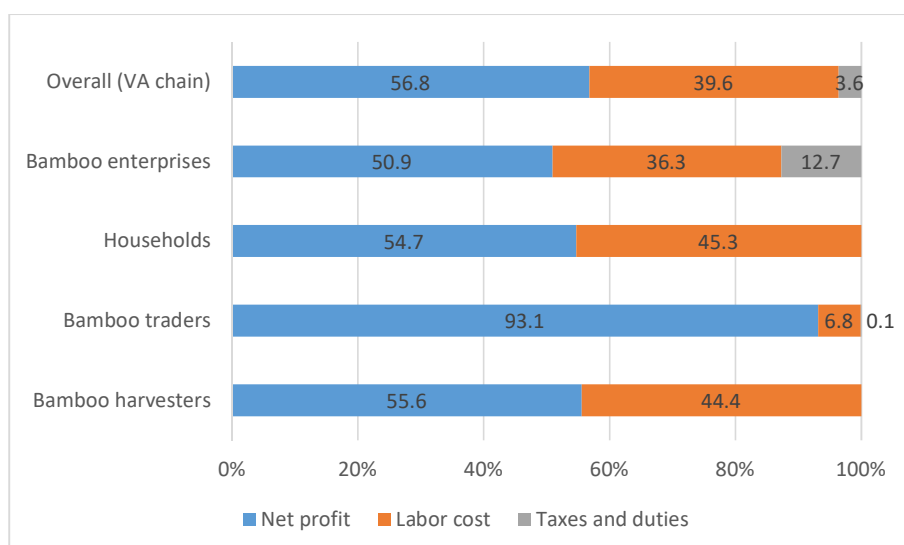
**Table 5.10. Costs, profit margin and value-added at Case - II**

No	Cost items and income	VND/lamp	VND/ton
<b>1</b>	<b>Export-FOB price</b>	<b>115,000</b>	<b>30,980,603</b>
<b>2</b>	<b>Material cost</b>	<b>81,600</b>	<b>21,982,759</b>
-	Semi-finished product	80,000	21,551,724
-	Accessories	1,600	431,034
<b>3</b>	<b>Costs for services</b>	<b>3,537</b>	<b>952,802</b>
-	Payments to suppliers	2,800	754,310
-	Selling expenses (excluding labor cost)	312	84,052
-	Administration cost (excluding labor cost)	160	43,103
-	Interest	65	17,457
-	Transportation from households to factory	200	53,879
-	Transportation from factory to port	2,240	603,448
4	Depreciation	152	40,948
5	Labor cost	10,800	2,909,483
6	Taxes and duties	3,782	1,018,922
<b>7</b>	<b>Total cost (2+3+4+5+6)</b>	<b>99,871</b>	<b>26,904,914</b>
<b>8</b>	<b>Net profit (1-7)</b>	<b>15,129</b>	<b>4,075,690</b>
9	Profit margin % (8/1)	13.16	13.16
<b>10</b>	<b>Value-added (5+6+8)</b>	<b>29,711</b>	<b>8,004,095</b>

Source: Field data (2015-2017)

### 5.3.10. Value-added and appropriation

Figure 5-19 shows that actors have contributed differently to the total value-added. In particular, bamboo traders only collect bamboo from harvesters and then sell to households, and they do not pre-process the raw materials. Hence, the labor cost of this stage merely accounts for around 7% of the value-added, whereas net profit makes up the rest of the value-added. Conversely, labor cost at the harvester and household level comprises over 40% of the value-added, because this stage of the production process is done manually and requires intensive involvement of labor. Net profit has contributed largely to the total value-added along the value chain with over 56%, while labor cost, and taxes and duties, respectively, account for nearly 40% and 4% of the total value-added.



**Figure 5-19. Distribution of value-added across the bamboo lamp value chain**

*Source: Extracted from Tables 5.8-5.10*

Households make up over 50% of the total value-added, which proves its important role along the value chain in comparison with other actors. Bamboo enterprises and harvesters amount to over 28% and 13% of total value-added, respectively, whereas bamboo traders have the least contribution to the total value-added at around 8% (Table 5.11.).

**Table 5.11. Value-added in the bamboo lamp value chain**

	Net profit (VND/ton)	Labor cost (VND/ton)	Taxes and duties (VND/ton)	Value added (VND/ton)	Percentage
Bamboo harvesters	2,065,000	1,650,000	0	3,715,000	13.17
Bamboo traders	2,062,269	150,000	1,851.9	2,214,120	7.85
Households	7,812,500	6,465,517	0	14,278,017	50.61
Bamboo enterprises	4,075,690	2,909,483	1,018,922	8,004,095	28.37
<b>Total</b>	<b>16,015,458</b>	<b>11,175,000</b>	<b>1,020,774</b>	<b>28,211,232</b>	<b>100</b>

*Source: Extracted from Tables 5.8-5.10*

The harvesters interviewed said that their value-added could be improved if an investment was made in a harvest road, to make transportation of Nua bamboo more convenient, since this would enable specialized vehicles to get closer to the forest, and thus transportation productivity would be increased. However, this investment into costly infrastructure is beyond the harvesters' financial ability, and thus harvesters need the assistance of the local authority in building better infrastructure to enhance harvesting productivity.

## **5.4. Comparative analysis of the two handicraft case studies**

### **5.4.1. Introduction**

Earlier sections of this chapter have given a comprehensive description of resources affecting Case-I and II upgrading. The degree of influence among factors on enterprise upgrading varies widely according to the changes in the business environment and current situation of each enterprise. Therefore, the purpose of this section is to demonstrate similarities and differences in terms of the main factors affecting growth of Case-I and II. Comparing the factors affecting enterprise upgrading explores why Case-I has managed and expanded its business while Case II has not. Based on the analysis results of Case-I and II, the main factors selected for comparison include the supply of semi-finished products, support from NGOs and local governments, human resources, production technology, marketing, innovation, business performances, and value-added distribution among chain actors.

### **5.4.2. External factors**

#### ***Supply of semi-finished products***

Case-I has connected over 800 households to produce semi-finished products. Case-I cooperates with households not only within Chuong My district but also with other households in Nam Dinh and Ninh Binh province to diversify product suppliers; this helps the company to not be dependent on households in just one area. Case-II has a smaller production scale, so the company only cooperates with 300 households in Chuong My district. There is a shortage of supply of skilled artisans in the handicraft villages due to the massive migration from rural areas to the city in search of more stable jobs and better incomes. Therefore, the company's dependence on one handicraft village causes difficulties in fulfilling orders on time.

#### ***Institutional conditions***

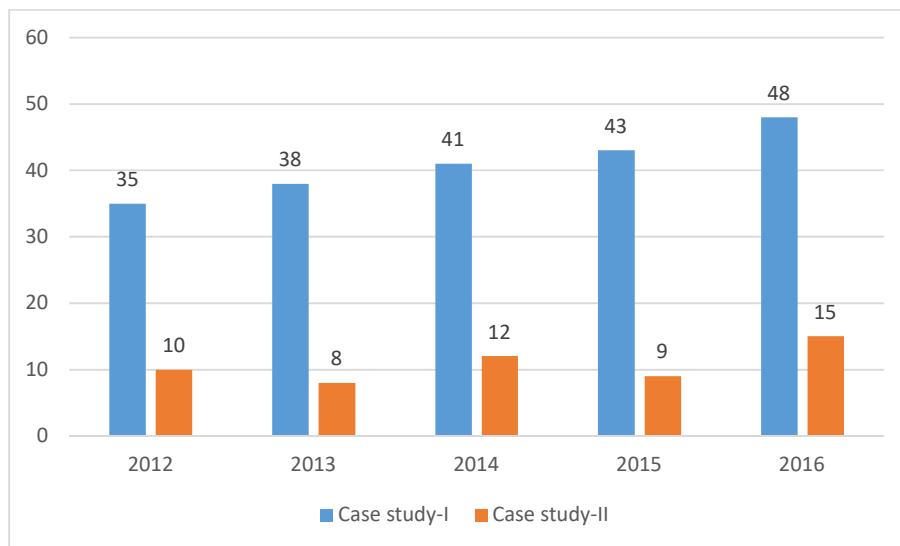
Several enterprises have managed to receive support from the government and organizations despite the unbalanced distribution of support among enterprises. The personal relationship between the director and the local authority, as well as organizations, plays a critical role in winning their support. The director of Case-I has established a good relationship with the local authority, so the enterprise has regularly updated information and used policies from the locality. Moreover, compared to other counterparts, Case-I loan procedures from banks are less complex, and processing time for loan applications is shortened. The director was also sent on

training courses in 2010 and 2015 to improve his management and marketing capacity. Conversely, the director of Case-II failed to develop the relationship with the local authority and organizations, so the company lacks interaction with authority and rarely receives the local support available; this poses a serious problem of an unequal business environment and dissatisfaction with state policies and mistrust of local authority.

### 5.4.3. Internal factors

#### *Human resource*

It is a fact that both Case-I and Case-II outsource the production of semi-finished products to households, and the two companies are only involved in a few simple stages to complete the products. The enterprises employ far fewer employees than other production industries. The number of employees in Case-I and Case-II in 2016 were 15 and 48, respectively. Figure 5-20 shows minor fluctuation in the number of employees over the years. While the number of employees in Case-I has increased slightly, the employee numbers of Case-II has experienced minor ups and downs over the years.



**Figure 5-20. Number of employees from 2012-2016**

*Source: Own calculation based on fieldwork (2012-2017)*

There is a big difference in terms of labor quality among the two enterprises. At Case-I, all employees who work in sales, accounting, marketing, and administration, as well as managers, have university degrees. Only employees directly working in the section of packaging, painting, product quality control graduated from vocational and high schools. On the contrary, the labor qualification at Case-II is much lower. None of the employees had a university degree, only 20% undertook vocational training, and the rest graduated from high schools.

Regarding the managerial level, the director and managers of Case-II were born and grew up in a family with a rich tradition of making bamboo and rattan handicraft products. Thus, they have been imparted hands-on knowledge and experience from past generations in terms of material processing, weaving skills, and cooperation with households, which plays an important role in training new workers and developing the business. However, their lack of academic knowledge has hindered the director and managers from running the company effectively, especially through economic difficulties.

Conversely, the director and managers of Case-I not only graduated from university, but also received continuous training courses to improve their academic knowledge, which has helped them to build wise business strategies including joining trade fairs to introduce new products, and innovation in design and marketing to upgrade the enterprise. However, the director of Case-I stated that he lacks practical experience in making handicraft products, which has caused some certain difficulties for him in monitoring production and cooperating with households. In short, to sail a business boat through the challenges and reap the success, it is required that the director has both the academic knowledge and practical experiences in production.

### ***Production technology***

Since the production process is mostly done manually by households, enterprises do not invest in modern machinery and technology. Electric driers are considered as their most important machines because the driers help enterprises to no longer be dependent on the weather to dry products in the rainy season. These machines ensure that products are not damaged by bad weather conditions like mold, and improve the production capacity of the enterprise to complete orders on time. Case-I and II both invested in an electric drying system in 2010 and 2012, respectively, but Case-I has more machines than Case-II. For instance, in 2016, Case-I had five paint sprayers, fifteen trolleys, five electric driers, and six packaging machines with a value of VND 500 million, whereas Case-II had two painting machines, one electric drier, and two packing machines. It is noticeable that Case-II machines were mostly depreciated, and their total value was reported at VND 8.8 million in 2016. Indeed, the company has difficulties in investing in new machinery due to a lack of financial capacity.

### ***Marketing activities***

Case-I has a wider range of products than Case-II. In detail, while Case-I sells not only bamboo and rattan products but also seagrass and cotton products, Case-II merely supplies bamboo and rattan products to the market. International markets are the main target of the two companies. Case-I aims to export to the USA, Europe, and Japan, which are the demanding markets of

high-quality products. In contrast, Case-II targets the less demanding markets of China and Taiwan.

The scale of marketing activities differs significantly among the two enterprises due to the differences in production scale and financial capacity. Case-I has invested greatly in marketing activities, including registering ISO 9001 certification on product quality, regularly attending domestic and international trade fairs, developing the company website, and promoting products on social media. All these marketing activities have helped the company access international markets conveniently. On the other hand, Case-II has met tremendous difficulties in accessing new markets due to the absence of marketing activities and wise business strategies.

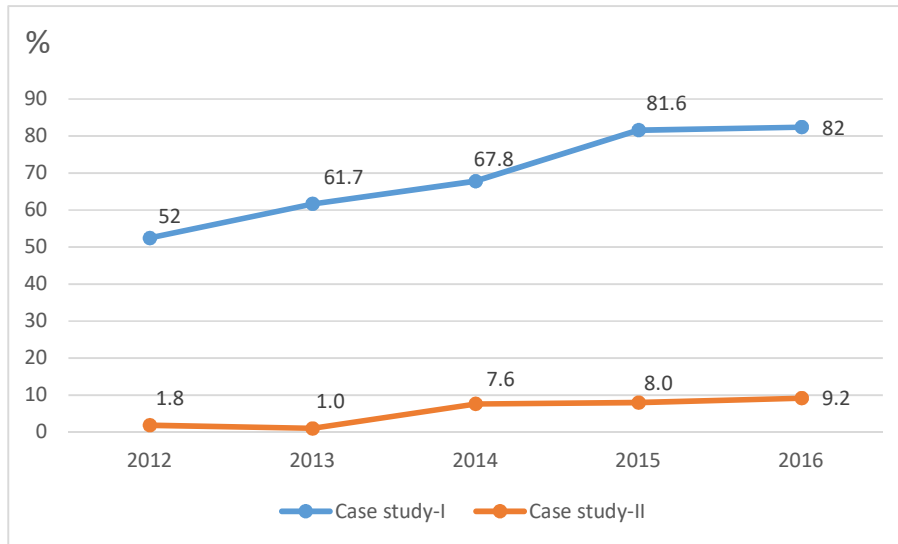
### ***Innovation***

The innovation level varies greatly between the two case studies. Case-II depends heavily on bamboo and rattan to make products, which curbs production diversification and designs. Conversely, Case-I relies not only on bamboo and rattan but also uses seagrass and cotton to make its products. It is clear that diversification of materials has opened more opportunities for Case-I to introduce new products and designs to customers.

Case-I presents ten new designs and 15 modified products each year. Thanks to the professional designers, Case-I designs can keep up with modern trends and satisfy international customers. Thus, 30% of these designs were chosen by international customers. Although Case-II does not have a design team, its director is a master artisan himself, and he introduces 15 new designs and over 20 modified products annually. These designs are not favored by customers since they are less attractive than those of its counterparts.

### ***Financial resources***

The ability to access bank credit is considered as one of the most important factors affecting the development of the businesses. However, only Case-I managed to get bank loans because it met all the requirements from the bank. Thanks to available capital, the company has a great competitive advantage in investing in marketing activities and advancing households. Figure 5-21 shows that the debt to equity ratio of Case-I in 2016 was over 80%, whereas this figure for Case-II stood at only 9%. In fact, this inaccessibility of bank loans is a big barrier to Case-II in implementing business plans and expanding production.

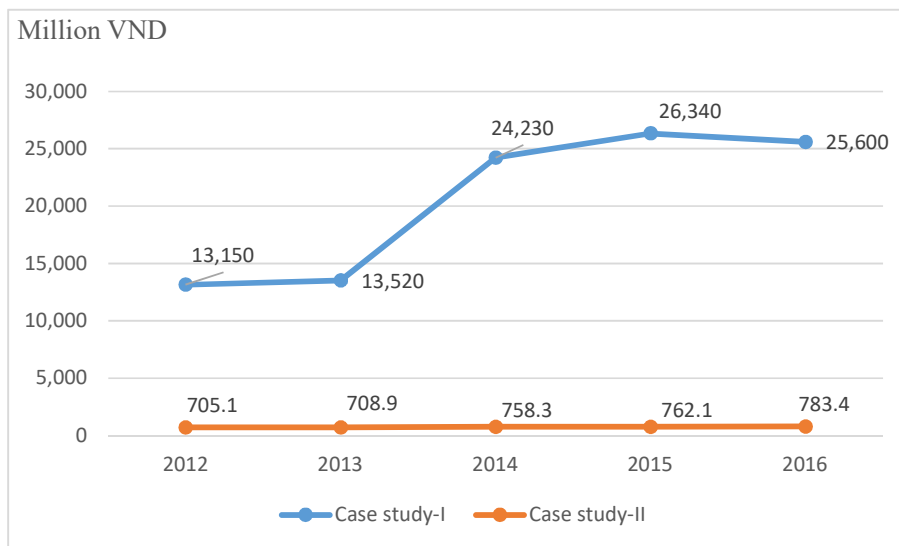


**Figure 5-21. Debt to equity ratio between Case I and II, from 2012-2016**

*Source: Own calculation based on financial data of Case I and II (2012-2016)*

#### 5.4.4. Business performances

Case-I expanded its production by reaching out of Chuong My district to cooperate with households in Nam Dinh and Ninh Binh province in 2014 and 2017, respectively. As a result, the company's production scale has increased significantly over the past years.



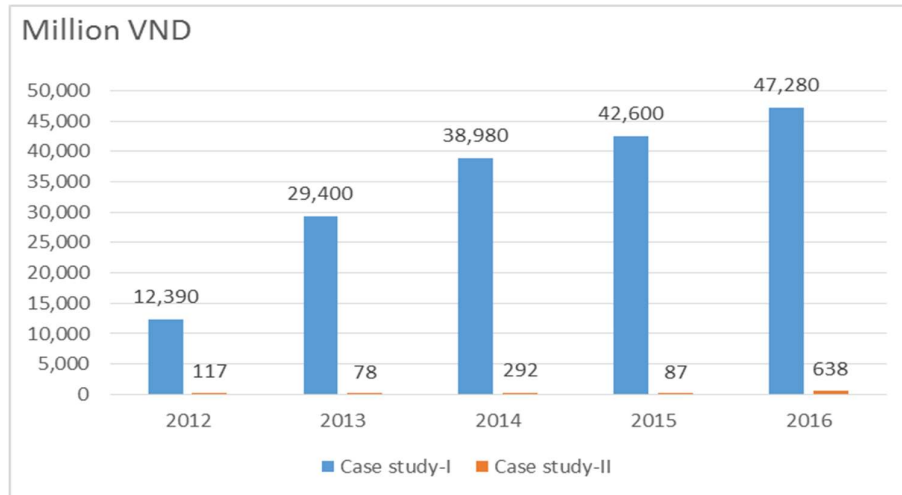
**Figure: 5-22. Total assets between Case I and II, from 2012-2016**

*Source: Own calculation based on financial data of Case I and II (2012-2017)*

For example, the total asset value almost doubled from VND 13,150 million in 2012 to VND 25,600 million in 2016. In contrast, since Case-II has not expanded its production, the total asset value has remained almost unchanged over the past years (Figure 5-22.).



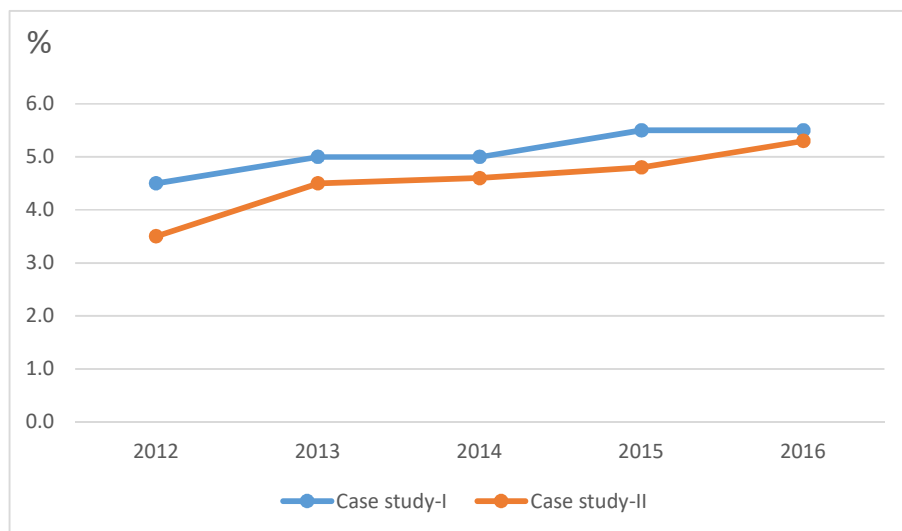
Case-I revenue has increased quickly over the years. In particular, the company’s revenue in 2012 was VND 12,390 million, and this figure increased nearly fourfold to VND 47,280 million in 2016 (Figure 5-23.). This performance was the result of wise investment in marketing and innovation activities. Conversely, Case-II turnover has fluctuated markedly over the years. Severe competition from both domestic and international markets, together with the absence of marketing strategies, are the two main reasons why the company has lost its regular customers.



**Figure 5-23. Revenue between two Case I and II from 2012-2016**

*Source: Own calculation based on financial data of Case I and II (2012-2017)*

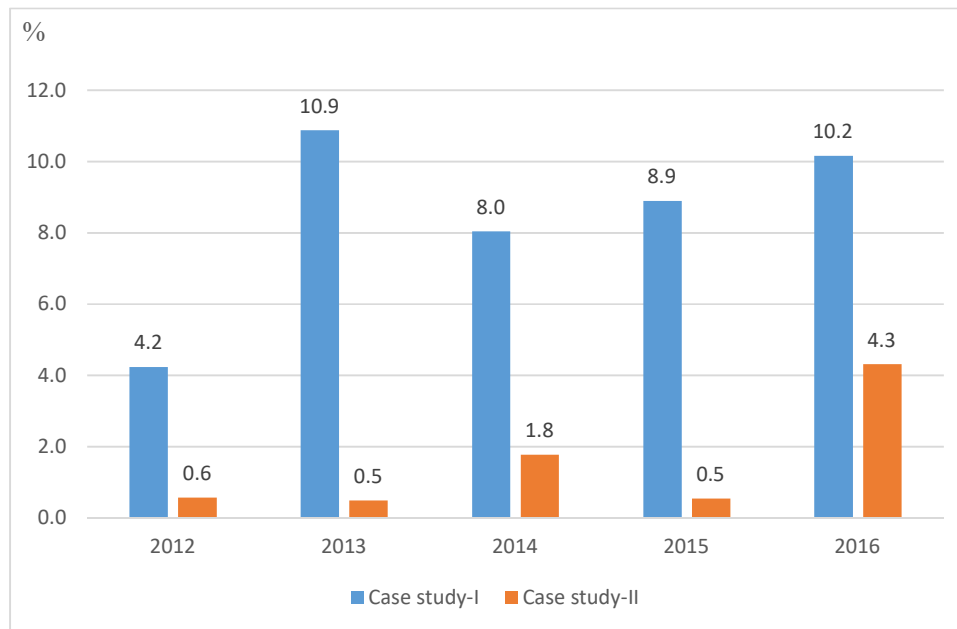
Regarding net profit margin, the profitability of Case-I was higher than that of Case-II during 2012 - 2016. (Figure 5-24.). This indicator shows that Case-I investment in production and marketing is more effective than Case-II.



**Figure 5-24. Net profit margin between Case I and II, from 2012-2016**

*Source: Own calculation based on financial data of Case I and II (2012-2017)*

ROA shows how effectively a company manages and uses its assets to generate profit, Figure 5-25 demonstrates that Case-I has used its assets more effectively than Case-II. For instance, whereas ROA of Case-II in 2016 was equivalent to 4.3%, the figure for Case-I reached 10.2%.



**Figure 5-25. ROA between Case I and II, from 2012-2016**

*Source: Own calculation based on financial data of Case I and II (2012-2017)*

All the indicators of Case-I, including revenue, net profit, ROA, and the accessibility of bank loans, stood at a higher level than those of Case Study II. This proves that Case-I has managed and expanded its business more effectively than Case-II.

#### **5.4.5. Comparison of the value-added by actors of the value chains**

Table 5.12 demonstrates that different stakeholders contribute value-added to the total value-added and economic indicators among stakeholders in the value chains. The enterprise level in the bamboo bowl value chain dominates the value-added compared to other actors. It contributes nearly 54% of the total value-added. In contrast, the handicraft household in the bamboo lamp value chain is the most important actor since it accounts for nearly 51% of total value-added (Table 5.12).

As opposed to the value-added by the enterprise level in two value chains, enterprises in the bamboo bowl value chain created close to VND 21 million per ton raw material, whereas the figure in the bamboo lamp value chain reached only around VND 8 million per ton (Table 5.12). Furthermore, the total value-added of the bamboo bowl value chain (around VND 31 million per ton) was higher than that of the bamboo lamp value chain (around VND 28 million per ton);

this shows that the bamboo bowl value chain is more effective in generating profit, jobs, and contribution to the local budget than the bamboo lamp value chain.

**Table: 5.12. Distribution of the value-added by actors of value chains**

Analytical level	Variables	Bamboo bowl value chain	Bamboo lamp value chain
<b>Harvesters</b>	Value-added (VND/ton), compared with total value-added (%)	3,715,000 (9.73%)	3,715,000 (13.17%)
	Producers' share (% of FOB price)	7.6	12.1
	Return on labor <sup>5</sup> (VND/day)	247,667	247,667
<b>Local traders</b>	Value-added (VND/ton), compared with total value-added (%)	2,214,120 (5.8%)	2,214,120 (7.85%)
	Profit margin (%)	33	33
<b>Households</b>	Value-added (VND/ton), compared with total value-added (%)	11,655,093 (30.53%)	14,278,017 (50.61%)
	Producers' share (% of FOB)	46.8	69.6
	Profit margin (%)	20.4	36.3
<b>Enterprises</b>	Value-added (VND/ton), compared with total value-added (%)	20,587,702 (53.93%)	8,004,095 (28.37%)
	Profit margin (%)	17.28	13.16
	Taxes and duties (VND/ton)	2,137,885	1,018,922
	Average wage (VND million/month)	5.5	3.6
<b>Value chains</b>	Total value-added (VND/ton)	38,171,915	28,211,232
	Value-added per final sale (%)	77	91.1
	Local value-added	Very low (almost all farmers and trades sell Nua bamboo without processing)	Very low (almost all farmers and trades sell Nua bamboo without processing)

Source: Own elaboration based on empirical result Chapter 5

<sup>5</sup> Most of smallholders do not usually pay for labor, since it is mainly family labor. Therefore, return on labor, considered benefit per 8 h labor, is the gross margins divides total working day. The gross margins is calculated by deducting total costs, excluding labor costs, from total revenue (Armengot et al., 2016).

#### **5.4.6. Synthesis of handicraft case study results**

The handicraft case study results show that handicraft households play an important role in making semi-finished products for enterprises. Yet little investment has been made to train artisans and buy processing machines. Therefore, most of the production process has been done manually with low productivity. Productivity can be improved by using machines in a number of stages in the production process such as cutting bamboo and drying products. The rapid urbanization in Vietnam has posed a threat to the labor resource in handicraft villages since there are many new industries that are offering a better and more stable income to attract artisans. Indeed, the labor force in handicraft villages now includes senior citizens or people who are not specialized to work in industrial zones and even the children after school time. Enterprises are facing a shortage of skillful labors who can make high quality products. In order to attract these labors to the bamboo handicraft industry, joint efforts of all stakeholders are necessary. Enterprises need to sign a long-term contract with artisans, improve the working conditions, and partially pay for their health insurance. Also, vocational training courses for artisans to sharpen their working skills are needed, which might be offered by the government and NGOs.

Investment in innovation in design and marketing activities has greatly contributed to the successful penetration of the international markets. However, most of the small-scale enterprises fail to implement marketing activities as well as research and develop new products. As a result, it is of necessity for enterprises to cooperate in executing marketing activities. The government and associations should create favorable conditions and connect the enterprises with the research centers to develop new products.

Regarding the characteristics of entrepreneurs, personal network and educational background of entrepreneurs play a crucial role in upgrading enterprises. Thanks to a close relationship between the owner of Case-I and the bank, it is relatively easier for this company to access the bank loans. The updated knowledge about marketing, international trade, and finance gaining from training courses has helped the owner of Case-I lead the company to overcome all the challenges and adapt to the market changes. Hence, to upgrade the business, it is necessary for entrepreneurs to have both practical experiences and profound knowledge about finance, accounting, international trade, and marketing.

## CHAPTER 6

### SMALL SEMI-INDUSTRIAL ENTERPRISES

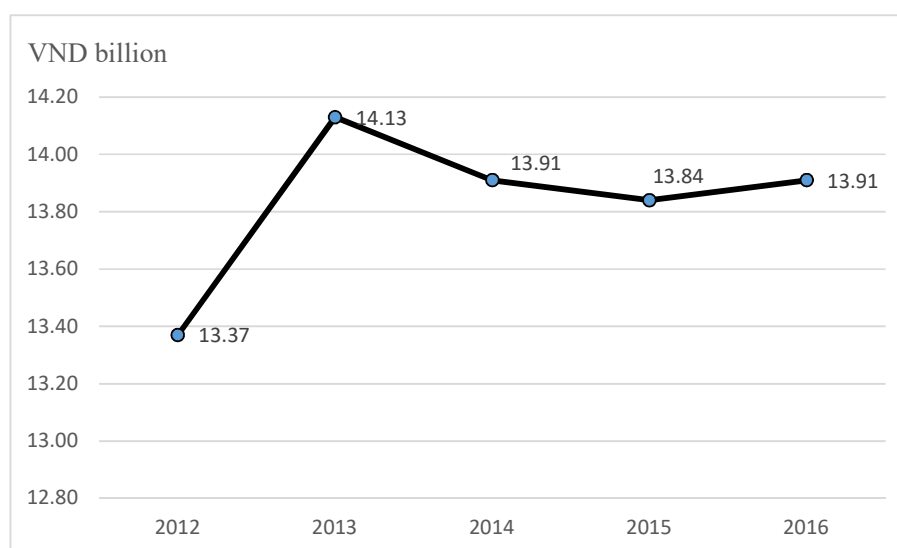
#### 6.1. Introduction

Most of the semi-industrial enterprises run small scale with outdated technology and machinery. The bamboo processing enterprises produce semi-industrial finished products like disposable chopsticks, votive paper, and traditional furniture, which are then used as material inputs in the production of the final products. The semi-industrial products are distributed to both domestic and international markets. The main characteristics of the enterprises and selection of semi-industrial case studies are further detailed in Chapter 3 (cf. section 3.2.2).

#### 6.2. Case Study-III

##### 6.2.1. History of development

Case Study-III (Case-III), a private family business, was founded in 2005 in Quan Hoa District, Thanh Hoa Province. The enterprise has offered disposable chopsticks and skewers since it was established. The disposable chopsticks have been widely consumed both in Vietnam and Taiwan.



**Figure 6-1. Total assets from 2012-2016**

*Source: Own calculation based on the financial statement of Case-III (2012-2016).*

The company has faced tremendous difficulties in expanding its production scale and entering new markets. Its total assets in 2012 were VND 13.37 billion, and this number only rose to VND 13.91 billion in 2016 (Figure 6.1). The number of employees in 2012 was 150, but this declined by more than half to 62 in 2016. Due to a shortage of capital the enterprise experienced challenges in investing in production, marketing, and innovation.

### 6.2.2. Raw material supply

Bamboo Luồng is the main material for making chopsticks. Bamboo Luồng is planted mainly in Quan Hoa, Ba Thuoc, and Lang Chanh Districts in Thanh Hoa Province, and is harvested manually. One or two local bamboo traders in each village collect bamboo Luồng from bamboo growers and sell it to bamboo-processing enterprises. Normally, it takes bamboo traders from three to five days to collect enough bamboo for an order from the company. The Director of Case-III stated that it is difficult to compete with local bamboo traders in purchasing bamboo Luồng from bamboo growers because bamboo traders have long-established relationships with bamboo growers, as they live in the same village. Local bamboo traders usually support bamboo growers by lending them money to pay for their children's school tuition fees, organize wedding parties, or repair their houses. As a consequence, the bamboo growers prioritize selling bamboo to these traders. Local bamboo traders possess farm tractors, which greatly assists bamboo growers to collect and transport bamboo in mountainous areas.



**Figure 6-2. 1: Fresh bamboo stored; 2: Fresh bamboo cut at Case-III**

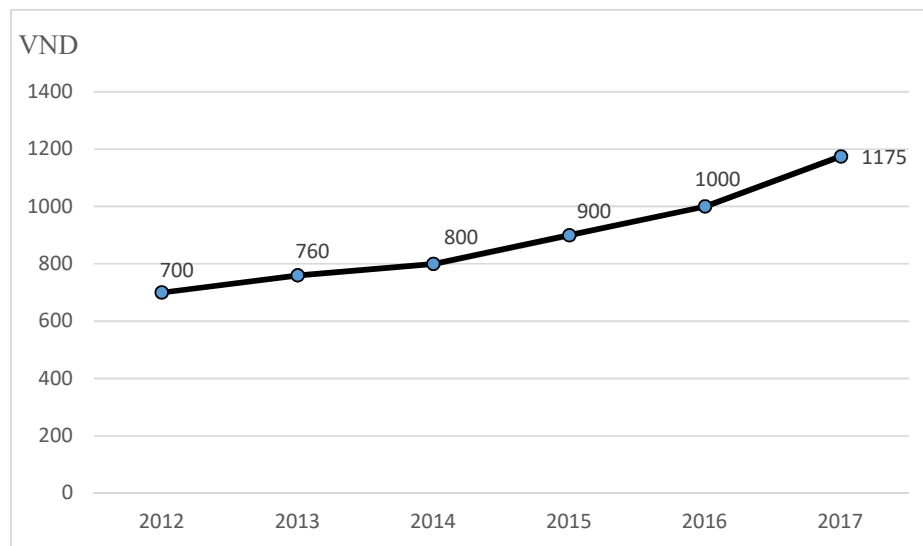
*Source: Fieldwork (2017).*

Case-III consumed over 300 tons of fresh bamboo per month in 2017, which was provided by eight bamboo traders in Quan Hoa District. The company respondents stated that the quality of Bamboo Luồng is evaluated based on the following criteria: (1) it has not been damaged by wood-destroying insects; (2) it must be at least two-years-old; (3) its length must be approximately nine meters and its diameter at least ten centimeters; and (4) its trunk must be

straight and sufficiently fresh. The quality of Bamboo Luồng has been decreasing in recent years.

The price of bamboo Luồng depends highly on its quality and the season. It is most often purchased by companies by the kilogram. Its price has risen by 40% compared to its price five years ago, while the national inflation rate in the five years was over 5%<sup>6</sup>. For example, in 2012, the cost of one kilogram of bamboo Luồng was VND 700, but this price increased to VND 1,175 per kilogram in 2017 (Figure 6.3). In the bamboo shoot season or the rainy season, the price can increase to VND 1,300 per kilogram.

Bamboo Luồng is grown in mountainous areas with high slopes, and the harvesting sites are located far from roads. Consequently, it can be quite difficult for bamboo growers to harvest and transport bamboo. The bamboo shoot season takes place from June to October, and people are advised not to harvest Bamboo Luồng during this time because mature bamboo Luồng is responsible for protecting bamboo shoots from storms. Bamboo Luồng is collected and sold less in this season, and the price can go up by 30-40% accordingly.



**Figure 6-3. The average price of fresh bamboo per kilogram from 2012 to 2016**

*Source: Own synthesis based on fieldwork 2015-2017.*

The bamboo Luồng market in Thanh Hoa Province has also experienced fierce competition from votive paper enterprises. For instance, the Director of Case-III stated that it is becoming increasingly challenging to purchase bamboo Luồng since the votive paper industry has developed. Votive paper enterprises do not require bamboo traders to grade quality of bamboo, whereas the chopsticks production process needs bamboo Luồng to be of high quality. This

<sup>6</sup> <https://cafef.vn/kinh-te-viet-nam-10-nam-thang-tram-2019010910072395.chn>

imposes a major burden on bamboo traders, as they have to spend time and human resources to classify bamboo Luồng while bamboo Luồng prices do not seem to be sufficiently differentiated by quality grade. Therefore, bamboo traders also prefer selling Bamboo Luồng to votive paper enterprises over chopsticks enterprises.

An officer of the Agriculture and Rural Development Department of Quan Hoa District reported that the quality of bamboo Luồng in Quan Hoa District has decreased significantly in recent years. For example, the bamboo shoots of Bamboo Luồng were destroyed by wood-destroying insects at a rate of 18% in 2017, compared to only 5% five years ago. The diameter of bamboo Luồng is two to three centimeters smaller than it was 10 years prior because the quality of the soil used has greatly diminished due to the lack of fertilizer over many years. Farmers have low awareness of sustainable harvesting and the management of bamboo Luồng plantations has been markedly poor, which has resulted in premature harvesting and excessive exploitation of Bamboo Luồng.

Severe competition has also arisen between chopstick enterprises and votive paper enterprises inside and outside of Thanh Hoa Province, which has made it much more difficult for Case-III to purchase raw materials.

### **6.2.3. Institutional conditions**

Thanh Hoa Province administration and certain international organizations have supported Case-III in technology transfer, market access, and preferential loans. In detail, the Green Bamboo Program, funded by GRET, was implemented from 2007-2013 to support small- and medium-sized bamboo enterprises in Ba Thuoc and Quan Hoa Districts. GRET collaborated with the provincial government to establish a bamboo association, as well as develop a website of the association to provide customers with direct information about products and bamboo-processing enterprises in Quan Hoa District. Indeed, many customers became aware of Case-III through this website. GRET also worked with VCCI to instruct and support the enterprise with exporting and importing procedures, so that it could more easily approach foreign markets. Importantly, in 2010, GRET funded the enterprise with 50% of the price of chopstick-processing machines imported from China.

Case –III and bamboo growers received support from local authorities such as the company gained preferential loans at a rate of only 3.5% annually, as compared to the normal rate of 7%. Bamboo growers were provided with VND two million per hectare to purchase NPK fertilizer, and 600 hectares of bamboo Luồng in the Quan Hoa district were fertilized consequently in

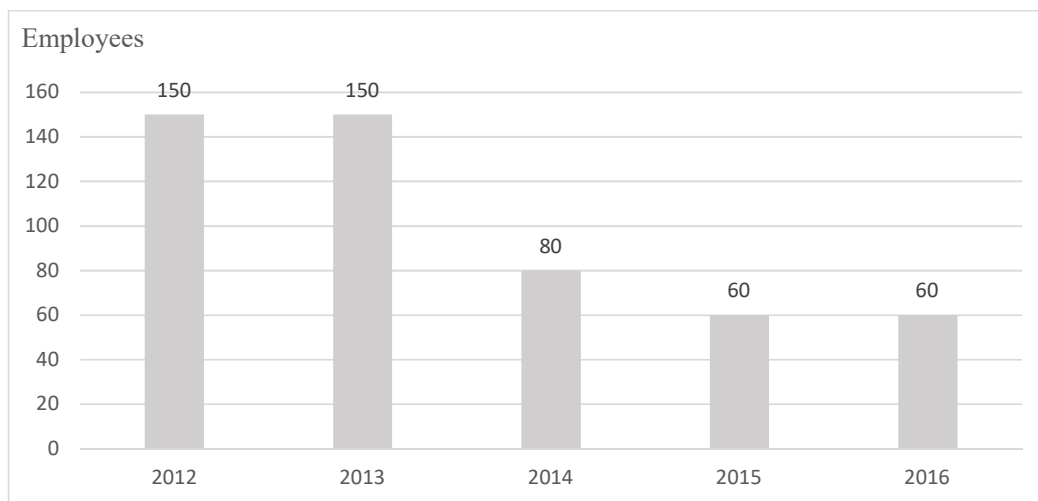


2017. The Agriculture and Rural Development Department, Quan Hoa District stated that using NPK fertilizer for bamboo Luồng also brought some desired effects, such as the rate of growing bamboo shoots was 30% higher than it was previously, and the diameter of bamboo shoots was 15% larger.

In conclusion, these supportive policies of local authorities and international organizations made significant contributions to the development of Case-III. However, some policies have not been practical, and it has sometimes been challenging for the enterprise to access assistance. For example, although there was a policy of preferential loans, the company still faced challenges in borrowing money from banks due to the complicated procedures involved.

#### 6.2.4. Human resources

In Case-III, employees are divided into two categories: indirect employees and direct employees. Indirect employees are managers, accountants, cashiers, administrative staff, and salesmen, which are members of the family that controls the company. For example, the daughter of Director is responsible for both accounting and sales positions; whereas, his wife is a cashier and also in charge of workers' payroll. In contrast, direct workers are classified into four teams, including a material team, a production team, a product finishing team, and a technical team. There is also a manager who supervises the activities of the teams and reports to the Director.



**Figure 6-4. The number of employees from 2012 to 2016**

*Source: Own calculation based on fieldwork (2015-2017.)*

Figure 6.4 shows that the number of workers in Case-III decreased dramatically from 150 in 2012 to 60 in 2016 due to difficulties in selling its products since 2015. Moreover, a personnel manager stated that it is very difficult for them to recruit skilled employees because the

company is located in mountainous areas with outdated infrastructure, slow economic development, poor working conditions, and low wages. Therefore, Case-III is unable to compete with enterprises in cities in attracting high-quality workers. The company also does not have employees who hold a university degree. Only 5% of workers are vocationally trained, and more than 90% of workers have graduated from high school only. Approximately 95% of workers in these enterprises are ethnic minorities and are not adequately trained, and thus their awareness of production regulations and their ability to comply with them is insufficient. It is very time-consuming for Case-III to train workers to strictly abide by the regulations.

The average salary of workers at Case-III was VND 4.5 million per month in 2016. The workers' salaries are determined collectively according to qualifications, experience, and specific position, as well as the company's business performance. The enterprise does not provide good incentives for workers, as they do not pay social insurance or offer protective clothing under Vietnam labor law. As a result, the employee turnover rate of the company is exceptionally high, at 28%. This has caused manifold difficulties for the company to produce goods and complete customers' orders in a timely manner.

Due to limited financial resources the company has not sent its workers to training centers and/or vocational schools. Local authorities and international organizations have not supported the company in training its workers. The company, however, does believe that training is necessary to improve workers' skills, and it would like local authorities and international organizations to offer training courses for its workers. The entrepreneur is considered to be one of the important factors contributing to the success of his business. Although the entrepreneur of Case-III did not attend university, he has a great deal of practical experience in production and business that significantly impacts training the company's employees and leading the business to overcome challenges.

#### **6.2.5. Production technology**

Case-III owns 24 bamboo-processing machines, of which 60% were purchased domestically, while the rest were imported from China and Taiwan. The respondents reported that the machinery of Case-III is fully depreciated because they were bought 10 years ago. Due to financial constraints, the company has not invested in modern machinery, which has greatly affected its production capability. As a result, the utilization rate of raw materials is less than 20%, while the existing bamboo-processing machines from China increase the utilization rate of raw materials to over 40%.

Case-III applies machines to the main steps of the production of bamboo chopsticks and barbecue skewers. This process is demonstrated in Figure 6.6, with three main steps as follows. Firstly, workers from the material team are in charge of checking Bamboo Luồng's length, age, and diameter when it is purchased from suppliers. Fresh Bamboo Luồng is then cut into pieces by a machine with a different length, based on the length of the chopsticks from 20 to 28 centimeters. Subsequently, the bamboo is split by machines into bars, which are later put through a chopsticks-forming machine to form bamboo strips. Bamboo production waste from the first steps accounts for 80% of the total waste. The bamboo waste from the chopstick production process is collected and sold to votive paper companies.



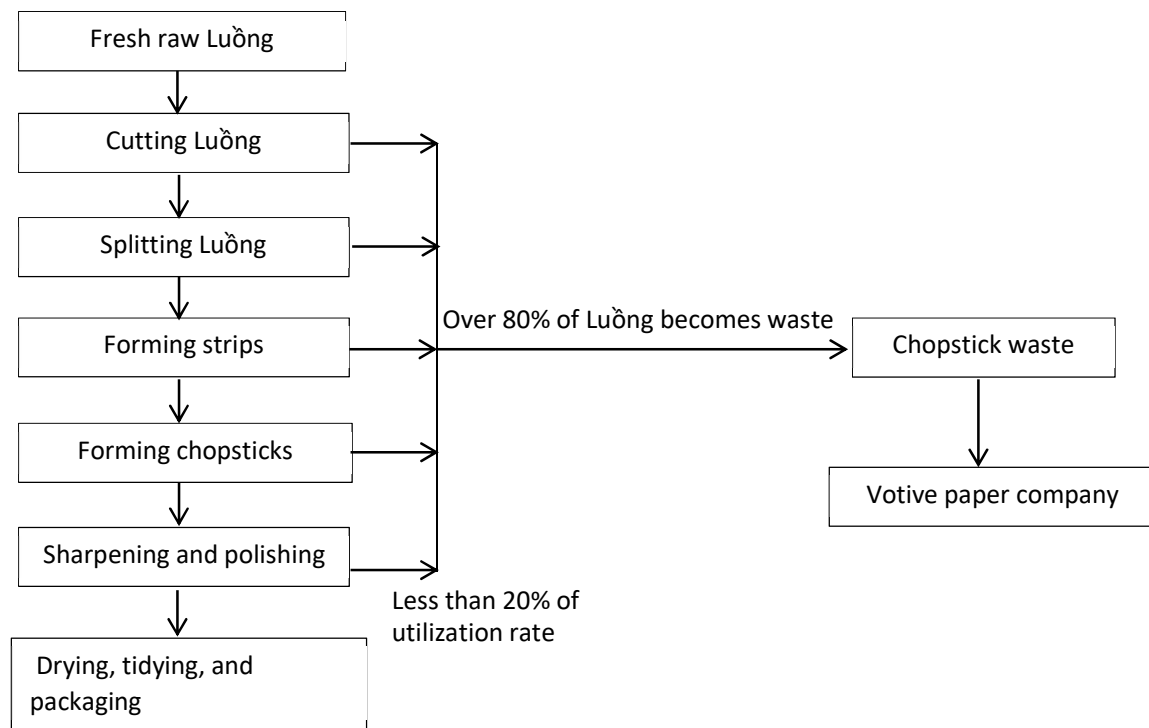
**Figure 6-5. 1: Bamboo sticks smoothed by machine; 2: Chopsticks produced by a machine at Case-III**

*Source: Fieldwork (2017).*

Secondly, workers from the production team guide the bamboo strips through the machine to form semi-finished chopsticks. These chopsticks then go through sharpening and polishing systems. The second step is the most important to achieve the perfect length, diameter, and gloss of chopsticks. Thus, workers from the production team have to carefully supervise the processes of production and machines. The third step of the process is the final completion, which includes drying, tidying, and packaging.

The Director of Case-III stated that the drying process can not only make the chopsticks dry evenly but also a light color and attractive. In order to achieve this, the drying process in the stove must be ensured to last for 72 to 90 hours, and the temperature must be adjusted to increase gradually, from 30°C on the first day to 40°C on the second day, 50°C on the third day and to 60°C or 70°C on the final day. When the temperature reaches 70°C, a fan must be turned on to dry the chopsticks gradually and to completely evaporate moisture from the chopsticks. If the

temperature becomes higher than 70°C, the chopsticks can be burned on their surface or not dried completely inside, which can cause mold on the chopsticks over time.



**Figure 6-6. Bamboo chopstick processing at Case-III**

*Source: Group discussion and key informant interview.*

After the drying process, chopsticks are sorted and packed into parcels of 35 to 50 kilograms for distribution to retailers. Therefore, drying-process control plays a critical role in chopstick quality, and this stage is only performed by skilled workers.

### 6.2.6. Market activities

Disposable chopsticks have been the company’s main product since 2008, accounting for 75% of its revenue. From 2011 to 2014, the average sales volume was 100 tons per month. The average price was VND 10,000 per kilogram. The company depends on agents to distribute its products to retailers, such as supermarkets and restaurants. The company has six regular distributors, which includes three domestic distributors from Ho Chi Minh City and three foreign distributors from Japan and Taiwan. Taiwan, Thailand, and Japan constitute the company’s main markets, with these three markets accounting for 65% of its overall sales.

However, since early 2015, the company has experienced major difficulties in selling products domestically and internationally due to especially strong competition from China. The total

sales volume of the company dropped markedly from 100 tons of chopsticks per month in 2014 to less than 60 tons per month in 2015.



**Figure 6-7. 1: Semi-disposable chopsticks; 2: Semi-disposable chopsticks packed at Case-III**

*Source: Fieldwork (2017).*

The oral agreement is a popular type of ordering method at Case-III. For instance, customers make orders by phone. They then give an oral agreement regarding the quantity and delivery time, as well as the price. The customers then deposit 20% to 30% of the order value in advance, with the remaining balance being paid after delivery. The oral contracts could lead to business risks in the future due to the lack of a legal framework when commercial disputes occur between customers and enterprises (Roxenhall and Ghauri, 2004; Bennett and Robson, 2004; Kirsten and Sartorius, 2002).

Marketing normally plays a critical role in accessing markets. However, its small scale and limited financial ability have prevented Case-III from investing in marketing activities. For example, although the company has been active for more than 10 years, distributing its products in both domestic and foreign markets, it has neither built websites for its products and services nor attended any pertinent trade fairs. In addition, its products have not achieved domestic or international certificates due to the absence of a supportive government and its small production scale. Indeed, the lack of marketing activities and product certificates has led to obstacles in approaching markets and obtaining new customers.

### **6.2.7. Innovation**

Asked about his view on innovation, the Director of Case-III stated that he strongly believes in the need for innovation. However, the enterprise has faced numerous obstacles to innovation. In detail, the Director asserted that international competitors from China far exceed his company in terms of technology development, product innovation, and marketing. However, Case-III's product categories have remained unchanged. The employees interviewed reported

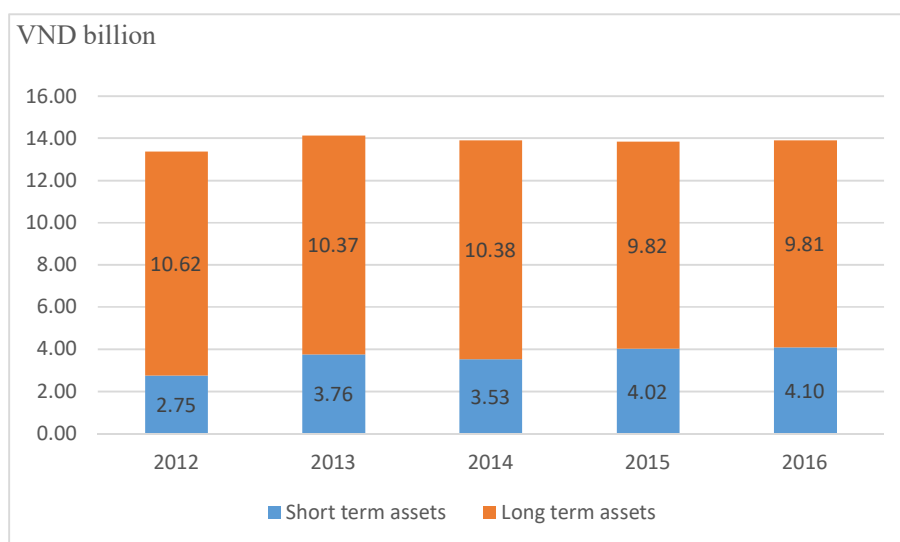
that they do not play a role in innovation in the products and organization of the enterprise, and they only produce products based on the protocol that they are given.

The scientists and technicians play a major role in providing training services to enterprises, such as technical training, production standardization, and development of new products, but the enterprise lacks a close partnership relationship with research centers. On the other hand, international organizations actively supported the enterprise in technology transfer. For example, the enterprise used to burn almost all of the bamboo waste from production for the purpose of heating, which provided low economic value. Due to technology transfer facilitated by the GRET bamboo waste has been processed into raw material input for the paper company since 2011, with a high economic value of VND 1,200 per kilogram.

### 6.2.8. Financial resources and business performances

This section aims to analyze Case-III's financial indicators, such as long-term assets, short-term assets, and cost structure. Capital access from different sources is also examined to show that it is difficult for the company to obtain business loans. Finally, revenue, profit, and ROA are analyzed to determine business efficiency.

Since Case-III has not invested in machinery since 2012, the long-term asset value has remained largely unchanged over time. The short-term asset values slightly increased from VND 2.75 billion in 2012 to VND 4.10 billion in 2016 (Figure 6.8). This indicates that the production scale of the company did not grow substantially overall.



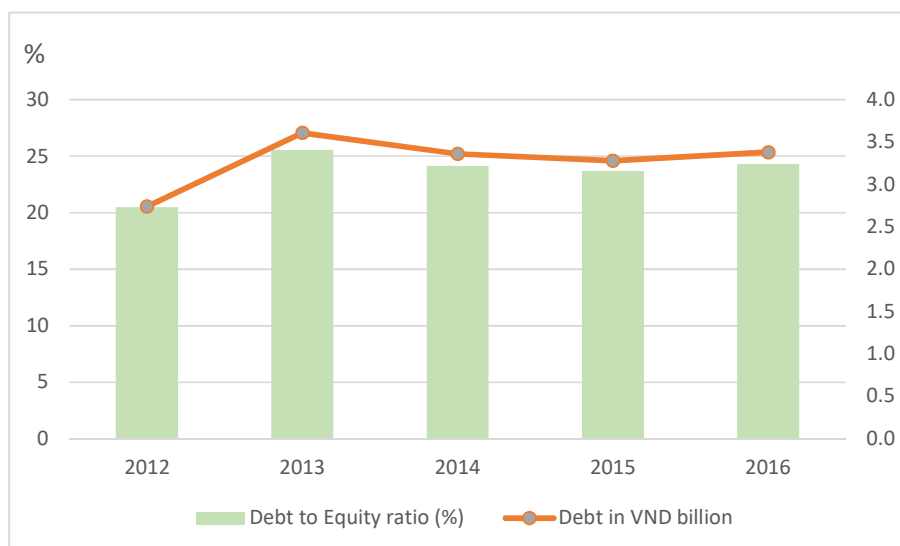
**Figure 6-8. Short-term and long-term assets from 2012 -2016**

*Source: Own calculation based on financial data of Case-III (2012-2016).*

The company has a great need for loans to invest in production and marketing activities. It has proven quite difficult to access formally capital resources due to the complicated loan procedures while the enterprise does not access to informal financial resources from family and friends. For example, the enterprise has to have fixed assets as collateral for a loan, it must demonstrate its business plan for loan use, prove its monthly income, as well as long-term sales contracts, in order to show that it can pay monthly interest. All of these conditions are difficult to fulfill because of its small-scale production, and its fixed assets are not sufficient to secure long-term loans. Since it is quite challenging to access long-term loans, the enterprise finds it very hard to implement long-term production and invest in machinery (Box 6-1).

**Box 6-1: Difficulties in accessing capital from banks.**

*A loan officer at a branch of the Vietnam Bank for Agriculture and Rural Development in the Quan Hoa District, stated that small enterprises located in mountainous areas are less competitive, due to a poor infrastructure and a shortage of skilled workers compared to other enterprises located in urban areas. Consequently, the bank offers preferential policies for these small enterprises in the district, i.e., the enterprises pay only 3.5% per year compared with the bank's standard interest rate of 7% per year. The bank does require the enterprises to have collateral for loans. However, enterprises with a small scale do not have enough assets to offer as collateral, and thus the banks have faced many difficulties in transferring capital to the enterprises (Agribank, Quan Hoa District, Hong, May 23<sup>rd</sup>, 2017).*



**Figure 6-9. Debt-to-equity ratio from 2012 -2016**

Source: Own calculation based on financial data of Case-III (2012-2016).

Figure 6-9 shows that the average debt-to-equity ratio during 2012-2016 was 23%. All of the debt, however, was created from short-term borrowings with a preferential interest rate of 3.5%

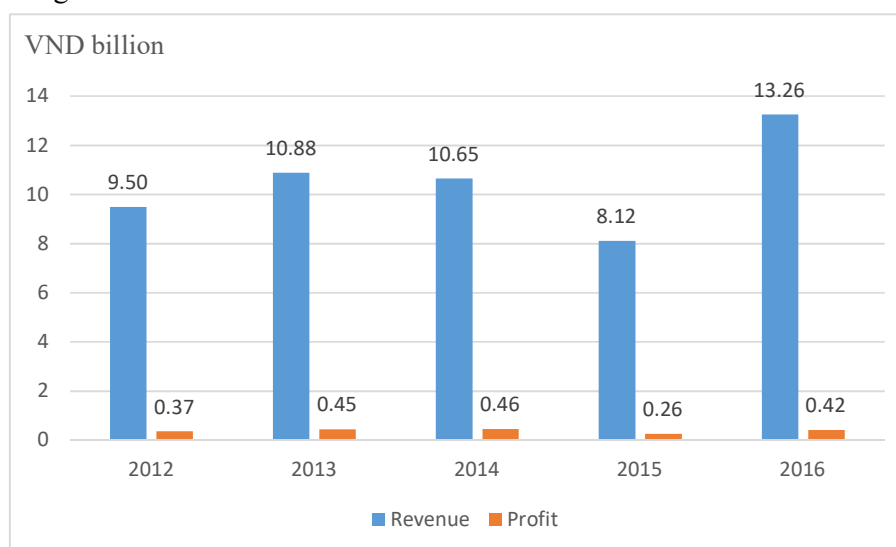
annually, instead of the standard rate of 7%. The company was required to mortgage the Land Use Rights Certificate of their factories and buildings in order to secure the loans.

**Table 6.1. Cost structure of Case III in 2016**

Cost structure	VND million/year	%
Bamboo raw material	5,312	41.4
Payments to suppliers	236	1.8
Selling expenses	249	1.9
Administration cost	159	1.2
Interest	170	1.3
Depreciation	3,685	28.7
Labor cost	2,928	22.8
Taxes	104	0.8
<b>Total cost</b>	<b>12,842</b>	<b>100</b>

Source: Own calculation based on financial data of Case-III (2016).

Bamboo material expenses comprised over 41% of total production costs, followed by depreciation with roughly 29% and labor costs with nearly 23%. Selling expenses, however, made up only approximately 2% of production costs, which shows that the company did not invest in selling activities.



**Figure 6-10. Revenue and profit from 2012- 2016**

Source: Own calculation based on financial data of Case-III (2012-2016).

As its main product, the sale of chopsticks accounted for up to 90% of the company's total annual revenue. A fluctuation in sales occurred during 2012-2016, as revenue increased steadily from VND 9.5 billion in 2012 to VND 10.65 billion in 2014, and dropped to only VND 8.12



billion in 2015 (Figure 6-10). This sudden decrease was due to strong competition from Chinese companies in terms of selling price and production technology. As a result, the profit has remained largely unchanged over time and accounts for a small amount, with an average of VND 0.39 billion.

### 6.2.9. Distribution of value-added along the chopstick value chain

Almost all bamboo farmers inherited their bamboo gardens from the previous generation, who had cultivated bamboo since the 1970s. Thus plantation costs are not provided in this research. The bamboo farmers have also not invested in fertilizer. Therefore, harvesting and labor costs constitute the total cost. Almost all bamboo farmers hire local laborers to harvest at a fixed price. For example, bamboo farmers only receive 50% of bamboo sales, while the rest is given to the harvesters who are hired to harvest. The price of Bamboo Luông varies widely and depends highly on the quality of the bamboo and rainy season. The average price in 2017 at garden gates was VND 800,000 per ton, and the harvesting cost was estimated at VND 400,000 per ton (Table 6-2).

**Table 6.2. Costs, profit margin, and value-added of bamboo farmers**

No	Costs, prices, and income	VND/ton
1	Average garden gate price	800,000
2	Material cost	0
-	Fertilizer	0
3	Costs for services	400,000
-	Harvesting cost	400,000
4	Depreciation	0
5	Labor cost (opportunity cost)	320,000
6	Land tax and duties	0
7	<b>Total cost (2+3+4+5+6)</b>	<b>720,000</b>
8	<b>Net profit (1-7)</b>	<b>80,000</b>
9	Profit margin % (8/1)	10
10	<b>Value added (5+6+8)</b>	<b>400,000</b>

Source: Field data (2015-2017).

The bamboo farmers spend an average of 48 days per year on bamboo garden per hectare. Labor cost is approximately VND 110,000 per day, which is equal to the daily minimum wage rate of the province. Bamboo farmers harvested an average of 16.5 tons per hectare per year, and thus labor cost is equivalent to VND 320,000 per ton per year. Table 6.1 shows that value-added was generated primarily by labor cost at VND 320,000 per ton of bamboo, while net profit only accounted for VND 80,000 per ton of bamboo.

Concerning the traders, they do not invest in trucks to transport the bamboo. The transportation depends strongly on local transportation partners. Transportation cost is calculated based on distance from the bamboo garden to the yard, and from the yard to the factory. The average distance from the yard to the factory is approximately 15 km, and thus transportation cost is calculated at VND 80,000 per ton (Table 6-3).

The traders employ local workers to load and unload the bamboo. Labor cost was VND 100,000 per ton. The traders do not have any business registration and prefer to remain as an informal business to avoid taxes and duties. Traders purchase an average of 60 tons of fresh bamboo per month, and they pay the bank VND 291,666 of interest per month. Therefore, the cost of interest is VND 4,861 per ton (Table 6-3). The traders earned a net profit of VND 159,506 per ton of bamboo, which constitutes the large part of value-added, while labor cost only comprised VND 100,000 of value-added.

**Table 6.3. Costs, profit margin, and value-added of bamboo traders**

No	Costs, prices, and income	VND/ton
<b>1</b>	<b>Factory gate selling price</b>	<b>1,175,000</b>
<b>2</b>	<b>Material cost</b>	<b>800,000</b>
	Purchase of Bamboo Luồng	800,000
<b>3</b>	<b>Costs for services</b>	<b>115,494</b>
-	Transportation from the bamboo garden to yard	26,667
-	Transportation from the yard to the factory	80,000
-	Interest	4,861
-	Administration cost	2,300
-	Informal fees (Facilitation)	1,666
<b>4</b>	<b>Depreciation</b>	<b>0</b>
5	Labor cost (Loading and unloading)	100,000
6	Taxes and duties	0
7	<b>Total cost (2+3+4+5+6)</b>	<b>1,015,494</b>
8	<b>Net profit (1-7)</b>	<b>159,506</b>
9	Profit margin % (8/1)	13.57
10	<b>Value added (5+6+8)</b>	<b>259,506</b>

*Source: Field data (2015-2017).*

For bamboo enterprises, disposable chopsticks are the main product of Case-III, and the most frequently produced, and thus it is chosen for analysis. Cost items and income are estimated based on per ton of produced semi-finished disposable chopsticks (Table 6.4). To produce a ton of chopsticks, five tons of bamboo Luồng are consumed, with a value of VND 5,875,00. The amount of production waste generated is equivalent to over three tons, with a value of VND 3,666,667. As mentioned previously, the waste is consumed by votive paper companies. The

semi-finished chopsticks are sold at the factory gate at VND 11,000,000 per ton. Although machinery was almost depreciated, buildings and land were still employed in calculating depreciation. Hence, depreciation cost is the second-largest expenditure, at VND 4,075,476 per ton of chopsticks.

**Table 6.4. Costs, profit margin, and value-added at Case-III**

No	Costs and income	VND/ton
<b>1</b>	<b>Gross revenue</b>	<b>14,666,667</b>
-	Revenue from chopstick	11,000,000
-	Revenue from chopstick production waste	3,666,667
<b>2</b>	<b>Material cost</b>	<b>5,875,000</b>
-	Bamboo raw material	5,875,000
<b>3</b>	<b>Costs for services</b>	<b>900,677</b>
-	Payments to suppliers	261,442
-	Selling expenses	<b>274,906</b>
-	Administration cost	176,077
-	Interest	188,252
<b>4</b>	<b>Depreciation</b>	<b>4,075,476</b>
5	Labor cost	3,238,209
6	Taxes	115,461
<b>7</b>	<b>Total cost (2+3+4+5+6)</b>	<b>14,204,823</b>
<b>8</b>	<b>Net profit (1-7)</b>	<b>461,844</b>
<b>9</b>	Profit margin % (8/1)	3.15
<b>10</b>	<b>Value added (5+6+8)</b>	<b>3,815,513</b>

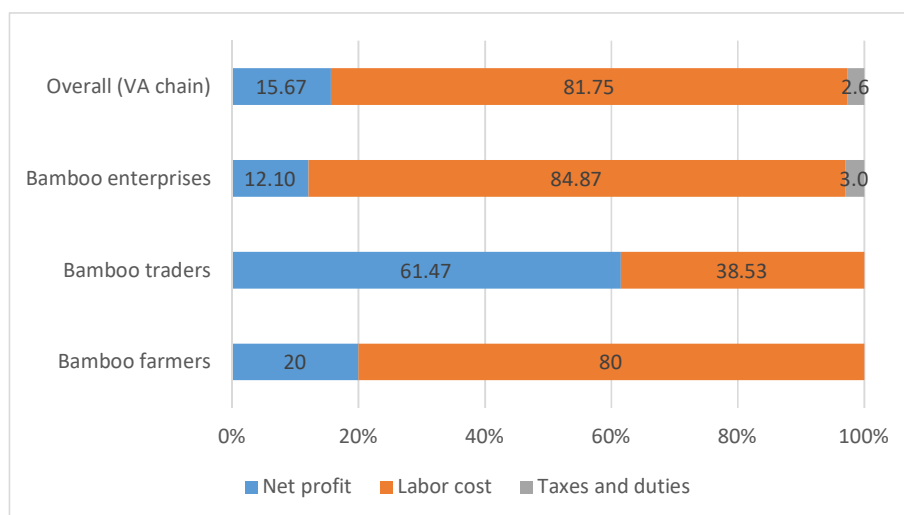
*Source: Field data (2015-2017).*

Chopstick production does not employ advanced machines, and the main stages of chopstick production are performed manually. Therefore, labor cost accounts for a large proportion of the total cost, at VND 3,238,209 per ton of chopsticks. After the total production costs are deducted from the selling price, the net profit is VND 461,844 per ton of chopsticks, and the value-added is estimated at VND 3,815,513 per ton of chopsticks (Table 6-4). The enterprise can improve net profit if it invests in modern machines to increase the utilization rate of raw material.

#### **6.2.10. Value-added and appropriation**

Figure 6-11 shows that labor cost at the farmer and the enterprise level contributes the largest proportion at 80% and nearly 85% of the value-added, respectively; whereas, net profit accounts for less than 20% of the value-added. In contrast, net profit at the trader level constitutes nearly 62% of the value-added. Overall, in terms of the distribution of the value-added along the chopsticks value chain, only 2.6% of the value-added goes to the local government in the form

of taxed and duties, net profit provides nearly 16% of the value-added, and labor cost creates the highest value at approximately 82% of the value-added.



**Figure 6-11. Distribution of value-added across the bamboo chopstick value chain**

*Source: Extracted from Tables 6.2-6.4.*

The government authority offers the farmers free land tax, and traders neither need a business registration nor are they required to pay taxes or duties. Table 6.5 indicates that the traders contribute less than 6% of the total value-added, the value-added at the farmer level accounts for approximately 9%, and the enterprise contributes the largest ratio of value-added at over 85%. This signifies that benefit-sharing among actors along the value chain is unfair.

**Table 6.5. Value-added in the bamboo chopstick value chain in Thanh Hoa Province**

Actors	Net profit (VND/ton)	Labor cost (VND/ton)	Taxes and duties (VND/ton)	Value added (VND/ton)	Percentage
Bamboo farmer	80,000	320,000	0	400,000	8.94
Bamboo traders	159,506	100,000	0	259,506	5.80
Bamboo enterprises	461,844	3,238,209	115,461	3,815,513	85.26
<b>Total</b>	<b>701,350</b>	<b>3,658,209</b>	<b>115,461</b>	<b>4,475,019</b>	<b>100</b>

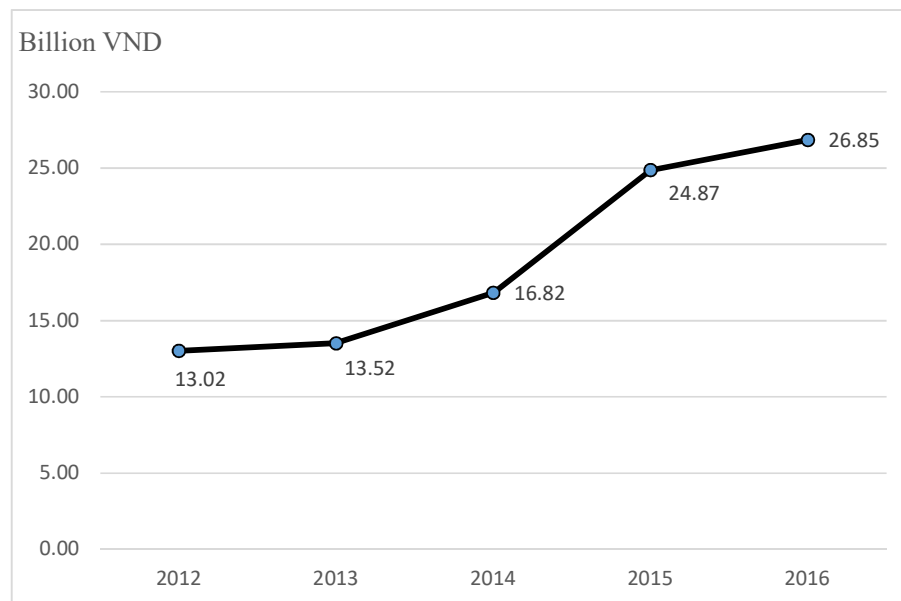
*Source: Extracted from Tables 6.2-6.4.*

The respondents stated that net profit at the farm level improves if they invest in chainsaws for harvesting. Harvesting productivity could increase eight times compared to manual harvesting if chainsaws were employed. The farmers are not willing to invest in chainsaws because the far distance from their home to the bamboo gardens, as well as the hilly terrain, make it harder to carry chainsaws than to bring handheld knives. Harvesting points are located far away from roads, and transportation over mountainous terrains is both difficult and costly.

## 6.3. Case Study-IV

### 6.3.1. History of development

Case Study-IV (Case IV) was established in 2007 in Quan Hoa District, Thanh Hoa Province. In the period from 2007-2014, the main products of Case-IV were disposable chopsticks and bamboo panels, which were sold to Thailand and Ho Chi Minh City, with monthly consumption of 300 tons of disposable chopsticks. Since 2015, the enterprise has had difficulties in selling disposable chopsticks in both domestic and foreign markets. It is for this reason that it changed its focus towards making votive paper, with an amount of investment capital of VND 2,500 million. Ever since the votive paper has become the company's main product, it has accounted for approximately 95% of its total revenue.



**Figure 6-12. Total assets from 2012-2016**

*Source: Own calculation based on the financial statement of Case-IV (2012-2016).*

The scale of the enterprise increased significantly, as its revenue went up from VND 31,580 million in 2012 to VND 72,440 million in 2016. Total assets in 2012 were VND 13.02 billion, and this amount doubled in 2016 (Figure 6-12). The number of workers rose by 38 from 105 in 2012 to 143 in 2016. This situation of the company is analyzed in detail in sections from 6.3.2 to 6.3.9.

### 6.3.2. Raw material supply

Bamboo Luồng and bamboo waste production are raw material inputs for producing votive paper. In 2017, the company purchased 4,000 tons of chopstick production waste each month from local chopstick enterprises at a price of VND 900 per kilogram of wet waste. The Director of the company stated that chopstick production waste offers great potential because there are over 30 chopstick factories in the province. Moreover, its price is approximately 25% cheaper than that of Bamboo Luồng, which gives Case-IV a major advantage over its competitors outside of the province. The enterprise uses approximately 50 tons of Bamboo Luồng monthly to produce votive paper. This is purchased from six local bamboo traders in Quan Hoa and Quan Son Districts. The company does not have difficulty purchasing Bamboo Luồng because it has established strong relationships with bamboo traders. Material transactions are often made once per week, and then the material is stored for a week's worth of production.



**Figure 6-13. 1: Fresh bamboo collection; 2: Bamboo waste collection at the Case-IV**  
*Source: Fieldwork (2017).*

There are also no written contracts between the enterprise and local bamboo traders because they have worked with each other for many years and live in the same village, and thus they trust each other. Indeed, there have had no problems since they started working together.

Its factory is located in a material zone so that it can save transportation costs compared to enterprises outside of the province. The distance from the factory inside of the province to local bamboo traders' sites is less than 30 kilometers; whereas, enterprises outside of the province have to drive more than 100 kilometers. A bamboo trader in Lang Chanh District, Thanh Hoa Province, stated that the distance from the selling point of local bamboo traders to Case-IV is only 10 kilometers, but the distance from the same traders to other customers in Hai Phong City is 250 kilometers. The transportation cost of Bamboo Luồng to Hai Phong City is estimated to be approximately VND 600,000 per ton, which adds to material costs by 60%.

Case-IV is concerned about the supply of Bamboo Luồng, as it directly affects its production strategies. If the area of plantation Bamboo Luồng does not increase and Bamboo Luồng is excessively exploited, there will not be sufficient Bamboo Luồng for the company to make products in the future.

### **6.3.3 Institutional conditions**

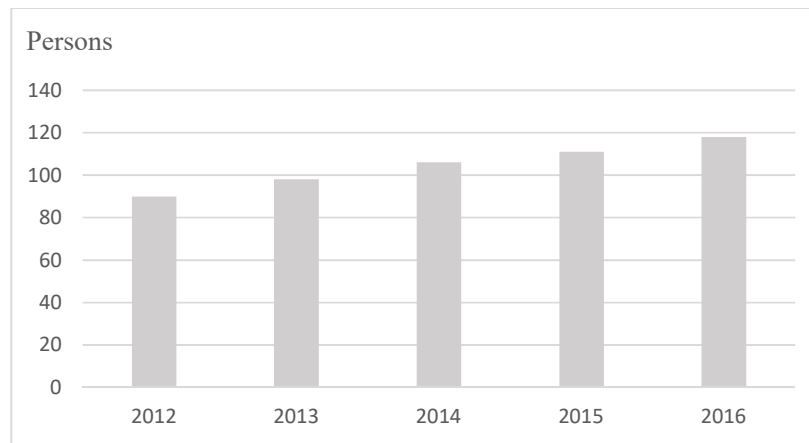
As mentioned in Case-III, the international organizations, such as GRET and ASAIID, support small bamboo enterprises (cf. section 6.2.3). However, not all enterprises in the district are chosen to be supported. Indeed, Case-IV is not on the list to receive the support of these projects. If the company wants to receive assistance from authorities and NGOs, it needs to focus on building a relationship with them.

Although the local government provides the enterprise with a free land lease for the first 15 years and preferential loans, this is insufficient to promote the development of the enterprise. The company is located in mountainous areas of Thanh Hoa Province, which presents it with many difficulties compared to its counterparts in urban areas. The infrastructure has not been developed, and distribution channels and customers are far from its location. The local government does not offer any support for trade promotion, such as introducing bamboo products to trade fairs, and advertising the enterprise and its products on social media. The local authority also does not connect the enterprise with research centers for product design and technology transfer. Therefore, the enterprise faces many obstacles in its further development.

### **6.3.4. Human resources**

The number of workers increased considerably from 90 in 2012 to 118 in 2017 since the enterprise expanded its production scale in 2015 by investing in three production lines to produce votive paper (Figure 6-14). Labor quality remained low. For example, the enterprise does not have workers who have attended a university. 10% of employees are vocationally trained, and more than 90% of employees are unskilled workers.

A production manager stated that female workers comprise more than 65% of the total workforce. The average age of employees is from 40 to 42-years-old. The reason underlying the dominance of female workers is that their male counterparts often work in industrial zones or move to cities to find jobs with higher salaries. Female workers usually follow the cultural norm in which, apart from working in local enterprises, women are supposed to devote their time housework and taking care of their children.



**Figure 6-14. The number of employees from 2012 to 2016**

*Source: Own calculation based on fieldwork (2015-2017).*

The average salary of workers at Case-IV in 2017 was VND 5 million per month. In fact, salaries depend highly on qualifications, experience, responsibility, a specific position, and the company's business performance. A production manager of Case-IV, is responsible for monitoring production activities, and is paid VND 10.6 million each month for eight working hours per day and 22 working days monthly. In contrast, an employee of the material team, is paid VND 4.5 million monthly if the material team completes at least 90% of the designated workload.



**Figure 6-15. 1: Machines repaired by technical staff; 2: Female workers at the paper production line at Case-IV**

*Source: Fieldwork (2017).*

Case-IV offers policies to attract employees to work at the enterprise for a long period of time. For example, its workers are provided with free iced lemon juice at its workshop in summer and a bonus of two working-day wages on public holidays. In addition, after two consecutive working years, workers get a 10% raise in their salary, and the enterprise also pays social insurance for its workers under Vietnam labor law. Due to these policies, it is easy for the



enterprise to retain existing workers and recruit new ones. As a result, the annual employee turnover rate of the enterprise is just 10%.

Regarding the management level, the entrepreneur of the company has over 20 years of working experience in the bamboo sector and developed a good relationship with bamboo suppliers. These have helped the enterprise to easily collect bamboo, and his experience has been transferred to employees, and effectively applied in raw material processing and quality control. Case-IV has nine managers, who also have rich production experience. However, both the entrepreneur and managers do not participate in vocational schools or universities, and thus are deficient in advanced knowledge about business administration, international trade, and accounting to run their business in an optimal manner.

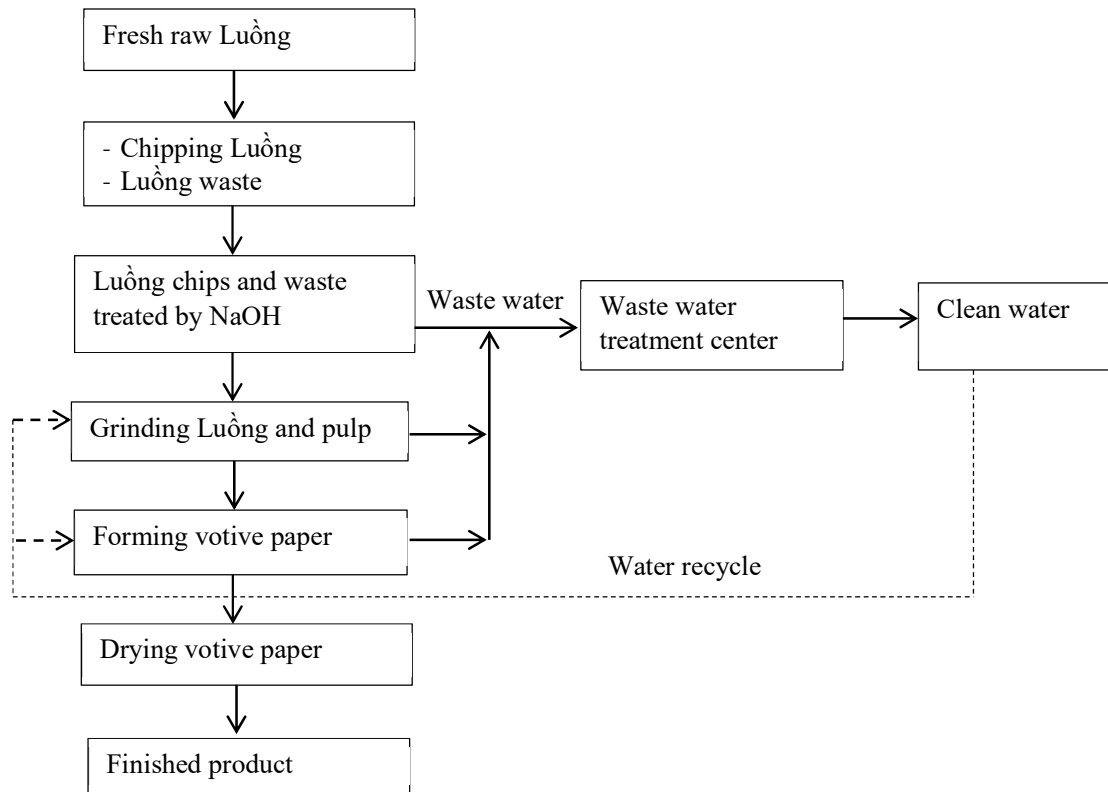
In summary, the number of female workers at the enterprise outweighs that of male ones, and most workers are mainly ethnic minorities with low skills and qualifications. Personnel at the management level are not equipped with knowledge from universities. The average salary of employees and working conditions at the company are considered to be higher than those of its counterparts.

### **6.3.5. Production technology**

Case-IV had 20 bamboo chopstick machines in 2015 and invested nearly 1.8 billion VND in three chopstick heating ovens. The chopstick production line has stopped since 2015 due to fierce competition from Chinese companies. Since then, the company has produced votive paper, and votive paper production necessitates investing heavily in advanced machines compared with chopstick production. According to the enterprise's financial statements, 60% of the capital invested in the paper production lines was borrowed from banks. The votive paper production lines include three grinder mill cylinder machines, three mold paper machines, and three machine dryer cylinders, all of which were imported from Taiwan. According to the circular number 12/2015/TT-BTNMT published by the Ministry of Natural Resources and Environment concerning national technical standards of industrial wastewater and paper pulp, Case-IV is required to build a wastewater treatment system. Accordingly, the enterprise invested VND 4,700 million in a wastewater treatment system in 2016, with a monthly operation cost of VND 60 million, which adds substantially to production costs.

Figure 6-16 presents three basic steps in making votive paper. In the first step, Bamboo Luồng is chopped into bamboo chips by chopping machines. Bamboo chips, along with bamboo waste collected from chopstick manufacturing factories, are then treated in a liquid sodium hydroxide

(NaOH), which softens the material and breaks Bamboo Luồng's structure, to maximize the amount of cellulose from Bamboo Luồng.



**Figure 6-16. Votive paper processing at Case-IV**

*Source: Group discussion and key informant interview.*

Secondly, after being treated in NaOH solution, the materials are brought to grinding machines to create paper pulp, which is then poured through a metal filter system. The system is used to strain cellulose, which creates raw paper. Subsequently, the raw papers run through rollers for drying and flattening and then form votive paper. Finally, the wastewater from NaOH treatment, the grinding process, and the votive paper forming process is moved to the treatment center, where it is treated through aeration tanks and sedimentation tanks. Afterward, qualified treated wastewater is reused in the processes of grinding and forming votive paper, and only a slight amount of treated wastewater is discharged to the environment.

Director of Case-IV, stated that due to the increasing demand for votive paper in both domestic and international markets, the enterprise is operating at 100% of its machinery capacity. Nevertheless, the company has not fully met the customers' orders. As a result, the enterprise would like to secure bank loans as soon as possible to expand its production scale and meet the large demand of the market.

### 6.3.6. Marketing activities

Chopsticks comprised 80% of total revenue and were distributed to both international and domestic markets, and the average price was VND 10,000 per kilogram. The international markets, such as Taiwan and Japan, accounted for 55% of total sales volume. In contrast, bamboo panels and bamboo barbecue picks were only consumed domestically. Bamboo panels collected by manufacturers from Hai Duong, Hanoi, and Thanh Hoa City become material inputs for producing bamboo flooring and pressed bamboo blocks. The average sales volume of bamboo panels was 60 tons per month. The panels were 1.3 meters long, one centimeter wide and six millimeters thick, and were sold at VND 2,300 per panel in 2014.

However, since early 2015, the company has experienced great difficulties in selling products domestically and internationally. Taiwan has forbidden the importation of disposable chopsticks from Vietnam after the Taiwan Food and Drug Administration (TFDA) and the Department of Food Safety and Hygiene, Ho Chi Minh City reported chemical bleach substances, such as sulfur (S), hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) and sodium sulfite (Na<sub>2</sub>SO<sub>3</sub>), in Vietnam's chopsticks. Although its chopsticks are clean and do not contain bleach or bleach-related substances, this negatively affected its disposable chopsticks distribution in both domestic and international markets. As a consequence, the average sales volume dropped from 300 tons of chopsticks per month in 2013 to less than 100 tons per month at the end of 2015.



**Figure 6-17. 1: Semi-finished bamboo panels; 2: Semi-finished votive paper**  
*Source: Fieldwork (2017).*

The company made a strategic decision to aim at producing semi-finished votive paper instead of chopsticks, due to votive paper's stronger financial potential. This turning point assisted Case-IV to overcome its business difficulties. This manufacturer produced 1,000 tons of votive paper per month, on average, in 2016 at a price of VND 7,000 per kilogram, and revenue from votive paper accounted for 95% of its total. This also led to a major shift in consumption markets, in which domestic markets, including Hai Duong and Hai Phong, constitute 40% of total revenue, while the rest is taken by the Taiwan market.

The semi-finished products are used as material inputs in the production of the final products. The enterprise is not able to invest in technology and advanced machines to produce the final products, such as votive money and burnt offerings, due to a paucity of human and technology resources. The enterprise wants to receive support from local governments and organizations to invest in a final votive paper production line that adds more value.

Trading transactions between Case-IV and its customers are based on written contracts, in which customers must pay 30% of the order value in advance, and the rest must be paid immediately after delivery. Case-IV stated that its written contracts show trust and responsibilities between the company and its customers. Its contracts are a legal framework to solve any commercial disputes that may arise in the future. The written contracts assist Case-IV and its customers to trust each other and conduct their business more professionally.

The enterprise has not invested in marketing activities, such as website development and attendance at trade fairs. The Director stated that the enterprise currently does not even have enough products to meet the high demand of the market, and thus it is not appropriate to invest in marketing. Instead, the enterprise prioritizes investment in production. In the near future, it could invest in marketing to introduce the products into different markets, as well as diversify its customer base.

In conclusion, the semi-finished votive paper is distributed to both domestic and international markets without marketing activities due to high demand. With the current demand and production, bamboo-processing factories, such as this enterprise, may not need to engage in marketing activities in the foreseeable future. The enterprise should consider the costs of these activities and incorporate them in its future analyses. As supply from other countries increases, as well as growing entrepreneurship due to prevailing market opportunities, a saturation of votive paper demand may occur in existing markets, resulting in the necessity to find markets and invest in marketing activities accordingly.

### **6.3.7. Innovation**

Thanks to a combination of chopstick, pick, and panel production lines, Case-IV significantly improves the utilization rate of raw material from 20% to almost 40%. Specifically, the lower section of bamboo culms, with short internodes and high wall thickness, are used to produce bamboo panels. The middle section of bamboo culms, with less internodes and moderate wall thickness, is employed to make chopsticks. The top section of bamboo culms, with a low wall

thickness, is utilized to produce barbecue picks.<sup>7</sup> The company's counterparts have only one chopstick production line, and thus only the middle section of bamboo culms are employed to produce chopsticks, and both the lower and top sections of bamboo culms become production waste.

While local competitors still use coal or a wooden drying system, which possesses certain major drawbacks, such as pollutive gas emissions and uneven heat that can cause the products to become moldy, the enterprise purchased three advanced electric drying ovens in 2010 to improve its product drying system. Based on a bank loan, the enterprise shifted production from chopsticks to votive paper in 2015. The enterprise successfully distributed the votive paper to new markets, such as the Taiwan, with three new distributors and the domestic market, with four distributors from Hai Phong and Hai Duong Province.

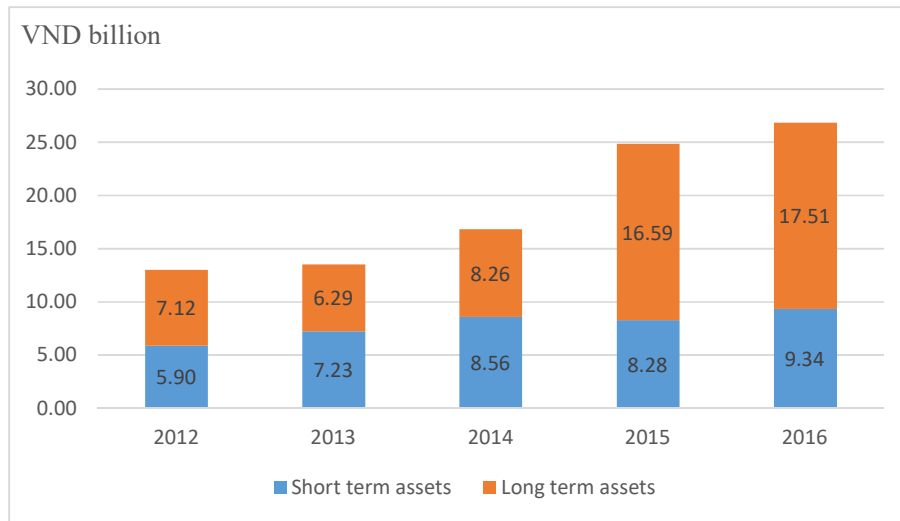
However, the Director stated that a large gap exists in innovation between his enterprise and that of Chinese competitors, and it is difficult to catch up with competitors regarding technological innovation due to its small-scale production and limited capital. Therefore, the company needs the government and international organizations to support technology transfer, as well as product research and development.

### **6.3.8. Financial resources and business performances**

From 2012-2014, Case-IV produced chopsticks and did not invest further in production. Thus the value of its total assets remained almost unchanged. However, its long-term asset value increased significantly in 2015, in which its value of VND 8.26 billion in 2014 doubled to VND 16.59 billion in 2015 (Figure 6.18). This remarkable change in 2015 was because the enterprise invested in a votive paper production system. In addition, short-term asset value grew rapidly from VND 5.90 billion in 2012 to VND 9.34 million in 2016. This indicates that the production scale of Case-IV increased markedly.

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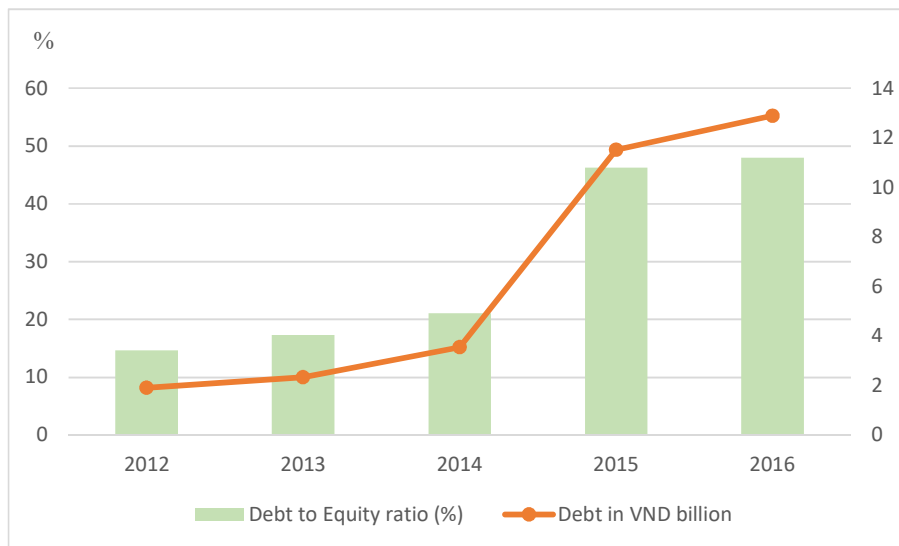
<sup>7</sup> The bamboo culm purchased by the enterprises is usually 10 meters in length. The bamboo culm is partitioned into three distinct sections, i.e., the bottom bamboo culm part, hereafter the lower section, which has an average length of one meter, with several internodes which are difficult to produce chopsticks. The second part is the middle bamboo culm part, hereafter the middle section, which is usually six meters in length, which has fair internodes gaps/distances that are suitable to produce chopsticks. The last part, which is the tip of the culm, hereafter the top section, is approximately three meters in length, is thin (wall thickness), and is only suitable to produce barbecue picks and toothpicks.



**Figure 6-18. Short-term and long-term assets from 2012 -2018**

*Source: Own calculation based on financial data Case-IV (2012-2017).*

Due to the Land Use Rights Certificate of its factory, which it used as collateral and proof of its profitability as a business, Case-IV successfully received credit from banks; whereas, almost all other small enterprises in the province failed to access credit. Figure 6.19 indicates that the debt-to-equity ratio increased from almost 21% in 2014 to approximately 48% in 2016. However, the Director of the company stated that the loan procedure remains quite complicated, and the banks need to simplify the loan procedure.



**Figure 6-19. Debt-to-equity ratio from 2012 -2016**

*Source: Own calculation based on financial data of the Case-IV (2012-2016).*

The company's cost structure reflects the proportion of each type of cost in producing votive paper. Table 6. 6 shows that raw material expenditure accounts for the largest part of the total

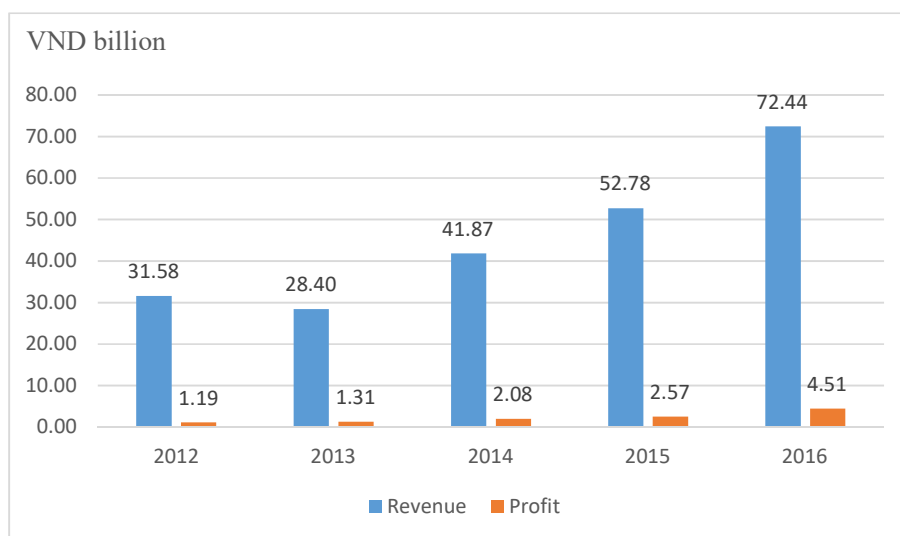
cost, at nearly 64%, followed by labor and depreciation costs, at approximately 13% and over 9%, respectively.

**Table 6.6. Cost structure of Case-IV in 2016**

Cost structure	VND million/year	%
Raw material expenses	43,694	64.3
Payments to suppliers	752	1.1
Depreciation expenses	6,417	9.4
Selling expenses	3,870	5.7
Labor cost	8,984	13.2
Administration cost	2,950	4.3
Interest expenses	138	0.2
Taxes and duties	1,127	1.7
Total	67,933	100

Source: Own calculation based on financial data of Case-IV (2016).

The revenue has more than doubled from 2012-2016. In 2015, revenue climbed rapidly from VND 52.78 billion to VND 72.44 billion in 2016 because the company moved its production focus to votive paper in 2015 when the chopsticks market began to decline. As a consequence, its profit increased by more than three-fold, from VND 1.19 billion in 2012 to VND 4.51 billion in 2016 (Figure 6.20).



**Figure 6-20. Revenue and profit from 2012- 2016 of Case-IV**

Source: Own calculation based on financial data of Case-IV (2012-2016).

### 6.3.9 Distribution of value-added along the bamboo votive paper value chain

The farmers and traders of the votive paper value chain are the same farmers and traders of the chopstick value chain. Value-added at the farmer and trader level is analyzed in the chopstick value chain (cf. section 6.2.9). Therefore, this section only presents the value-added analysis at the votive enterprise level. Cost items and income are calculated based on per ton of produced semi-finished votive paper (Table 6.7).

**Table 6.7. Costs, profit margin, and value-added at Case-IV**

No	Cost items and income	VND/ton
<b>1</b>	<b>Gross revenue</b>	<b>7,000,000</b>
<b>2</b>	<b>Material cost</b>	<b>4,222,177</b>
-	Bamboo raw material	422,218
-	Chopstick production waste	3,799,959
<b>3</b>	<b>Costs for services</b>	<b>745,134</b>
-	Payments to suppliers	72,714
-	Selling expenses	373,994
-	Administration cost	285,105
-	Interest	13,321
<b>4</b>	<b>Depreciation</b>	<b>620,115</b>
5	Labor cost	868,143
6	Taxes and duties	108,886
<b>7</b>	<b>Total cost (2+3+4+5+6)</b>	<b>6,564,455</b>
<b>8</b>	<b>Net profit (1-7)</b>	<b>435,545</b>
9	Profit margin (%) (8/1)	6.22
10	Value added (5+6+8)	<b>1,412,574</b>

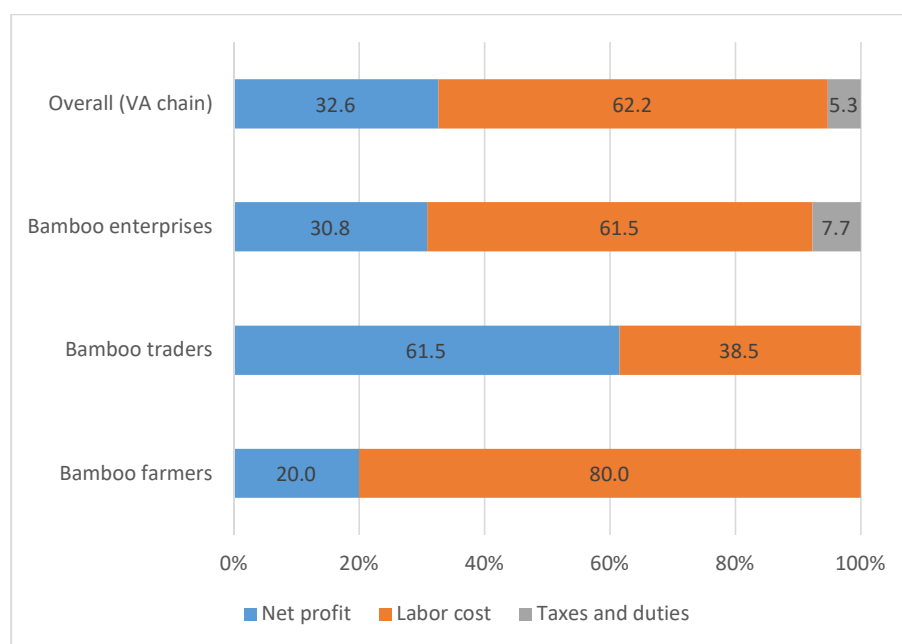
*Source: Field data (2015-2017).*

The selling price per ton of semi-finished votive paper at the factory gate is equivalent to VND 7,000,000. After the total production costs are deducted from the selling price, the net profit is VND 435,545 per ton. Value-added is estimated to be VND 1,412,574 per ton of semi-finished votive paper. It is evident that the highest proportion of the value created is workers' wages (VND 868,143), followed by net profit (VND 435,545), and taxes and duties (VND 108,886).



### 6.3.10. Value-added and appropriation

Figure 6.21 indicates that labor cost at the farmer level constitutes 80% of the value-added, while net profit makes up only 20% of the value-added. In contrast, net profit at the trader level accounts for over 60% of the value-added, while wages are equivalent to less than 40% of the value-added. From the distribution of value-added along the votive paper value chain, a very small percentage (5.3%) of the value-added is contributed to the local government in the form of taxes and duties, net profit constitutes over 32% of the value-added. Labor cost comprises the largest proportion of the value-added at over 62%.



**Figure 6-21. Distribution of value-added across the votive paper value chain**

Source: Extracted from Tables 6.2, 6.3, and 6.7.

Table 6-8 indicates that the highest value created is realized at the enterprise level at 68.17%, while the value-added at the farmers and traders level account for 19.30% and 12.52%, respectively.

**Table 6.8. Value-added in the votive paper value chain in Thanh Hoa Province**

Actors	Net profit (VND/ton)	Labor cost (VND/ton)	Taxes and duties (VND/ton)	Value added (VND/ton)	Percentage
Bamboo farmers	80,000	320,000	0	400,000	19.30
Bamboo traders	159,506	100,000	0	259,506	12.52
Bamboo enterprises	435,545	868,143	108,886	1,412,574	68.17
<b>Total</b>	<b>675,051</b>	<b>1,288,143</b>	<b>108,886</b>	<b>2,072,080</b>	<b>100</b>

Source: Extracted from Tables 6.1, 6.2, and 6.5.

## **6.4. Comparative analysis of two semi-industrial case studies**

### **6.4.1. Introduction**

The previous sections of this chapter have discussed the main characteristics of Case-III and IV. The degree of influence among factors on enterprise upgrading is complex and peculiar. Therefore, the purpose of this section is to compare the degree of influence among factors on upgrading between Case-III and IV. This section explores why Case-III and IV achieve different business performance, and Case-IV has succeeded in upgrading its business while Case-III has not. Based on the analysis results of Case-III and IV, external factors (bamboo materials supply, support from NGOs and local governments) and internal factors (human resources, production technology, marketing, innovation, business performances, and value-added distribution) are used to compare the two Cases.

### **6.4.2. External factors**

#### ***Raw material supply***

In Case-IV, chopstick production waste accounts for 90% of the total raw material inputs that are collected from local chopstick companies to make votive paper. 90% of all bamboo enterprises in the province are chopsticks companies, so the supply of chopstick production waste is abundant and offers great potential. In most cases, chopstick companies previously used chopstick production waste as a burning source in the drying process, which fails to take full advantage of its economic value. Instead, by collecting chopstick production waste, votive paper companies contribute substantially to the value-added of the chopstick production chain.

Case-IV also consumes approximately 75 tons of bamboo Bamboo Luồng monthly, which is three times more than that in Case-III. The Director of Case-III stated that it has been more difficult for his company to buy Bamboo Luồng in recent years since it has to compete against votive paper companies whose scale of production has been continually growing. In fact, both votive paper and chopstick companies purchase Bamboo Luồng from bamboo traders at the same price. However, due to production requirements, chopstick companies require Bamboo Luồng to be of high quality, at least two-years-old, straight and without pests, which takes farmers and traders time and human resources to classify qualified Bamboo Luồng. On the other hand, votive paper companies have no particular requirements for farmers and traders, since all of the materials are chopped into bamboo chips by chopping machines. As a result, traders who

were interviewed said that they like to sell materials to votive paper companies rather than chopstick companies.

### ***Institutional conditions***

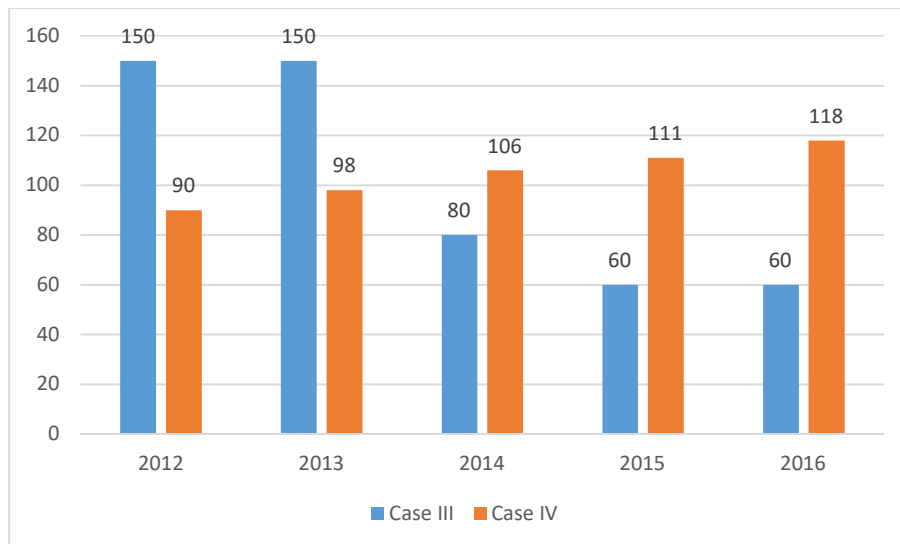
Case-III has received great support from international organizations. For instance, the Director was chosen by GRET to visit China in order to learn advanced bamboo-making technology, and GRET financed Case-III to purchase advanced chopstick production machines from China in 2010 to improve the utilization rate of the material. GRET and VCCI supported Case-III in exporting procedures. This assistance has had positive effects on the enterprise's development. The Director stated that when international cooperation projects are completed, his company has failed to keep up with production due to the lack of financial and human resources. In addition, the company does not receive support from the local government in term of trade promotion and technology transfer because chopsticks production is not on the priority list of support.

In contrast, Case-IV has been greatly assisted by local authorities, including a 15-year exemption from a production land lease and a 50% reduction in the interest rate. Obviously, this assistance has significantly facilitated its production process and encouraged the Case-IV to invest in the production of votive paper. However, this research shows that the supportive policies of the local authority still pose certain problems. For example, it is difficult for small enterprises to obtain bank loans due to the complexity of existing credit policies. The local authority also does not support the company in product development, training employees as well as promoting its products.

### **6.4.3. Internal factors**

#### ***Human resources***

Bamboo companies have faced tremendous difficulties in entering markets due to severe competition from international rivals. As a result, Case-III had to cut down its labor force from 150 employees in 2012 to 60 employees in 2016 (Figure 6.22). Only important positions, such as chopstick production workers and packaging workers, were retained. Employees who participated in the interview contended that they were only temporarily hired from five to six months yearly, in accordance with the order quantity that the company received. Many employees left the company because the working conditions did not meet labor law standards, and the income was comparatively low and unstable. The company has struggled to compete with its rivals in labor recruitment and to fulfill orders on time.



**Figure 6-22. Number of employees at both companies from 2012 to 2016**

*Source: Own calculation based on fieldwork (2012-2017).*

In contrast, due to the expansion of production scale and investment in the votive paper production line, the number of laborers in Case-IV increased considerably from 90 in 2012 to 118 employees in 2016 (Figure 6.22). Employees interviewed stated that they worked full-time and received stable and higher incomes than that offered by other bamboo-processing companies. Since the employees are paid a part of social insurance and equipped with protective clothing, pursuant to Vietnam labor law, they are satisfied to commit to the company in the long-term. This is a comparative advantage for the company in both retaining existing employees and recruiting for new positions.

Both enterprises are located in mountainous areas, which are 140 kilometers away from Thanh Hoa City. The infrastructure is not developed, and labor's average income is lower than that in cities. Consequently, it is difficult for the two companies to attract well-trained and skilled labor from urban areas. Most of the companies' workers are local residents who are ethnic minorities. They have only a high school education, and received their training on the job from skilled workers.

There is no significant difference in terms of labor quality in both Cases. No single employee received a university education in both Cases, and only 5% and 10% of employees were trained in Case-III and Case-IV, respectively. Case-III's entrepreneur developed a strong professional network with international organizations, local authorities, and other bamboo companies as the Chairman of the Bamboo Association in Quan Hoa District. This professional network has helped the enterprise to promote its business and facilitate new business opportunities. In

contrast, Case-IV's entrepreneur has not realized the important role of professional networks, and thus he has not invested in developing a relationship with stakeholders.

### ***Production technology***

Table 6.9 shows that machinery in Case-III was purchased 10 years ago and has fully depreciated. This outdated machinery is the primary cause of the low utilization rate of raw materials (below 20%); meanwhile, advanced machinery could double the utilization rate.

**Table 6.9: Comparison of the machinery of the two Cases**

<b>Name</b>	<b>Type of machine</b>	<b>Year's purchase</b>	<b>Quantity</b>	<b>Purchase price (VND million)</b>	<b>Accumulated depreciation (VND million)</b>
<b>Case-III</b>	Sawing/cutting machines	2005	3	15.2	<b>Completed</b>
	Splitting machines	2005	3	31	
	Fixed thickness and width slicers	2010	4	43.6	
	Chopstick-forming machines	2003	3	25.6	
	Chopstick-sharpening machines	2006	4	29	
<b>Case-IV</b>	Grinder mill cylinder machine	2015	3	2,500	750
	Paper-moulding machine	2015	3		
	Machine dryer cylinder	2015	3		
	Waste water treatment system	2015	1	4,700	1,410

*Source: Field data (2015-2017).*

By understanding increasing competition in chopstick production from both domestic and international markets, and especially Chinese companies, Case-IV invested in a modern production line of votive paper in 2015, when there was a high demand for votive paper both in and outside of the country. This investment has brought success to the company in the form of production expansion. Accordingly, the company's revenue and profit have increased recently (Figure 6.26 and 6.27).

### ***Marketing activities***

Since both cases could not invest in producing final products due to the lack of human and financial resources, they provide semi-finished products. Semi-finished disposable chopsticks are distributed domestically, while semi-finished votive papers are sold to both domestic and international markets, such as Taiwan.

Case-III's Director stated that his company lacks a marketing budget to promote its products. Its customers are also more proactive in approaching the company to audit production capacity and negotiate the buying and selling. Poor marketing activities are one of the reasons hindering the development of the company compared to its competitors.

Conversely, Case-IV's Director stated that, even though his company did not invest in marketing activities, it had no difficulty in selling semi-finished votive paper due to the current high demand of both domestic and foreign markets. This is a greatly advantageous situation that assists the company to succeed in delivering products to new markets. Particularly, the company has established new markets for votive paper in the two provinces of Hai Duong and Hai Phong, as well as a new foreign market in Taiwan. Case-IV's entrepreneur also stated that the supply of votive paper in the near future would be abundant and competitive because the votive paper industry within Thanh Hoa Province and nationwide has been growing rapidly in recent years. Accordingly, the company is considering investing in marketing activities and distribution channels to further augment its competitiveness.

### ***Innovation***

The level of innovation in both Cases is still weak. Case-III cannot invest in new machinery, technology, or product designs. In fact, the company produces existing poor designs or copies designs from its competitors and those found on the Internet. However, some customers require the company to make their own designs.

In contrast, Case-IV heavily invested in votive paper production lines in 2015 to take advantage of a new and profitable market opportunity. Nevertheless, Case-IV's entrepreneur emphasized that, with its current capability, the company cannot conduct research and develop final products. Therefore, it calls for support from the government and international organizations to train and transfer technology in final votive paper production to add more value to its bamboo votive paper chain.

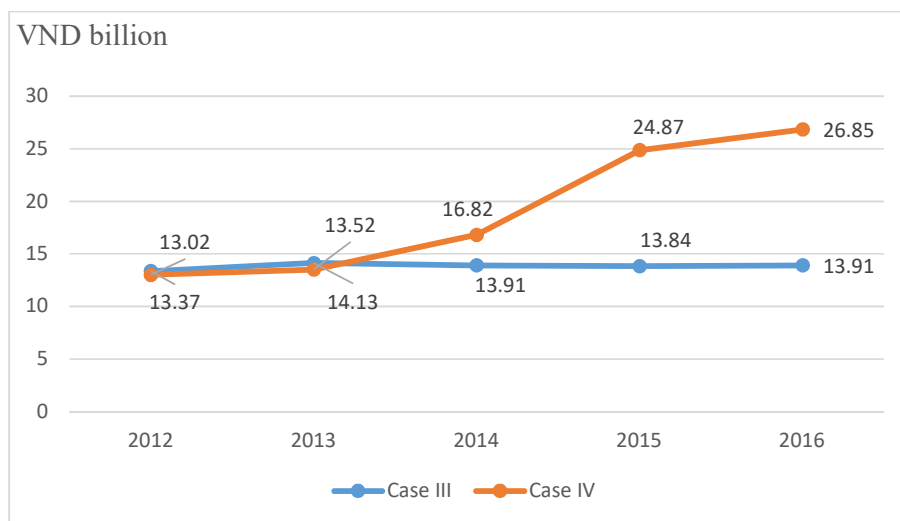
### ***Financial resources***

Case-III has difficulties in accessing long-term bank loans since the company fails to meet the banks' credit policies. According to Case-III's financial statements, the average debt-to-equity ratio over the 2012-2016 period only reached 23%, and these were all short-term debts of less than one year. Since it could not access long-term bank loans, the company could not invest in new machinery and production expansion. In contrast, due to its profitable business and a 6000-square-meter production area as collateral, Case-IV could access long-term bank loans to invest in production and machinery. Case-IV's financial statements show that the average debt-to-

equity ratio over the 2012-2016 period remained at nearly 30%, and most of these debts were for long-term periods of over one year.

#### 6.4.4. Business performances

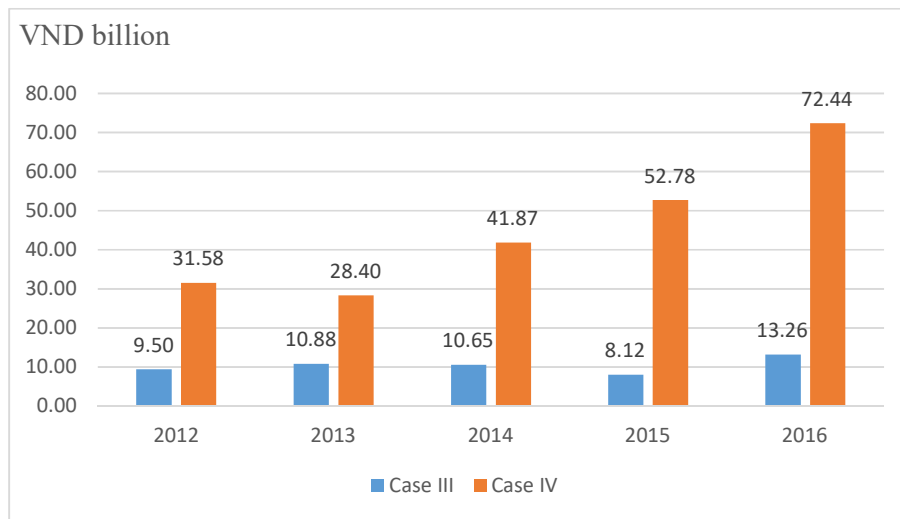
Figure 6.23 indicates that the total asset value of Case-III remained nearly unchanged, with an average amount of VND13.8 billion over the period from 2012-2016. On the contrary, the total asset value of Case-IV increased rapidly from nearly VND 13 billion in 2012 to approximately VND 27 billion in 2016, which demonstrated its continuous production expansion. Case-IV successfully invested in a new production line of votive paper in 2015; whereas, most local bamboo companies did not. This is considered to be a comparative advantage of Case-IV against its rivals since customers trust the company’s production capacity to fulfill their orders.



**Figure 6-23. Total assets between the two Cases from 2012 -2016**

*Source: Own calculation based on financial data of the companies (2012-2017).*

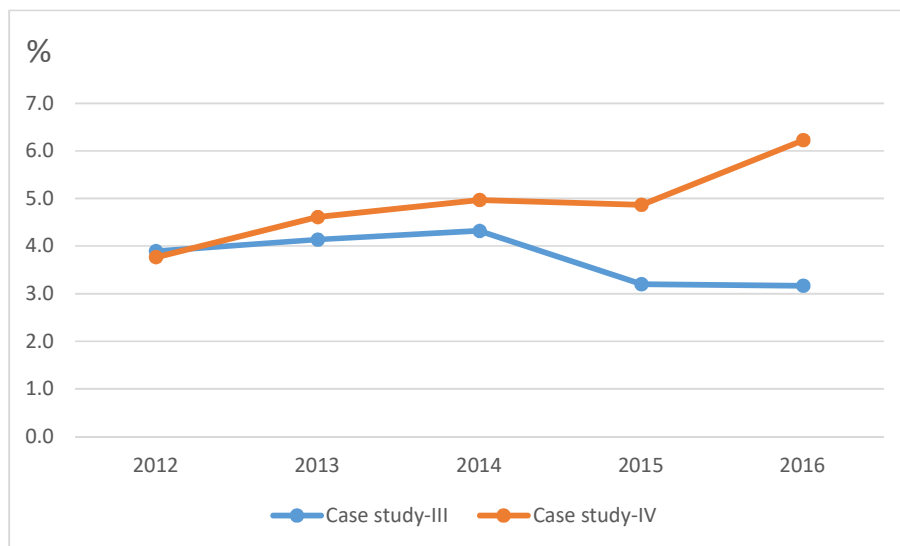
As mentioned above, Case-III experienced numerous difficulties in selling disposable chopsticks, and thus its revenue fluctuated over time and reached over VND 13 billion in 2016 (Figure 6-24). This study indicates that bamboo-processing enterprises within Thanh Hoa Province are facing great hardship in expanding production and markets. Case-IV is among a few companies which have succeeded in expanding markets and advancing sales revenue in recent years. Its revenue in 2012 was nearly VND 14 billion, and this amount surged by more than five times to reach VND 73 billion in 2016 (Figure 6-24).



**Figure 6-24. Revenue between two Cases from 2012 -2016**

*Source: Own calculation based on the financial data of the two companies (2012-2017).*

The lack of investment capital in production and the absence of marketing activities resulted in an unstable net profit margin of Case-III from 2012 to 2016. In contrast, Case-IV experienced tremendous success due to its financial capacity to invest in modern machinery and the ability to meet the demands of the market. Case-IV’s net profit margin increased steadily (Figure 6-25).

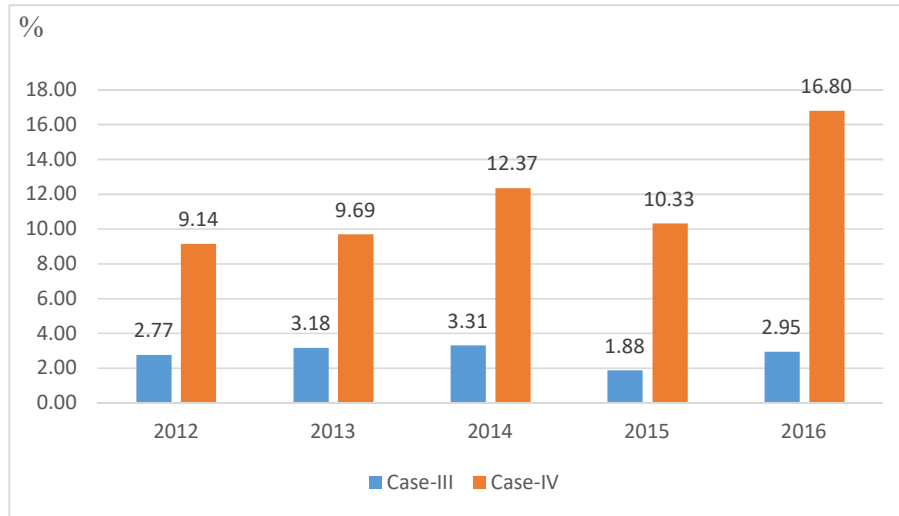


**Figure 6-25. Net profit margin between the two cases from 2012-2016**

*Source: Own calculation based on the financial data of the two companies (2012-2017).*

ROA is a key metric that is used to compare effectiveness in managing and using assets to generate earnings among different enterprises. Figure 6-26 shows that Case-IV was more successful than Case-III in managing and using assets. In particular, whereas Case-III’s ROA was only 2.95% in 2016, Case-IV’s ROA was 16.8% in the same year.





**Figure 6-26. ROA between the two cases from 2012-2016**

*Source: Own calculation based on the financial data of the two companies (2012-2017).*

All of the indicators, including total assets, capital mobilization ability, revenue, net profit, and ROA, show that Case-IV succeeded in investing in production and expanding its business, while Case-III encountered major difficulties in upgrading. The biggest barrier of Case-III in business upgrading is not having access to long-term bank loans to modernize machinery and increase the utilization rate of raw materials. Therefore, the government and organizations need to take measures to remove barriers to bank loans, including simplifying loan procedures, and offering guarantees for business loans. Investing in marketing activities to promote products is considered to be a core strategy for enterprises to improve their competitiveness and expand into new markets.

#### **6.4.5. Comparison of value-added by actors of the two value chains**

Table 6.10 presents a comparison of value-added among actors along value chains and economic performance indicators. Regarding economic performance, the votive paper value chain is relatively effective because the producers' share at the farmer level, and profit margin and return on labor at the enterprise level of the votive paper value chain, are higher than those at the chopstick value chain. Producers' share at the farmer level of the votive paper value chain reached 16.8%, and profit margin at the company level obtained 6.2%; whereas, those at the chopstick value chain were much smaller, at 10.7% and 3.2%, respectively.

Moreover, value-added distribution among actors in the votive paper value chain is more fairly distributed than in the chopstick value chain. For instance, the value-added distribution of the votive paper value chain at the farmer level is 19.3%, trader level is 12.5%, and enterprise level

is 68.2% of total value-added; whereas, at the chopstick value chain, those at the farmer level is 9%, trader level is 5.3%, and enterprise level is 85.3% of total value-added. This proves that the position of farmers and traders, and the vertical integration of downstream activities, at the votive paper value chain, are more important than those at the chopstick value chain.

However, the total value-added of the chopstick value chain is twice as high as that of the votive paper value chain. This is demonstrated by the fact that chopstick production employs intensive labor, and thus the labor cost per ton of chopsticks is very high compared with that of votive paper. Specifically, the labor cost per ton at the chopstick enterprise level (VND 3,238,209) is four times higher than that at the votive paper company level (VND 868,143). Local value addition at both value chains is very low because farmers and traders do not invest in primary processing.

**Table 6.10. Distribution of value-added by actors of value chains**

Analytical Level	Variables	Chopstick Value Chain	Votive paper Value Chain
Farmers	Value-added (VND/ton), compared with total value-added (%)	400,000 (8.9%)	400,000 (19.3%)
	Producers' share (% of FOB or gate factory price)	10.7	16.8
	Return on labor (VND/day)	137,931	137,931
Local traders	Value-added (VND/ton), compared with total value-added (%)	259,506 (5.8%)	259,506 (12.5%)
	Profit margin (%)	13.6	13.6
Enterprises	Value-added (VND/ton), compared with total value-added (%)	3,815,513 (85.3%)	1,412,574 (68.2%)
	Profit margin (%)	3.2	6.2
	Taxes and duties (VND/ton)	115,461	108,886
	Labor cost (VND/ton)	3,238,209	868,143
Value chains	Total value-added (VND/ton)	4,475,019	2,072,080
	Value-added per final sales (%)	30.5	29.6
	Local value addition	Very low (almost all farmers and traders sell Bamboo Luồng without processing)	Very low (almost all farmers and traders sell Bamboo Luồng without processing)

*Source: Own elaboration based on empirical results of Chapter 6.*

#### 6.4.6. Synthesis of semi-industrial case study results

Case study results indicate that being located near the bamboo resources is a big advantage for the enterprises since they can minimize the transportation costs, and it is much easier for them to establish a good relationship with bamboo farmers and traders. Yet, these bamboo stands are situated in mountainous terrain with poor infrastructure, which makes it difficult for bamboo enterprises to distribute their products to retailers. As a result, having the policy to develop infrastructure and create a stable business environment is the key to draw the investment into the bamboo industry. Furthermore, although Vietnam is blessed with abundant bamboo sources, bamboo farmers have limited awareness of sustainable harvesting. In fact, the over-exploitation of bamboo has lowered the quality of bamboo materials over the past years. In order to solve this problem, it is necessary for bamboo farmers to be trained on harvesting techniques and sustainable management of bamboo sources by enterprises and local governments.

Regarding bamboo processing machinery, most enterprises use outdated production machinery, so they encounter numerous difficulties in improving the utilization rate of raw materials and introducing new products to the market. Indeed, enterprises can cooperate to increase the utilization rate of bamboo culm, by different enterprises use different parts of the bamboo culms. While chopstick companies use the middle-upper part of bamboo culm, bamboo flooring companies need the middle-lower part of the bamboo culm in the production process, and votive paper companies utilize production waste. Almost all parts of the bamboo culm are made full use of. There has been a limited collaboration among these bamboo processing companies due to the barrier of a competitive view. They are afraid that the partner firms can imitate technology and business ideas.

In terms of bamboo processing technology, analysis of market changes, investment in new technologies, and new products play an important role in the success of a bamboo enterprise. Case study results show that when the chopstick market reached the saturation level, together with the severe competition from Chinese competitors, Case-IV has successfully invested in a new technology of making votive papers. The production of votive papers as a replacement for disposable chopsticks has drawn much customers' intention. Nevertheless, the biggest challenge for bamboo enterprises is the financial ability to accommodate technology innovation. Therefore, it is of necessity for these companies to be given priority in access to long-term bank loans.

With regard to marketing activities, case study results also reveal that bamboo enterprises have failed to do the marketing activities, including the absence of trade fairs, promoting products on social media, developing website, which means that information about the company and products do not spread to the target customers. Also, the distribution system is not developed. This indicates that bamboo enterprises are facing a number of challenges in selling products and breaking into a new market.

## **CHAPTER 7**

# **DETERMINANTS OF KEY FACTORS AFFECTING SMALL BAMBOO ENTERPRISES UPGRADING**

### **7.1. Introduction**

Earlier chapters explained how internal and external factors impact the upgrading of both handicraft and semi-industrial bamboo enterprises. Case studies show that enterprise development is determined by many factors that are complex and vary according to environmental business and conditions of each enterprise. The identification and classification of factors that have influenced the upgrading of bamboo enterprises are still not examined. The purpose of this chapter is to identify and classify the key factors affecting bamboo enterprise upgrading.

A structural analysis is conducted by utilizing the MicMac computer software with three primary stages to identify main factors and interrelations between factors (Ejdys et al., 2016; Nader Zali et al., 2015). (1) define the relevant factors affecting enterprise upgrading based on case study results in Chapter 5 and 6 and literature review, (2) describe the relations between the factors by building matrix and drawing direct impact graph, (3) identify the key factor among all the factors based on ranking the influence level for each pair of factors by participants. The structural analysis method, selection of factors, and their interaction were further detailed in Chapter 3 (cf. section 3.5.1). MicMac computer software is presented in Appendix 1.

### **7.2. Key factors affecting small handicraft enterprise upgrading**

#### **7.2.1. Total impact strength and the strongest direct impact between factors**

A direct impact matrix of handicraft upgrading is made up of 12 rows and 12 columns according to 12 factors (cf. section 3.3.1, Chapter 3 and Appendix 1), and the characteristics of the direct impact matrix are given in Table 7.1. In 23 instances, there is no relationship between variables; in 26 instances, a limited influence is found among variables; in 45 instances, a strong influence is detected among variables; and in 50 instances, a crucial influence between factors is presented. The degree of completion is 87.02%, which indicates the percentage of values

different to zero over the total cells of the matrix. On average, the degree of completion that is approximately 20% is accepted (Ejdys et al., 2016).

**Table 7.1. Characteristics of the direct impact matrix**

<b>Indicator</b>	<b>Value</b>
Matrix size	12
Number of zeros (no influence)	23
Number of ones (limited influence)	26
Number of twos (strong influence)	45
Number of threes (crucial influence)	50
Degree of completion	87.02%

*Source: own elaboration based on MicMac software ver. 6.1.2*

Participants (business owners, managers, traders, households) in the focus group discussions at handicraft case studies discuss the influencing relationship among factors, and estimate the influence level on the scale (cf. section 3.3.1, Chapter 3).

**Table 7.2. Total strength of direct impact occurring between structural analysis factors**

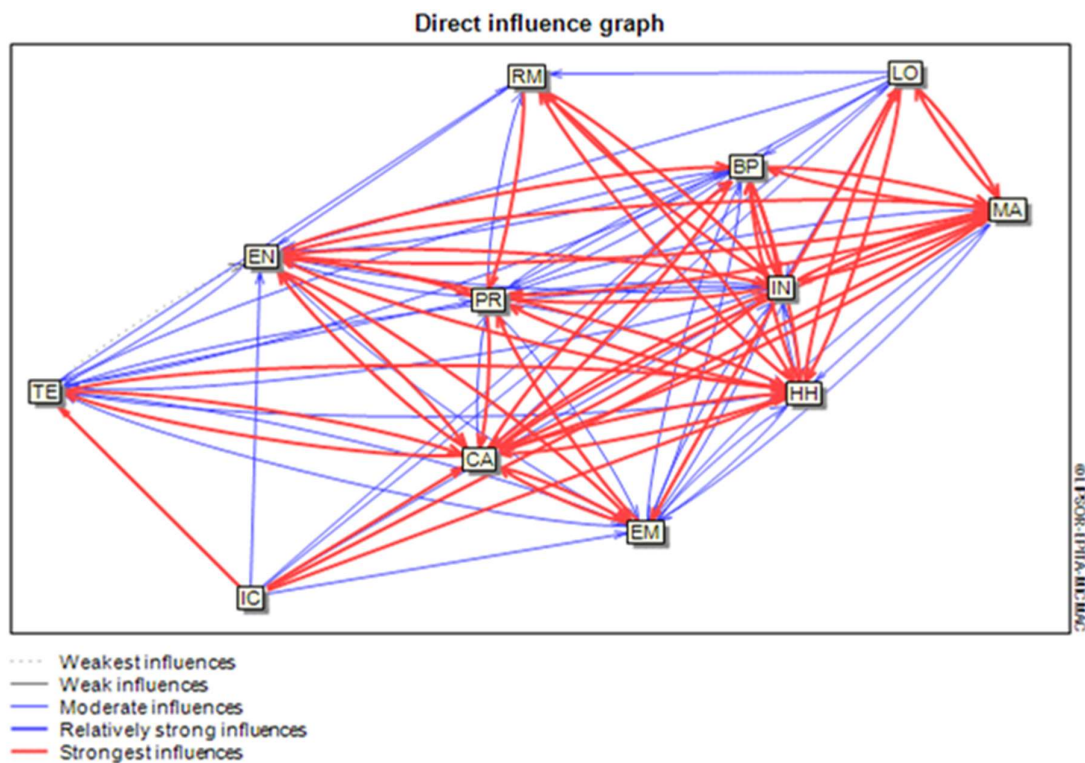
<b>Short label</b>	<b>Factors</b>	<b>Number of influences</b>	<b>Number of dependencies</b>
RM	Raw material supply	17	17
IC	Institutional conditions	23	6
LO	Location	23	12
PR	Product	19	<b>26</b>
MA	Marketing	<b>24</b>	<b>25</b>
HH	Handicraft households	<b>26</b>	<b>29</b>
TE	Technology and equipment	18	20
EN	Entrepreneur	<b>26</b>	<b>24</b>
EM	Employee	21	24
CA	Capital	<b>25</b>	<b>30</b>
IN	Innovation	23	<b>27</b>
BP	Business performance	21	<b>26</b>
Total		266	266

*Source: own elaboration based on MicMac software ver. 6.1.2*

The total score of each row shows the importance of the influence of a factor on the whole system. The results in Table 7.2 show that entrepreneurs, handicraft households, and capital, give the highest score according to the rows of the matrix, which shows that these factors have the largest effect on other factors of the system. However, factors such as raw material supply, technology, and product, have the lowest score according to the rows of the matrix; thus, these factors have only a very small effect on the remaining factors of the system.

The total score in each column indicates how dependent one factor is to another. Capital, handicraft households, and innovation factors are highly dependent on the remaining factors of the system because these factors give the highest score compared to other factors in the columns. At the same time, institutional conditions, location, and raw material supply have the lowest score according to the rows of the matrix; thus, these factors are highly independent of others (Table 7.2).

The direct influence graph (Figure 7-1) presents a visualization of the influence of relations between factors. The arrows show the level of the direct impact of individual factors on the remaining factors. Figure 7-1 shows that EN, HH, MA, IN, and CA not only receive many arrows from the remaining factors but also distribute many arrows to other factors; this demonstrates that these factors strongly affect the whole system and drive handicraft bamboo enterprise operations.



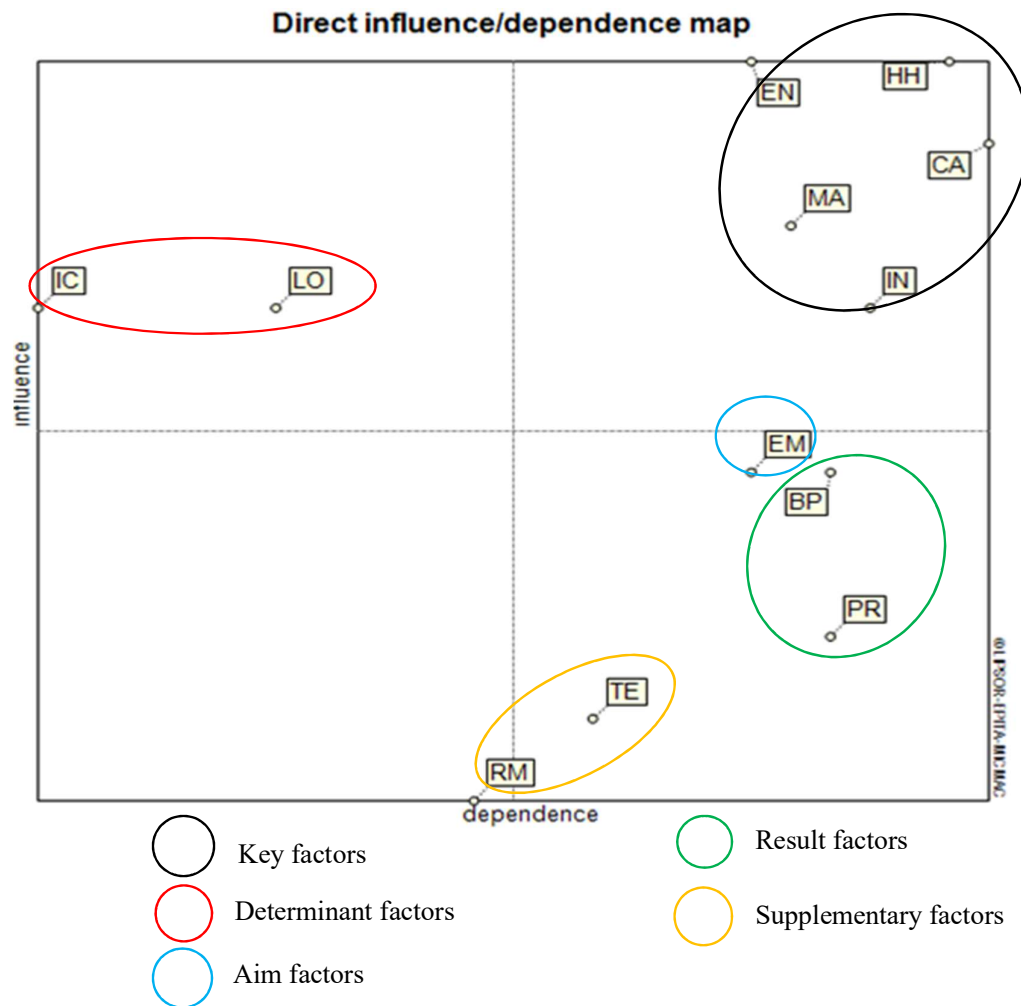
- |                              |                              |
|------------------------------|------------------------------|
| RM: Raw material             | TE: Technology and equipment |
| IC: Institutional conditions | EN: Entrepreneur             |
| LO: Location                 | EM: Employee                 |
| PR: Product                  | CA: Credit                   |
| MA: Marketing                | IN: Innovation               |
| HH: Handicraft households    | BP: Business performance     |

**Figure 7-1. Direct influence graph, handicraft Case studies**

*Source: own elaboration based on MicMac software ver. 6.1.2*

### 7.2.3. Factor classification of the structural analysis based on the direct impact

The direct influence-dependence map (Figure 7-2) demonstrates the layout of the structural analysis factors. Horizontal and vertical axes are scaled to increasing intensity of dependence and influence of factors, respectively, based on their total scores. The map indicates that there are five factor groups affecting bamboo enterprise upgrading: (1) key factors: (HH), (EN), (CA), (MA), and (IN); (2) aim factors: (EM); (3) result factors: (BP) and (PR); (4) determinant factors: (IC) and (LO); (5) supplementary factors: (TE) and (RM).



RM: Raw material  
 IC: Institutional conditions  
 LO: Location  
 PR: Product  
 MA: Marketing  
 HH: Handicraft households

TE: Technology and equipment  
 EN: Entrepreneur  
 EM: Employee  
 CA: Credit  
 IN: Innovation  
 BP: Business performance

**Figure 7-2. Direct influence x dependence map, handicraft Case studies**

Source: own elaboration based on MicMac software ver. 6.1.2

First, the important role of vertical cooperation between businesses and suppliers in enterprise development has been confirmed in recent studies (Tambunan, 2005; Zeng et al., 2010). As analyzed in Chapter 5, handicraft households are key suppliers that provide semi-finished products to the enterprises. The cooperation between households and enterprises is long-established over many years, and it can be said that this is a relationship of mutual benefit. From the side of the enterprises, they can take full advantage of skilled artisans in the handicraft villages to make semi-finished products, which allows enterprises to minimize the costs of labor and administration, and of course, maximize their margin accordingly. The outsourcing of production to households is an optimum scenario given that the companies only hire the households for particular orders. Households can make their own time arrangement, which is a very flexible and convenient way to continue production while also doing housework and farming. Households do not have to depend on a single company; instead, they can work for other competitors at the same time.

Labor from families is migrating to the cities to find jobs with higher salaries. Thus, companies have difficulty in mobilizing enough artisans to complete orders on time. If the authority has no policy of labor training for the handicraft village, or no cooperation with enterprises to attract skilled labor, it will be disadvantageous for enterprises to be able to fulfill orders on time.

Credit access is rated as one of the most important factors affecting production investment and marketing activities and guarantees the financial ability to make advanced payments to households (Cuong et al., 2007b; Jasra et al., 2012). According to Case-I's financial statements for the period 2012-2016, the debt-to-equity ratio in 2016 was over 80% (cf. Figure 5-7, Chapter 5). Thanks to these loans, the company now has the financial resources to expand production to other provinces, participate in trade fairs, and make advanced payments to households.

In contrast, smaller enterprises cannot access credit from banks because of the complex loan procedures, such as having sufficient collateral, a profitable business, and a good relationship with the government and the bank. Case-II has suffered from insufficiently fulfilling the requirements of the banks. According to financial statements from Case-II in the period 2012-2016, there were no recorded debts from banks. As a result, this difficulty in credit access hindered any potential investment in the company's production capability.

Regarding the characteristics of entrepreneurs, the higher the level of education, English skills, working experiences, and personal networks of entrepreneurs, the more the ability of entrepreneurs is increased to solve problems and capture business opportunities (Pham and Matsunaga, 2019; Reeg, 2013; Andadari, 2008; Muda and Rahman, 2016). There are huge gaps in education and working experiences among entrepreneurs. The Director of Case-I graduated



from the University of Foreign Languages and participated in training courses in business administration, brand development, and marketing. This knowledge gained from university and training courses led him to be fully cognizant of the role of marketing and innovation in business development. This marketing course inspired the Director, and thus the company, to attend international fairs for introducing products, as well as to use social media to promote Case-I products. The training courses also provided him with valuable knowledge in preparing for the fairs, and how to communicate effectively with customers at the fairs, as well as in the company's after-sales service. Most of the company's customers are international; from Europe, the USA, and Japan. Thanks to graduating from a foreign language university with good English ability, the Director is confident in oral communication and thus in negotiating business contracts with international customers; this has contributed to Case-I's success in expanding into international markets and increasing sales revenue during the 2012-2016 period (cf. Figure 5-8, Chapter 5).

In contrast, the entrepreneur of Case-II is lacking in formal education in marketing, business administration, and accounting, which can cause certain difficulties in doing business. Also, he has a reluctant business mindset and fears the risk of investing in marketing and production. A total of 95% of Case-II's revenue comes from international markets, but the fact that the entrepreneur cannot speak English has hindered him in oral communication and negotiating business contracts with customers. He was born and raised in a family with a tradition of bamboo and rattan production; thus, he has gained extensive practical knowledge from his family members such as material process, product design, and production. This valuable knowledge is shared with his employees and households to improve product quality. Therefore, to sail the business boat against the challenges and attain the business goals, entrepreneurs must equip themselves not only with academic knowledge but also practical experience. Indeed, academic knowledge, together with hands-on experience as well as mutual support, have all assisted entrepreneurs in overcoming business difficulties and grasp the opportunities available.

Marketing activities are considered an important factor in increasing competitiveness, expanding markets, and increasing sales (Afriyie et al., 2018; Liu, 2019). Most bamboo handicraft enterprises do not invest in marketing activities because of limited human and financial resources. Case-II is a particular example. It does not participate in annual trade fairs, and its website and showroom have not been developed. Therefore, it has experienced difficulties in expanding information on its products and services to customers, as well as in accessing the markets.

In contrast, thanks to sufficient financial resources, Case-I has invested professionally in marketing activities. These wise marketing activities have brought success in entering international markets. Sales manager of Case-I, stated that attending trade fairs has given her company two core benefits. Firstly, trade fairs are effective platforms to meet potential customers and build a reliable brand, providing an excellent opportunity for the company to introduce its latest products and designs to customers as well as to build customer connections. Secondly, through trade fairs, the company has a great opportunity to showcase industrially-made handicrafts in the world and learn about competitor innovative products; this inspires Case-I in designing new products and building appropriate business strategies.

Case-I's website has been professionally developed. It is a platform where customers can fully update themselves about the company's latest products and business in nine different languages. Its website is thus a useful tool to increase the credibility and reliability of the company. Since most of Case-I's customers are international, with far geographical distance, its website is like a bridge connecting the business with its customers.

Regarding innovation in product design and raw materials, Case-I's innovation in these areas has all contributed to Case-I's success compared to its competitors. Thanks to the professional and well-trained design team, the company's new designs catch the attention and meet the demands of international customers. Twenty new designs annually are introduced and promoted to customers at the trade fairs. According to Case-I's Director, its new designs are favored and highly recommended by customers, with an ordering rate of 40%.

Case-I has successfully diversified its production by using new raw materials. The company has collaborated with handicraft villages in Nam Dinh and Ninh Binh provinces to produce vases, laundry baskets, and trays from seagrass since 2012, and new embroidery products from cotton such as bed linens, table linens, bath linens, and accessories since 2017. These new products diversify Case-I's product offering and provide its customers with more choice than its competitors who depend significantly on rattan and bamboo in production.

In contrast to Case-I, innovation in product design and the use of new materials has not been developed in Case-II. Its production is highly passive and relies strongly on customer designs. The coordination with households outside Chuong My district to test new materials is out of reach of the enterprise because it lacks financial resources to pay for households as well as human resources to manage production activities in expansion. As a result, poor innovation is one of the biggest barriers to developing the enterprise.

Identifying five key factors, including households, entrepreneurs, credit, marketing, and innovation, together with analysis of the relationship between these key factors and enterprise upgrading, comprehensively explains why Case-I has been able to successfully expand production, approach international markets, and achieve profitable business performance. In contrast to Case-I, some enterprises get stuck in finding ways to develop their business on a larger production scale.

Identifying these key factors has helped the company to work out which areas to focus on to create its competitive advantage and overcome challenges. The company understands its weaknesses and can mitigate these.

Apart from the key factors, the research also pinpointed other factors which influence business development at different levels, namely: technology and raw material supply (supplementary factors); institutional conditions and location (determinant factors); employees (aim factors); and business performance and product (result factors).

As mentioned above, most of the production process is done manually, so technology and machinery do not have a strong influence on household bamboo production and enterprise upgrading. Households said that they did not experience any difficulty in collecting the raw material because bamboo wholesalers in the district offer diversified material and are open daily. The distance from the market to households is less than three-kilometers, so it is easy to transport the material to their homes. The large demand for bamboo raw material and overexploitation of bamboo has led to an increase in bamboo price by about 20% compared to five years ago, which increases production costs accordingly.

Enterprises located in the handicraft village can easily build good cooperation with the households in producing semi-finished products. The skilled labor of households in the handicraft village is a rich outsource of the enterprises. Although policies and support from government and organizations play a vital role in developing the enterprises, both the Case-I and Case-II said that government support policies for enterprises are far from practical and are difficult to implement.

### **7.3. Key factors affecting small semi-industrial bamboo enterprise upgrading**

#### **7.3.1. Total impact strength and the strongest direct impact between factors**

A direct impact matrix of handicraft upgrading is made up of 12 rows and 12 columns according to 12 factors (cf. section 3.3.1, Chapter 3 and Appendix 1), and the characteristics of the direct

impact matrix are given in Table 7.3. In 29 instances, there is no relationship between factors; in 21 instances, a limited influence is found; in 43 instances, a strong influence is detected; and in 51 instances, a crucial influence between factors is presented. The degree of completion is 79.86%, which indicates the percentage of values different to zero over the total cells of the matrix. On average, the degree of completion was approximately 20% (Ejdys et al., 2016).

**Table 7.3. Characteristics of the direct impact matrix**

<b>Indicator</b>	<b>Value</b>
Matrix size	12
Number of zeros (no influence)	29
Number of ones (limited influence)	21
Number of twos (strong influence)	43
Number of threes (crucial influence)	51
Degree of completion	79.86%

*Source: own elaboration based on MicMac software ver. 6.1.2*

Participants (business owners, managers, traders, households) in the focus group discussions at semi-industrial case studies discuss the influencing relationship among factors, and estimate the influence level on the scale (cf. section 3.3.1, Chapter 3).

**Table 7.4. Total strength of direct impact occurring between structural analysis factors**

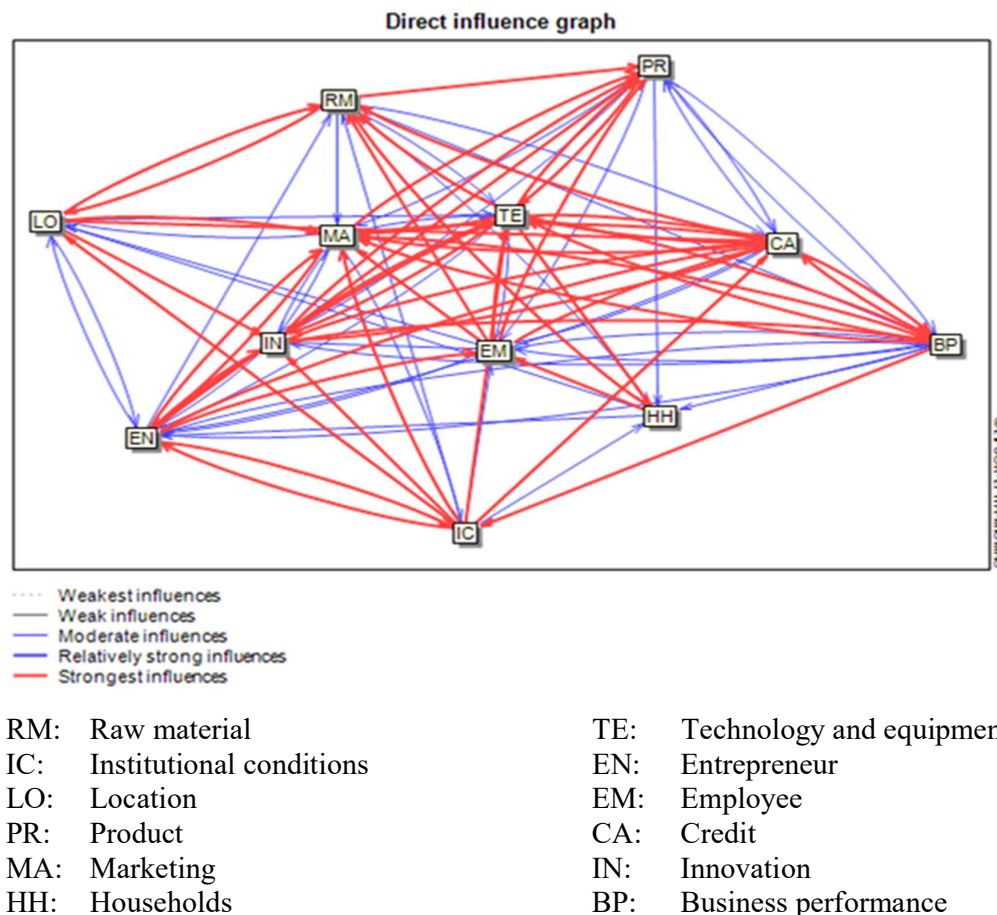
<b>Short label</b>	<b>Factors</b>	<b>Number of influences</b>	<b>Number of dependencies</b>
RM	Raw material supply	19	23
IC	Institutional conditions	<b>27</b>	12
LO	Location	21	14
PR	Product	17	24
MA	Marketing	21	<b>27</b>
HH	Households	12	15
TE	Technology and equipment	<b>26</b>	<b>27</b>
EN	Entrepreneur	<b>28</b>	22
EM	Employees	<b>25</b>	20
CA	Capital	22	<b>28</b>
IN	Innovation	18	<b>25</b>
BP	Business performance	24	23
	<b>Total</b>	<b>260</b>	<b>260</b>

*Source: own elaboration based on MicMac software ver. 6.1.2*

The total score of each row shows the importance of the influence of a factor on the whole system. The results in Table 7.4 show that entrepreneurs, institutional conditions, and technology and equipment give the highest scores according to the rows of the matrix, which indicates that these factors have the largest effect on other factors of the system. However,

factors such as households, products, and innovation have the lowest scores according to the rows of the matrix; thus, these factors have only a very small effect on the remaining variables of the system.

The total score in each column indicates how dependent one factor is to another. Capital, technology and equipment, and marketing factors are highly dependent on the remaining factors of the system because these factors give the highest scores compared to other variables in the columns, while institutional conditions, location, and households have the lowest score according to the rows of the matrix; thus, these factors are highly independent of others.



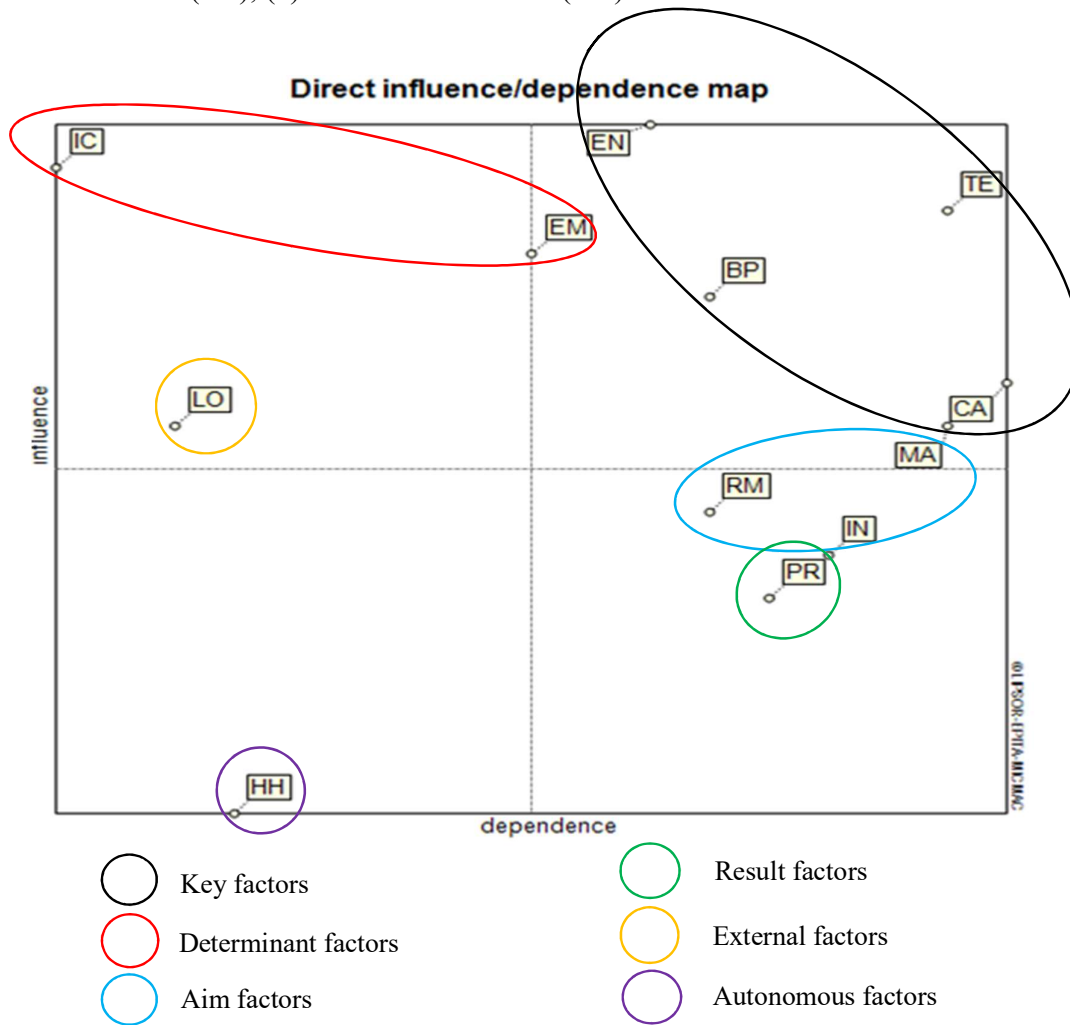
**Figure 7-3. Direct influence graph, semi-industrial Case studies**

*Source: author's elaboration based on MicMac software ver. 6.1.2*

The direct influence graph (Figure 7-3) presents visualization in the influence of relations between factors. The arrows show the level of the direct impact of individual factors on the remaining factors. Figure 7-5 shows TE, CA, and MA located in the center of the graph, and not only receiving many arrows from other factors but also delivering many arrows to the remaining arrows; this illustrates that these factors greatly impact the whole system and drive the development of small semi-industrial bamboo enterprises.

### 7.3.2. Factor classification of the structural analysis based on direct impact

The direct influence-dependence map (Figure 7-4) shows the six factor groups affecting bamboo enterprise upgrading: (1) key factors:(EN), (TE), (BP), and (CA); (2) aim factors: (MA), (RM), and (IN); (3) result factors: (PR); (4) determinant factors: (EM) and (IC); (5) external factors: (LO); (6) autonomous factors: (HH).



RM: Raw material  
 IC: Institutional conditions  
 LO: Location  
 PR: Product  
 MA: Marketing  
 HH: Households

TE: Technology and equipment  
 EN: Entrepreneur  
 EM: Employee  
 CA: Credit  
 IN: Innovation  
 BP: Business performance

**Figure 7-4. Direct influence x dependence map, semi-industrial Case studies**

Source: author's own elaboration based on MicMac software ver. 6.1.2

Several studies have also identified the critical role of an entrepreneur's working experiences, leadership skills, and personal network in enterprise development (Reeg, 2013a; Zalesna, 2012). The Director of Case-IV has engaged in the production of bamboo chopsticks, bamboo

mats, and bamboo poles for construction since the 1980s; therefore, his hands-on experiences have played a part in processing the raw materials and training his employees. Also, the entrepreneur has built up good relationships with his suppliers, which gives the company more favorable conditions in collecting and buying bamboo materials than other competitors.

The Director of Case-III company works as chairman of the Bamboo Association of Quan Hoa district, Thanh Hoa province; thus, it is advantageous for him to build up a personal relationship with other bamboo companies, local authorities, and international organizations. Thanks to this network, he can quickly update market information and receive great support from these international organizations.

Both entrepreneurs of Case-III and Case-IV do not hold a university degree nor take part in any training courses. This lack of academic knowledge has hindered them in how to analyze finance, the market, and in running their businesses. The Director of Case-III said that he lacked academic knowledge to comprehensively analyze market opportunities and write the annual financial report to the tax authority. In the worst case, this has even given him a reluctant psychology in expanding business production, which has definitely contributed to the company missing out on many good business opportunities. In short, a high-quality entrepreneur requires both academic knowledge and practical experiences to sail their business boat through the waves of business change and overcome all the challenges to reach sustainable development.

Recent research has shown that modern technology and equipment can boost productivity, improve business performance, and enhance business competitiveness (Jasra et al., 2012; Le, 2010). It would create significant competitive advantage for bamboo companies if they could manage to invest in modern machinery. The Director of Case-IV stated that customers usually paid a visit to the company to audit its production capacity; thus, a modern production line would be a big credit enabling the company to win customer trust in terms of product quality and on-time delivery. Moreover, modern technology and machinery have allowed votive paper companies to use the waste from chopstick production as input in the production of votive papers, which adds more value to the chopstick value chain.

Nevertheless, it is a fact that other chopstick companies still use outdated machines bought over ten years ago. As a result, the utilization rate of raw material is very low (under 20%), which means that more than 80% of the raw bamboo material becomes waste with a very low economic benefit (Nguyen and Martin, 2016); this is not only a big waste of bamboo material but also proves the low production capacity of chopstick enterprises. Consequently, these companies cannot accommodate large-scale orders on time and with a guarantee of high quality.

Indeed, the outdated machinery is the reason why chopstick enterprises in Thanh Hoa province are left behind by other international competitors in terms of product innovation.

Most bamboo enterprises in Thanh Hoa province merely provide semi-finished products due to the lack of skilled workers, modern technology, and financial ability to further invest in the production of final products. These enterprises lose their opportunity to increase the value added for the chopstick and votive paper value chains.

Regarding credit access, the ability to get a long-term bank loan is a key driver of business development, because enterprises then have the finance to timely invest into production and smoothly implement their business plans. Case-IV is one of a limited number of bamboo companies that have successfully accessed bank loans because the company has profitable business performance and collateral property. This source of credit has enabled the company to implement its business plans smoothly and invest in a new production line of votive papers to take advantage of new market opportunities.

In contrast to Case-IV, most other companies fail to access bank loans due to the complexity of the borrowing procedure and lack of collateral property. This difficulty has curbed these semi-industrial bamboo enterprises from expanding production and investing in modern machinery to improve the utilization rate of raw materials.

Business performance is considered an important factor affecting the remaining factors. Thanks to Case-IV's profitable business performance, the income of employees at the company is higher than that of employees of counterpart companies. Case-IV also offers its employees better working conditions compared to its local competitors. The company can easily fill its job vacancies. Indicators of profitable business performance, such as revenue, profit, total assets, and ROA, are considered as collateral assets that convince the bank to award a loan. Thanks to its profitable business, the Case-IV can afford to invest in production.

Key factors, including entrepreneurs, technology and equipment, and credit access, have proved their roles in upgrading small, semi-industrial bamboo enterprises. These key factors have become vital components for enterprises to formulate judicious business strategies that can successfully adapt to the vigorous change in environmental business.

The study identified the relationship between small, semi-industrial bamboo enterprise upgrading and other factors, namely: marketing, raw material supply, and innovation (aim factors); product (result factors); employees and institutional conditions (determinant factors); location (external factor); households (autonomous factors).



Bamboo enterprises in Thanh Hoa province have paid little attention to marketing activities such as taking part in trade fairs and developing their websites. Small-scale production, together with a shortage of finance and limited support from local government and organizations, all explain the poor marketing activities. It is difficult for bamboo companies to sell their products. To increase sales revenue, the authority should assist enterprises in product promotion, but at the same time, the enterprises themselves have to find their own way to develop. For example, bamboo enterprises can rely on affordable marketing activities to build their websites and develop trustful relationships with their distribution system.

External factors, such as government policy and location have influenced the development of enterprises. For instance, the provincial authority of Thanh Hoa has created favorable business conditions for bamboo enterprises by mapping out the Bamboo Sector Development Strategy to 2030. Within this strategic development plan, areas of bamboo materials will be sustainably grown to supply to local enterprises. Other attractive offers include favorable interest rate, reduction in land leasing fees, and links to international organizations. These support policies from the local authority have created a stable business environment, which allows enterprises to implement long-term investment into production. There remain a number of shortcomings in implementing these policies. Small-sized companies fail to access bank loans. Enterprises do not receive support in technology transfer and trade promotion. It is advisable for the local authority to organize regular dialogues with enterprises to better understand their difficulties and needs, which will enable the local authority to provide the bamboo enterprises with timely support.

Bamboo enterprises that locate themselves in the raw material areas have a big competitive advantage of lower transportation costs and a good relationship with bamboo suppliers. These enterprises are generally located in mountainous areas, far from the city center and of under-developed infrastructure; hence, they are quite disadvantaged in approaching the distribution system.

#### **7.4. Synthesis of key factors affecting four case studies**

The handicraft and semi-industrial bamboo enterprises show similarities in terms of key factors affecting their upgrading. Both handicraft and semi-industrial enterprises consider credit access and entrepreneurs to be key factors affecting the upgrading of enterprises. Thanks to successful access to long-term bank loans, Case-IV has invested in a modern production line of votive papers, and Case-I has successfully expanded its production to other provinces to diversify its

products, by using new input materials such as seagrass and cotton. Bank loans facilitate Case-I to participate in the trade fairs. The results of this study prove that long-term bank loans have a positive effect on the development of business, which is in line with the findings of other studies (Cuong et al., 2007b; Macqueen, 2008).

Most enterprises claim that they have difficulty in getting bank loans due to the complexity of credit procedures. The biggest problem for small-sized enterprises is that they do not have collateral property. Case-II failed to implement its business plan since it proved impossible for the company to access bank loans during the period 2012 to 2016. Similarly, Case-III could only get short-term bank credit; hence, the company failed to invest in production upgrading and making new products of high demand. This financial challenge has made enterprises lag behind other international rivals in terms of technology and innovation, as well as product research and development. To unravel the difficulty of bank loans, it is necessary to simplify the borrowing process for small bamboo enterprises. The authority and international organizations could cooperate with banks to guarantee the loans.

The practical experiences of the entrepreneurs in both handicraft and semi-industrial case studies play an important role in solving all production-related issues such as bamboo material processing, product design, and employee training. The entrepreneurs' personal networks and the formal education of entrepreneurs positively influencing firm development have been found only in handicraft case studies; this result also supports the findings of previous studies (Pham and Matsunaga, 2019; Reeg, 2013). The entrepreneurs' personal networks have greatly facilitated relationship development among bamboo enterprises, bamboo suppliers, and the authorities. Some entrepreneurs who have undergone training in terms of marketing, finance, and market analysis can smoothly implement their business plans and build smart business development strategies. Taking the Director of Case-I as an example, the knowledge he has gained from university and marketing training courses has helped him develop brand development strategies, to successfully take part in both domestic and international trade fairs, and, importantly, to promote the company's products via social media.

Conversely, entrepreneurs in the semi-industrial case studies lack academic knowledge in business administration and run their businesses relying on their own hands-on experiences. These experiences are not sufficient to navigate the business challenges and upgrade their businesses to a higher level. For instance, the Director of Case-III said that his lack of university academic knowledge, and training courses in business administration and financial analysis, have caused him problems in fully understanding both accounting systems and financial reports.

Not being able to speak English has hindered him from directly communicating and negotiating with international customers.

It is evident that to run and upgrade a business successfully, entrepreneurs of both handicraft and semi-industrial enterprises need to acquire both practical experiences and updated academic knowledge on marketing, finance, and market analysis. These experiences and knowledge clearly help directors to adjust their business plans in response to changes in the market and to seize new business opportunities.

The handicraft and semi-industrial bamboo enterprises show differences in terms of key factors affecting their upgrading. Technology and cutting-edge machinery are considered as very important factors that can bring big competitive advantage for small semi-industrial bamboo enterprises; this corresponds with the research results of other authors (Le, 2010; Tambunan, 2007; Wang, 2006). Advanced bamboo machines take the lead in improving the utilization rate of bamboo materials. These cutting-edge machines can be considered as collateral for a bank loan, and a key factor to win customer trust in terms of production capacity and on-time delivery of large orders. Because bamboo handicraft products are mostly produced manually, advanced machines are not considered as a key variable affecting the upgrading of small handicraft bamboo enterprises.

Innovation in product design and raw materials is viewed as an important factor that can provide competitive advantage for handicraft enterprises; this result also supports the findings of other studies (Endalamaw, 2015; Xie et al., 2010). Case-I is among a limited number of companies which can not only produce innovative handicraft products from bamboo and rattan but also offers its customers handicraft products made from new materials of seagrass and cotton. These new materials have helped the company diversify its products and become less dependent on the traditional materials of bamboo and rattan. To create new designs that can meet the demand and norm of international customers, Case-I has, in fact, invested substantial resources into market research and product innovation. These new designs have contributed to the success of the company. Investment in product innovation comes with a very high cost and risk of failure due to the continuous and vigorous change in business products elsewhere in the world. Most of the small bamboo enterprises in this study fail to invest in product innovation and make products based on customer designs.

Most handicraft and semi-industrial bamboo enterprises are unable to invest in marketing activities; thus, it is difficult for them to expand their market. These results are in line with the findings of other studies (Liu, 2019; Maro'ah et al., 2018; O'Dwyer et al., 2009). With small-scale production and lack of finance, Case II, III, and IV can neither invest in developing their

website or showroom, nor take part in trade fairs. The enterprises themselves cannot establish their own distribution system but rely on the middlemen to approach retail channels.

Some enterprises are fortunate to have sufficient financial capacity and skilled workforce to implement marketing activities. Case-I is a typical example among them because the company has successfully invested in promoting its products via its website and social media as well as trade fairs. This investment in marketing activities has made a great difference to Case-I in terms of brand development and product promotion, which has helped Case-I to enter international markets, namely the USA. There is no doubt that marketing plays a crucial part in developing business, yet the selection of marketing activities must depend on each company's marketing budget.

Enterprises must train their sales and marketing representatives to have sufficient knowledge and experience to implement marketing activities successfully. Enterprises also need great support from the government and international organizations in promoting their products at the trade fairs. The provincial authority or leading bamboo enterprises should establish a Bamboo Association and offer initial support for businesses to run their organizations. Hopefully, this Association can help connect bamboo enterprises in terms of information sharing, production support, and technology transfer.

The collaboration between enterprises and households in making semi-finished products at handicraft villages is viewed as an innovative business model since it is a win-win cooperation. The mutual benefits include decreased transaction costs, improvement in artisans' living standards, and the preservation of ancient traditions as well as the increased attraction of tourists. Rapid urbanization is threatening this cooperation. The labor in the handicraft villages has shifted their interests from the bamboo sector to other industries, which poses a threat of labor deficiency.

Inter-firm cooperation plays an important role in facilitating firm development such as market shares, financial support, transaction costs reduction, technical assistance, and the bundling of resources for larger orders (Birru, 2011; Lamprinopoulou and Tregear, 2011; Zeng et al., 2010; To, 2017). Case study results indicate that enterprises do not cooperate to enhance production capacity and competitiveness due to the barrier of a competitive view of owners. This hinders the upgrading of small bamboo enterprises.

Farmers and traders do not participate in primary processing. There is stiff competition in the purchase of bamboo material between votive paper companies and other bamboo processors. Votive paper companies offer traders the same price for different kinds of bamboo culms, and

there are no price premiums paid to compensate for traders' bamboo grading efforts. Bamboo processors requiring high-quality bamboo face procurement difficulties, given that traders prefer to sell ungraded bamboo to processors that accept low-quality culms. This price mechanism does not encourage farmers to sustainably harvest bamboo because they can sell immature bamboo culms to votive paper companies for the same price as mature culms. To obtain sustainable harvesting, farmers and traders should participate in primary processing such as they have primary processing machines to produce specific bamboo culms according to the requirements of enterprises (Zhaohua and Wei, 2018). High-quality culms are delivered to the furniture and chopstick companies at a high price, and low-quality culms are sold to votive paper factories.

## **7.5. Future pathways: three scenarios for small bamboo enterprises in Vietnam**

### **7.5.1. Assessment of upgrading scenarios**

Scenarios describe enterprises' possible future situation, which focuses on problem solving and creating strategies to achieve future goals (Den Herder et al., 2014; Kosow and Gaßner, 2008). The researcher proposes three different upgrading scenarios (see table 7.5) based on local conditions and enterprises' resources (Zhaohua and Wei, 2018). Multiple Criteria Decision Analysis (MCDA) method was employed to select the most appropriate model among different strategies alternatives (Bizikova and Krcmar, 2015).

Conditions for upgrading enterprises are rooted in six key factors that were extracted from structure analysis method, empirical results, and literature reviews: (1) bamboo resources, (2) financial resources, (3) entrepreneur, (4) marketing, (5) innovation, (6) cooperation (see table 7.5). If bamboo resources are managed and harvested properly, enterprises will approach quality bamboo raw materials for long-term production. Enterprises are able to implement production activities if they successfully access external finances (Ramalho et al., 2018). Entrepreneurs can solve business barriers and capture the opportunities if they are sufficiently equipped with practical experience and modern knowledge (Reeg, 2013a). Enterprises will access the market smoothly if marketing activities are promoted (Afriyie et al., 2018). Enterprise can improve their competitiveness and sales volume if they invest in innovation in products and organizations (Subrahmanya et al., 2010; Xie et al., 2010). Businesses will enhance production capacity and business performances if cooperation among chain actors is developed (Macqueen et al., 2006).

**Table 7.5: Conditions for upgrading enterprises**

<b>Scenarios</b>	<b>Conditions</b>	<b>Assessment indicators</b>
1. Business As Usual (BAU) 2. Upgrading traditional production 3. The transformation from traditional production to industrial production	Bamboo resources	<ul style="list-style-type: none"> <li>- Harvesting techniques</li> <li>- Quality and quantity material</li> <li>- Plantation areas</li> </ul>
	Financial resources	<ul style="list-style-type: none"> <li>- Loan procedures</li> <li>- Collateral support</li> <li>- Diversified finance tools</li> </ul>
	Characteristics of the entrepreneur	<ul style="list-style-type: none"> <li>- Working experience</li> <li>- Business knowledge</li> <li>- Personal network</li> </ul>
	Marketing activities	<ul style="list-style-type: none"> <li>- Distribution channels</li> <li>- Trade promotion</li> <li>- Digital marketing</li> </ul>
	Innovation capacity	<ul style="list-style-type: none"> <li>- New designs/product</li> <li>- Products research and development</li> <li>- Utilization rate of materials</li> </ul>
	Cooperation	<ul style="list-style-type: none"> <li>- Information sharing</li> <li>- Technical support</li> <li>- Financial support</li> </ul>

*Source:* own elaboration

### **7.5.2. Scenario I: Business-As-Usual**

This model assumes that there will be no changes in the production capacity of enterprises in the future. The enterprises continue to produce low-value products, namely semi-finished disposable chopsticks, votive paper, handicraft, and traditional furniture. Outdated machines, low quality of human resources, old-fashioned products, and poor marketing activities will remain unchanged. Entrepreneurs have limited opportunities to participate in training courses to enhance their knowledge. Bamboo resources continue to be overexploited, the quality of raw materials will be low, and bamboo plantation areas will not be expanded. Enterprises will have difficulty in accessing credit. Support from government and organizations will remain weak, and linkages between actors along the value chain will not be improved.

#### ***Bamboo resources***

Under this scenario, bamboo resources will be prematurely and improperly harvested due to the low awareness of bamboo farmers towards sustainable exploitation. Bamboo farmers have not been trained by the local government on exploitation techniques, sustainable bamboo

management, and quality grading standards of bamboo materials. Bamboo resources cannot meet the demanding market of high-quality bamboo.

The cost of bamboo harvesting continues to be high (accounting for over 50% of bamboo sales volume), and the bamboo plantation area will not be expanded due to the tremendous difficulties of harvesting such as the manual harvesting, complex mountain terrain, financial shortage to invest in harvesting chainsaw and undeveloped forest road construction.

The bamboo enterprises will not sign bamboo purchasing contracts with farmers. Farmers are not well informed about market information and have no power over the price negotiation with traders. Farmers are not involved in primary processing, which means the value-added distribution between farmers and other actors along the bamboo value chain is still unequal. Case study results have shown that farmers in the bamboo bowl and chopstick value chain only respectively account for the added value of 9.73 % and 8.9 % against the total added value.

### ***Financial resources***

Enterprises will face up with numerous difficulties in credit access since there is a limited number of financial service providers and lack of support from local authority and organizations in long-term loan guarantee. Bamboo enterprises are not familiar with the financing process with a load of documents and fail to fulfill necessary terms and conditions from banks. As indicated in case studies, the debt to equity ratio of bamboo enterprises is very low (the figure of Case II is under 6%). The financial shortage results in stagnant business activities. Bamboo chopstick companies, for example, are still using outdated machinery which are fully depreciated. These companies cannot afford to buy new machinery, which explains the low utilization rate of raw materials (just under 17%). Handicraft enterprises experience the same story of finance when they do not have ready cash to pay the households in advance.

### ***Characteristics of the entrepreneur***

Entrepreneurs will bear significant challenges in transforming their business from traditional to modern mode since they are not professionally trained to acquire the essential knowledge of business administration, international trade, finance, and accounting. Studies have proved the importance of the entrepreneurs' experiences and academic knowledge in enterprises upgrading (Naldi et al., 2007; Narkhede et al., 2014). Case study results have shown that a few entrepreneurs who have both hands-on experiences and academic knowledge are able to map out wise business strategies and run the business smoothly. Most business owners are farmers from rural areas who do not have high educational background, so they lack modern scientific knowledge and soft skills like communication and negotiation skills.

The owners are not ready to participate in training courses because they fear the risk of investing in training courses. The desire for self-employment and supplementing income drives farmers to establish their own business enterprises. Due to fear of bankruptcy and shortage of entrepreneurial skills, these farmers do not want to expand the enterprise. Instead, they keep the enterprises small and manageable by them.

### ***Marketing activities***

Bamboo enterprises will be struggling to implement marketing activities due to the lack of marketing human resources and financial sources. Enterprises cannot afford to participate in trade fairs and build up their own website to promote products and services. These enterprises have not received any support from the local authority and organizations towards trade promotion activities. They have no chances to introduce their products to the market and access new domestic and international markets.

### ***Innovation capacity***

The bamboo enterprises' innovation capacity in product design, material, and product quality will not be improved owing to the outdated machinery and lack of government support. There will be the absence of collaboration between the enterprises and research centers developing new products and materials. As mentioned in the previous chapters, most of the bamboo enterprises' designs are either old-fashioned or imitated from competitors' design and the internet. The enterprises' designs have not met the customer's expectations, and they continue depending on designs given by customers.

### ***Cooperation among actors along bamboo value chain***

Bamboo enterprises will not cooperate with counterparts at the same stage of the bamboo value chain in terms of information sharing, financial support, and technology transfer. It is the barrier of a competitive view of owners that ascribes to the absence of cooperation because the companies do not trust their partner firms and are afraid that the new ideas and technology might be imitated.

The cooperation between bamboo enterprises and handicraft households has posed numerous challenges. One of the biggest difficulties is the fact that many artisans have left the handicraft village to find a better income job in big cities; hence, the companies are short of labor force to fulfill the orders. Case study results have shown that while it only took bamboo enterprises 60 days to fulfill an order of 40-foot container of bamboo and rattan baskets five years ago, it now takes them at least 90 days due to the labor scarcity. Households will not receive financial



support from enterprises to invest in primary processing machines; thus, the bamboo materials will be manually processed by artisans.

### **7.5.3. Scenario II: Upgrading traditional production**

This model assumes that the enterprises continue to produce traditional bamboo products such as disposable chopsticks, votive paper, handicraft, and furniture. Production capacity and competitiveness will improve. Loan procedures will be simplified so that the enterprises will successfully access loans. New machines will be invested to increase production capacity. Entrepreneurs will get financial support from the local government to attend business training courses. The provincial government and NGOs support enterprises to participate in trade fairs to introduce products. Vertical and horizontal cooperation along the value chain will be improved. Bamboo farmers will be trained in sustainable harvesting and management. This model can be achieved because it is suitable for local conditions like existing bamboo resources, policy frameworks, and enterprises' resources.

#### ***Bamboo resources***

In this model, the quality of bamboo resources will be improved by training the farmers on harvesting techniques and bamboo resource management. Forestry extension services provide farmers with practical knowledge, namely tending techniques, harvesting practices, and forest management skills in forest protection and conservation at the local level (Agbogidi and Ofuoku, 2009; Samari et al., 2012; Sim and Hilmi, 1987). The local authority will send experts to discuss with the villagers about the core problems in bamboo harvesting and then consult them on how to properly harvest bamboo and at the same time improve villagers' awareness towards sustainable bamboo harvesting and management. In addition, during our interviews, it was reported that to manage bamboo resources sustainably, the local governments will implement strict regulations on harvesting quota and the age of bamboo from bamboo forest. Bamboo will be only allowed to be harvested at least one-year-old and with a minimum diameter of 4 centimeters. However, bamboo harvesting management is subject to significant challenges since bamboo forests are located in complex mountain terrain, and forest ranger force and budget are limited.

According to Thanh Hoa Province's Agriculture Department, bamboo farmers can improve the harvesting productivity and income by using a chainsaw in the replacement of traditional knives. Yet, chainsaw transportation in such a complex mountain terrain and over an average distance of 2 to 3 kilometers from farmers' house to bamboo gardens has raised another matter

of concern. Hence, the usage of chainsaw may further consider depending on each harvesting location. The case study results have shown that forest road construction will be difficult to invest, so most of bamboo transportation will be carried manually, which definitely increases the harvesting cost (accounting for 50% of the total bamboo sales volume). In order to reduce transportation costs, it is necessary to invest in forest road to make way for tractors. Local government and enterprises, in fact, play a crucial role in transportation investment because bamboo farmers have no financial capacity and resources. Enterprises provide financial support for bamboo growers under a contract for investing in forest road. The bamboo growers are contractually responsible for the supply of bamboo materials to the enterprises. The enterprises have concerns about uncertainty of bamboo supply from bamboo growers such as the growers lose interest in the contractual partnership and the damage to bamboo resources by insects or disease.

### ***Financial resources***

Enterprises will have favorable access to long-term loans from banks to invest in new machines and implement production activities. As mentioned in the previous chapters, most enterprises financed their business from their saving and cash income. They face major challenges in accessing external finances. Significant obstacles to bamboo enterprises' financial access are the lack of sufficient collateral and financial institutions' consultations. The loaning procedures need to be streamlined and local government and NGOs will send experienced staff to enterprises to support them in completing loan application (Ramalho et al., 2018).

Small enterprises do not have enough fixed assets such as land, machines, and buildings, which are often used as collateral to secure loans. Enterprises need collateral in form of secured lending by the government and NGOs, which may be a major source of risk reduction for the bank (Ramalho et al., 2018). Diversified financial instruments offer the enterprises more options to access loans such as venture capital funds, financial cooperatives, credit unions, financial leasing and insurance companies (Macqueen, 2008; Yoshino and Taghizadeh-Hesary, 2018). Vietnam Bank for Agricultural Development, with the goal of supporting agricultural and rural development, needs to introduce various new products aimed specifically at financing small bamboo enterprises, so they have the opportunity to compete with big enterprises in accessing loans.

### ***Characteristics of the entrepreneur***

Entrepreneurship training courses will provide owners with new knowledge and skills to solve business barriers and capture the opportunities and inspire owners to innovative management

(Jusoh et al., 2011; Trang, 2016). Therefore, through entrepreneurship training courses, entrepreneurs will be equipped with modern scientific knowledge, namely production management, accounting, and marketing. This advanced knowledge will assist the business owners in adapting to the international market's complicated and challenging situations.

Case study results have shown that owners experienced difficulties in participating in the training courses because their factories are located remotely, thereby being out of reach for training services. The additional financial barrier and multi-function characteristic of entrepreneurs limits their time and efforts to participate in workshops usually organized in the city. The director of Case III reported that a training course in the city usually takes at least two weeks and costs approximately VND five million, excluding accommodation and travel expenses. To encourage entrepreneurs to participate in training course, it is crucial to identify their needs and interests. A discussion platform between service providers, such as government agencies or NGOs and entrepreneurs, is required. Knowledge sharing between companies, especially successful stories should be stimulated. This approach proves useful to learn about advanced technology of bamboo processing and exchange innovative ideas.

### ***Marketing activities***

Small-sized enterprises are unlikely to implement marketing activities because of the high cost. For instance, the total cost of attending the Ambiente Trade Fair in Frankfurt, Germany, is approximately VND 800 million (cf. section 5.2.6, Chapter 5), which is much beyond these companies' budgets. Therefore, the government and organizations play an important role in promoting small companies' marketing activities (Park et al., 2019). The assistance includes special training courses to accommodate enterprises with regulations and procedures of international trade fairs, develop a website, and promote products through social media. According to Quan Hoa's Agriculture Department, in Thanh Hoa province, a majority of local bamboo companies failed to develop a website; however, the bamboo association in cooperation with GRET project established a shared website for all local companies to introduce their business activities in 2009. Thanks to this website, a lot of customers and business partners get to know about small bamboo companies in Quan Hoa district. However, the GRET project's termination also put an end to the website due to the financial shortage to maintain the website. The bamboo association in Quan Hoa district stated that establishing a website is considered a very effective way to promote products; thus, bamboo enterprises need financial support from local government and NGOs to restart the website and transfer such website models to other localities.

To be less dependent on external support, small-sized bamboo enterprises need to cooperate in marketing activities to share market information, reduce transaction costs and improve economies of scale and their position in markets (Fred et al., 2020; Gyau et al., 2014). Small bamboo enterprises, for example, complete larger orders in a short timeframe under subcontract to counterparts. The enterprises need to cooperate to participate in trade fairs to share marketing costs. The enterprises enhance marketing skills by sharing successful lessons in website development, sales promotion, and participation in trade fairs.

### ***Innovation capacity***

Bamboo enterprises' design capacity will be improved by cooperating with master artisans at the trade village and research centers. Studies have shown that indigenous technologies and knowledge play a vital role in innovation (Endalamaw, 2015). Hence, enterprises need to collaborate with master artisans who have rich material knowledge and experience in producing handicraft products to train employees on product design. Enterprises must involve handicraft households into the material innovation and new designs since they are the vital factors in improving product quality and design. Research centers can support enterprises in creating new designs and technology transfer (Wang, 2006). China has established thousands of product research and development centers to support its bamboo enterprises. There is no doubt that China stays ahead of other countries in developing bamboo products (Endalamaw, 2015; Zhaohua and Wei, 2018). In contrast, in Vietnam, most enterprises have no connection with research centers. Also, untrained labor force together with outdated machinery have hindered enterprises from the adaptability of transferred new designs and technology. Local governments must allocate their budget in the labor training, research, and development of new bamboo products and then transfer to the enterprises.

### ***Cooperation among actors along the value chain***

Enterprises are encouraged to continue to sign subcontract with households to produce semi-finished products because it is a mutual benefit relationship like job generation, adapted costs, and transaction cost reduction (Macqueen et al., 2006). Case study results have shown that bamboo enterprises have, indeed, created employment for hundreds of households. The average income of artisans in the handicraft villages is 25% higher than the national average. By using available skilled artisans at the handicraft villages, the bamboo enterprises can minimize the transaction costs including the administration and training costs. Households can make their own time arrangement, which is a very flexible and convenient way to continue production while also doing housework and farming.

The rapid urbanization in Vietnam has threatened the cooperation between enterprises and households since a large number of artisans shifted their interests from bamboo to other sectors. Bamboo enterprises will soon be in the severe shortage of labor force to maintain their production. Local authority and enterprises must work side by side to offer household benefits including the training for young generation and partial social insurance. An officer of handicraft association, Hanoi, stated that handicraft households cannot afford processing machines, so the enterprises can offer financial support to a group of 3 to 5 households to purchase a bamboo splitting machine instead of using traditional knives. This could boost the households' productivity and at the same time attract them to sign long-term contract with enterprises to produce semi-finished products. To lift the dependence on a single trade village, enterprises need to cooperate with households from other locations out of the county. Such outside cooperation poses a concern of both financial and labor resources.

#### **7.5.4. Scenario III: The transformation from traditional production to industrial production**

The enterprises will produce high-value industrial products such as bamboo flooring, modern bamboo furniture, bamboo panels with advanced technology and machines. The companies will have access to long-term loans through government's support policies. Entrepreneurs will be trained to improve academic knowledge of business administration and finance. The enterprises will successfully access the market by investing in design, product research and development, and marketing activities. Coordination among actors along the value chain will be developed. The bamboo area will be expanded, and the quality of raw materials will be improved to meet the industrial production. The prospect of achieving this scenario is far away from reality due to the high requirements of quality of bamboo resources, investment capital, technology of bamboo processing, and quality human resources.

#### ***Bamboo resources***

The bamboo plantation area needs to be expanded to accommodate the increasing industrial production. Vietnam has over 70,000 hectares of bamboo plantation which generates about 40 million bamboo culms annually (Đặng, 2014). This capacity can produce approximately 500,000 square meters of bamboo panels. Thanks to the increasing market demand of industrial bamboo products and supportive investment policy, this sector is expected to rocket in the near future. The existing local bamboo resources could no longer meet the high demands for raw

materials. The government will map out the development strategy and supportive policy to expand the bamboo plantation.

In 2016, Thanh Hoa's People Committee ratified the Bamboo Development Strategy to 2020 and vision to 2030, in which nearly 30,000 hectares of *Luồng* has been planted by 2020 (THPPC, 2016). Supportive policies have been implemented, including subsidies for farmers to buy bamboo seedlings and fertilizers as well as free 15-year land lease for factories located in bamboo areas (Đặng, 2014; DOFA, 2015a). According to Thanh Hoa's bamboo association, these policies are not attractive enough to promote bamboo plantation expansion. To expand the bamboo plantation area, the local governments may offer policy incentives such as offering enterprises land use rights contract for a period from 30 to 50 years. The farmers should also be allowed to transfer the land user rights to enterprises or cooperate with enterprises to expand bamboo plantation. Enterprises can use the land user rights of the bamboo garden as collateral for bank loans.

In order to make high-value industrial bamboo products, bamboo material must have good quality. According to Qisheng et al., (2002), to make industrial bamboo products, bamboo must meet the four quality criteria, including over 4-year-old of age, diameter of over 10 centimeters, freshness, and straightness. Providing high-quality bamboo sources for industrial production is a great challenge for Vietnam due to the above-mentioned difficulties in bamboo exploitation and management. There exists a big competition in purchasing high-quality bamboo with construction, bamboo chopstick, and votive paper production.

A manager of Agriculture Department, Quan Hoa district stated that encouraging bamboo farmers to get Forest Stewardship Council (FSC) certification pilot is a good way to practice sustainable bamboo development. In 2019 European Union and Oxfam supported 545 bamboo farmers in Quan Hoa district and BWG company to obtain FSC certification for their bamboo plantation areas. This allowed farmers to receive training in sustainable bamboo harvesting and management as well as have more chances to sign the long-term sale contract with bamboo enterprises. Farmers can enjoy a 20% increase in the bamboo income because the price of bamboo with FSC certification is higher than the one without FSC.

### ***Financial resources***

Enterprises need a significant amount of capital to invest in modern machinery and implementing production activities. It is not easy for enterprises to have long-term credit access from banks owing to the barriers mentioned above. Scenario II highlights the solutions to foster access to credit for bamboo enterprises.

In addition to the bank loans, the investment partners play a vital role in generating capital and sharing resources, management experience, and risk (Janssen et al., 2008; Soerodjo, 2020), so enterprises will call the business partners both from inside and outside the country in the forms of a joint venture or purchasing shares in the project. The bamboo industry in Vietnam will have a great opportunity to draw domestic and international investors thanks to the abundant bamboo resources, the low price of bamboo materials (price of Vietnamese bamboo is just a third of Chinese one) and affordable labor force compared to other South-East Asia countries, as well as attractive investment policies offered by Vietnamese government (Ly et al., 2012b; Zhaohua and Wei, 2018). Nevertheless, it will be a great challenge at the moment in convincing investors to invest in the bamboo industry because the bamboo resources are mostly located in complex mountain terrain and the bamboo industry's supportive policies, including labor training, land ownership, and financing for small-scale producers, are ambiguous.

### ***Characteristics of entrepreneur***

Business owners will be professionally trained in management as well as equipped with modern knowledge of production management, accounting, finance, and marketing. Practical and academic training courses that enrich entrepreneurs' knowledge have been addressed in scenario II. In addition to academic knowledge, business owners' personal networks play an important role in approaching financial resources, business opportunities, market information, and enhancing relationships with institutions (Muda and Rahman, 2016). As shown in the case study results, if business owners establish good relationships with the authorities and banks, their company will be able to approach bank loans and obtained the local government's support in participating in trade fairs. Most business owners are not fully aware of their relationship with stakeholders, so they may miss out on business opportunities. Therefore, entrepreneurs will invest in partnership relationships with institutions to facilitate the transformation from the traditional model to an industrial one.

### ***Marketing activities***

In this model, diversified marketing activities will be implemented to provide enterprises with favorable market access. Studies have shown that government plays an important role in orienting and supporting enterprises in market research, establishing international business centers, regular organization of trade fairs, and website development (Hoque, 2018; Ibrahim and Mustapha, 2019; Osei et al., 2016). Thanks to the local authority's assistance in annual trade fairs, Chinese bamboo enterprises succeed in introducing their new products and establish business partnerships with domestic and international traders. Chinese government initiated

promotion centers to familiarize enterprises with foreign trading procedures and international market trends (Zhaohua and Wei, 2018).

Market research will give enterprises the opportunity to examine the market potentials, target customers, suitable distribution channels, and potential competitors (Paul, 2019), but small-scaled bamboo enterprises are unlikely to carry out market research due to the complexity and high cost of such activities. As indicated in the case studies, calling the local authority for investment in bamboo products promotion at the moment will be not feasible since Vietnam has not built up particular policies for industrial bamboo production, and the provincial budget is limited.

Vietnam's industrial bamboo products such as bamboo panels, bamboo flooring, and modern furniture have to compete with international competitors from China and India. China, for instance, accounted for 95% of bamboo flooring in European market (Baksy, 2013b). Bamboo products from these countries have a vast array of designs with competitive prices and an extensive distribution system, whereas Vietnam is just a newbie in this field. International organizations have shown their vital role in helping enterprises access the international market (Kindu, 2010; Ranjan, 2000). According to the key informant interviews, with the helpful support of NGOs, namely European Union, Oxfam, and VCCI in product design and trade promotion, small bamboo enterprises may make innovative products and get access to global distribution channels like IKEA and Amazon.

Enterprises will cooperate with existing wood products distribution systems to present their products through these channels. This cooperation will take the full advantage of the existing resources and mitigate the investment cost of setting a new distribution system. Industrial bamboo products are considered to have an opportunity to compete with the wood products of the same kinds because of the scarcity of wood supply. Bamboo products are, in fact, claimed to be environmentally friendly and renewable resources, hardness and durability as well as of short rotation cycle (only 2 to 5 years) (Bansal and Zoolagud, 2002; Chaowana, 2013).

With the virtue of internet development, many enterprises can manage to reach international customers by using their own websites to introduce their products and offer online sales services (Mathews et al., 2019; Yusfiarto and Pambekti, 2019). During our interviews, it was reported that, many Vietnamese bamboo enterprises are still ignorant of digital marketing and do not even have their own websites. Thus, they will be trained in digital marketing to catch up with the global marketing trend and access new markets.



### ***Innovation capacity***

Enterprises will heavily invest in technology of bamboo processing and new product development to enhance their competitive advantage. Studies have confirmed that the level of innovation in technology and product in accordance with the market changes greatly contributes to the company's success story (Brata, 2009b; Xie et al., 2010). Lessons from Anji, China show that Chinese bamboo enterprises are able to adapt well to market changes in terms of new product introduction. Bamboo single laminated flooring, for instance, was popular in China and sold well in international markets during the 1980s-1990s period; however, these products were quickly outdated. Shortly after that, with the support of research centers, Chinese bamboo companies successfully launched pressed bamboo technology to replace the laminate one, which drew much attention from customers (Zhaohua and Wei, 2018).

Vietnam's bamboo industry is just warming up with the low capability of product research and development. Enterprises face numerous difficulties in processing raw bamboo material and introducing new designs. There is an absence of government support in technology innovation and new product development. To achieve this scenario, government needs to prepare a legal framework to support industrial bamboo production such as training human resources and establishing bamboo research and development centers. Local government and enterprises pay attention to the development of other associated sectors such as foreign trade, machinery manufacturing, and chemical industry, which can provide business services for bamboo enterprises such as the chemical industry play an essential role in providing glues for producing bamboo flooring.

### ***Cooperation among actors along bamboo value chain***

Actors along the value chain will cooperate to improve production capacity, competitiveness, and added value distribution and by this way reduce adaptive cost (Abteu et al., 2014; Makosa, 2015). The cooperation among chain actors plays a crucial role in increasing utilization rate of raw material and facilitate the transformation from a traditional business model to an industrial one. As confirmed by Zhaohua and Wei (2018), enterprises provide bamboo farmers with primary processing machines to produce specific semi-products according to the requirements of factories dedicated to particular products. Different parts of bamboo culms are utilized for different purposes. Base part of bamboo culm is used for charcoal while middle lower part of bamboo culm is used to make flooring and panels. Middle upper part of bamboo culm is utilized to produce chopsticks whereas the top part of bamboo culm is used in the production of toothpicks and skewers. Almost every part of the bamboo culm is utilized; thus, the utilization rate of raw material reaches over 90%.

As indicated in previous chapters, the coordination between actors along the bamboo value chains is weak, and farmers do not participate in primary processing. Chopstick companies buy fresh bamboo culm from traders and only use the middle-upper part of bamboo culm for chopsticks production, and another part of bamboo culm becomes waste production. As a result, its utilization rate of raw material was only below 17%. If the coordination between chain actors is not improved, it will be difficult for enterprises to obtain an industrial production scale.

Associations play an important role in connecting enterprises. The associations can organize an annual workshop to provide new designs and invite experts to present seminars on product design trends. These events lead enterprises, suppliers, and distributors to interact with each other and capture business opportunities. The association collaborates with NGOs to regular dialogue with enterprises to identify their core problems so that they can provide policymakers with problems faced by businesses (Macqueen, 2008).

Case study results have shown that some enterprises shared large orders with counterparts by subcontract to fulfill orders in a short time. Customers usually advance about 30% of the contract value to the enterprises. Local traders financially support enterprises by delaying payment for orders from 2-3 weeks. This amount is used to pay salaries and buy raw materials. However, this is only short-term financial support. Enterprises will prepare long-term financial resources to invest in production.

#### **7.5.5. Assessment of scenario feasibility**

As mentioned above, each scenario reveals the advantages and challenges in terms of bamboo resources, employment, capital investment, the technology of bamboo processing, and market access (see table 7.6). The selection of suitable scenarios for small bamboo enterprises in Vietnam depends on local conditions and the realities of bamboo enterprises. Furthermore, group discussion, key informant interviews, and experts' consultations provide an opportunity to conceptualize the scenarios of enterprises.

In terms of bamboo resource aspects, under Scenario - I, bamboo resources continue to be overexploited, so it is difficult to obtain the long-term supply of bamboo materials. On the other hand, Scenario-II and III have potentials to improve the quality of bamboo resources because bamboo farmers will receive training in technical harvesting and sustainable management. Scenario – III illustrates that the bamboo plantation area needs to be expanded to accommodate large-scale industrial production. However, bamboo farmers stated that they do not want to expand the bamboo area because the income from bamboo is not stable, the harvesting cost is

high, and the local government lacks favorable policies to promote the expansion of bamboo plantation. Therefore, to extend the bamboo plantation area, the local government should provide preferential policies such as bamboo plantation subsidies. Enterprises contract with bamboo growers for plantation, harvest and purchase to ensure the sustainable development of bamboo resources while meeting the needs of a growing industry. Besides, bamboo farmers are encouraged to participate in FSC certification to receive support in technical harvesting and sustainable management.

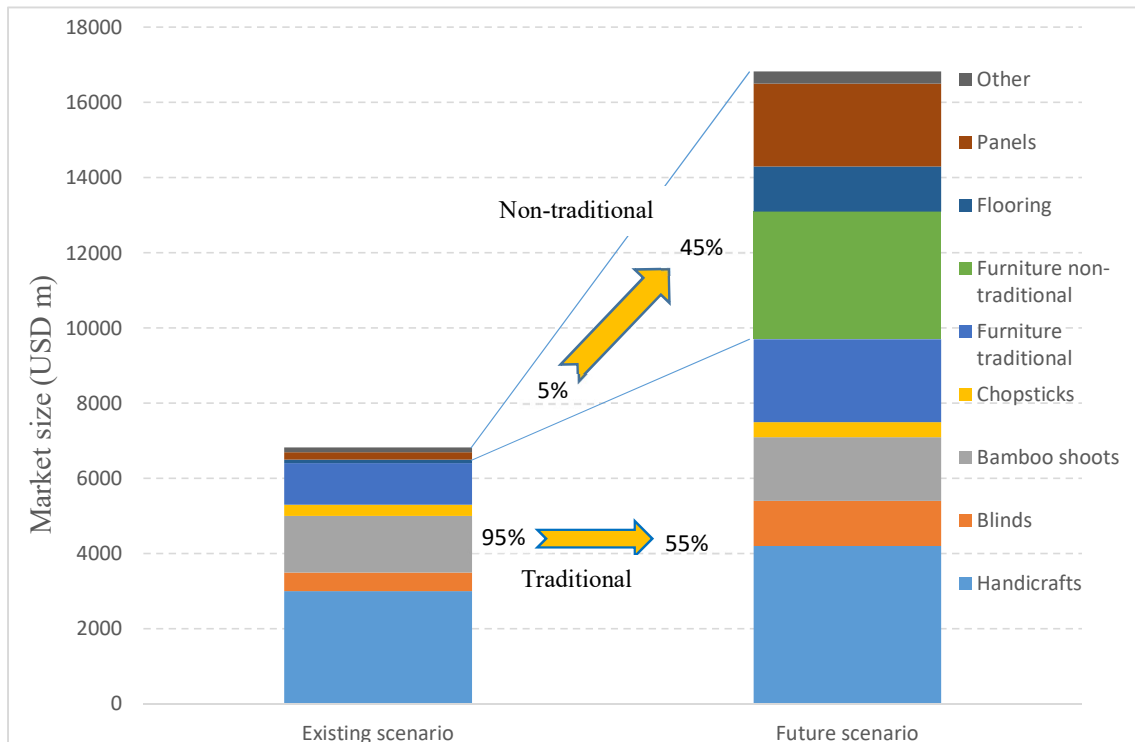
**Table 7.6. Comparison of constraints and advantages among scenarios**

Scenario	Constraints	Advantages
<b>Scenario-I:</b> BAU	<ul style="list-style-type: none"> <li>- Overexploiting bamboo resources</li> <li>- Producing traditional products with low value-added</li> <li>- Poor working conditions and low income</li> <li>- Weak market access</li> <li>- Outdated machines</li> <li>- The low utilization rate of raw materials</li> <li>- Lack of product innovation</li> <li>- No cooperation among chain actors</li> </ul>	<ul style="list-style-type: none"> <li>- Low investment</li> <li>- Providing manual jobs for local people</li> </ul>
<b>Scenario-II:</b> Upgrading traditional production	<ul style="list-style-type: none"> <li>- Continuing to produce traditional products</li> <li>- The requirement of medium capital investment</li> </ul>	<ul style="list-style-type: none"> <li>- Managing bamboo resource</li> <li>- Investing in new machines</li> <li>- Improving utilization rate of raw materials</li> <li>- Increasing quality products</li> <li>- Enhancing market access</li> <li>- Providing more job opportunities for local people</li> </ul>
<b>Scenario-III:</b> The transformation from traditional production to industrial production	<ul style="list-style-type: none"> <li>- Intensively investing advanced technology of bamboo processing and new product development</li> <li>- Implementing bamboo plantation expansion</li> <li>- Requiring close cooperation among chain actors</li> <li>- Rising unemployment for unskilled local workers</li> </ul>	<ul style="list-style-type: none"> <li>- Increasing production capacity</li> <li>- Improving utilization rate of raw materials</li> <li>- Providing new industrial bamboo products with high value-added.</li> <li>- High chance to access international markets</li> </ul>

Regarding social criteria, the bamboo industry under Scenario – I and II provides many job opportunities given the labor-intensive characteristic of relevant production stages. The bamboo enterprises located in the bamboo resources and/or handicraft villages additionally lead to an associated benefit of creating jobs for local people. Despite that, the working conditions and workers' income are generally at a low level due to enterprises' small-scale production and limited financial capacity. As a result, labor tends to migrate from handicraft villages to urban areas to find more stable jobs. Handicraft villages are finally trapped in labor shortage to produce handicraft products. In contrast, the modern workplace with normally labor-saving production techniques resulted from Scenario – III may increase job losses, specifically for unskilled labors currently dominating the labor workforce in Vietnam's bamboo industry. This Scenario represents as an opportunity to improve working conditions and income for employees in the bamboo sector. Technological advancement requires a number of skilled labors, which are difficult to achieve in the short-term.

In terms of capital investment aspects, under Scenario - II, enterprises continue to produce traditional products with low value-added. Enterprises will invest in new machines to improve the utilization rate of raw materials and production capacity. Marketing activities are also financed to increase market access opportunities. Under Scenario - III, enterprises heavily invest in modern technology of bamboo processing to produce industrial bamboo products. These products not only increase value-added for actors along the value chain but also have a high opportunity to access international markets. The mobilization of capital to invest in industrial production is the biggest challenge for bamboo enterprises due to complicated loan procedures and collateral.

The Vietnamese bamboo industry can integrate Scenario - II with Scenario – III to manage its development goals. According to growth scenarios of the world bamboo market (Oxfam Hong Kong, 2006), traditional products such as handicrafts, blinds, shoots, chopsticks, and traditional bamboo furniture are of low value and have little potential to develop, but these products significantly contribute to socio-economic development. The current local conditions and available resources of bamboo enterprises in Vietnam are considered to be suitable to produce traditional products in Vietnam. Traditional products will be invested, but the market share of traditional products decreases from 95% (Existing scenario) to 55% (Future scenario) (Figure 7-5).



**Figure 7-5. Growth scenarios for the world bamboo market**

Source: (Oxfam Hong Kong, 2006)

Industrial bamboo products, namely modern/laminated furniture, flooring, and panels, have a higher chance to grow, so these industrial products will be invested to achieve the growth rate increases from 5% (Existing scenario) to 45% (Future scenario) (Figure 7-5). To achieve industrial production goals, technology innovation and new product development are a priority for policy support. The Vietnamese bamboo sector will have leading enterprises that are able to invest in advanced technology of bamboo processing and marketing campaigns. The leading enterprises play an important role in promoting chain actors, so they should be given various types of support, including land, loans, finance, taxation from local governments, and international organizations.

## CHAPTER 8

### FINAL REFLECTIONS AND RECOMMENDATIONS

#### 8.1. Lessons learned and critical reflection from the case studies

This study employs the case study approach to explore factors affecting enterprise upgrading. Usage of the case study approach has proved to be effective, since it allows the researcher to generate the detail and comprehensive analysis on the business activities of the bamboo enterprises and examine the driving factors of enterprise upgrading.

Enterprises are purposively selected based on a set of criteria including human resource, technology, material purchasing, marketing activities, production scale, development history, and business performance in recent years. This strategy is suitable to capture the most common enterprise resources and their impact on enterprise upgrading. The enterprises selected are exemplary for other enterprises of the region, and the case study results are the lessons learned to other studies with similar contextual situations. The use of embedded case studies allows to compare between upgraders and non-upgraders. Through a comparative analysis, the study has shown the reasons why some enterprises have succeeded in doing business while others have failed to manage their business and could not overcome the difficulties. Enterprise comparison has encountered challenges due to differences in establishment year, resources, and business scale.

The study has shown exemplary evidence of how internal and external factors affect the upgrading of bamboo enterprises. From the case study results, the key factors driving the upgrading are identified, and alternative scenarios are proposed for small bamboo enterprises. The results lead to hypothetical assumptions because the evidence is not at all given.

Vietnam is blessed with abundant bamboo resources for long-term industrial production. However, bamboo farmers' poor awareness of bamboo management and sustainable harvesting is the cause of excessive and improper exploitation of bamboo. Also, manual harvesting and the complicated mountain terrain have accelerated the exploitation cost, which discourages bamboo farmers from expanding the bamboo area, and thus bamboo supply may not meet the rising market demand for bamboo materials in the near future. In order to enhance the quality of bamboo materials and expand the bamboo area in support of industrial production, bamboo farmers need governmental assistance to improve exploitation techniques. The establishment

of joint venture businesses between bamboo enterprises and farmers is useful, since the enterprises can invest in bamboo plantations and support farmers in harvesting, and in return, farmers can sign long-term sale contracts with the bamboo enterprises (Zhaohua and Wei, 2018).

The government plays a critical role in orienting and facilitating the upgrading process of bamboo enterprises (Hoque, 2018; Osei et al., 2016). Enterprises stated that due to the complicated administrative procedure between central and local government, it was difficult for them to access supportive policies. Although the government does have a policy of allowing businesses to borrow money from banks with preferential interest rates, businesses cannot enjoy this incentive due to the barrier of complicated loan procedures. Another concerning issue is the lack of particular policies regarding the bamboo sector, which hinders bamboo enterprises from direct, head-to-head competition with other enterprises (Phan, 2020). Local authorities need to maintain regular dialogue with enterprises to identify their core problems and determine solutions.

Although the labor cost of the bamboo industry in Vietnam is cheaper than other countries in the region, most employees currently working in bamboo enterprises have a low educational background. These employees hold only a high school diploma and have no professional training, and hence it is difficult for them to adapt to modern machinery and technology. Small-scale production and poor business results do not enable bamboo enterprises to invest in employee training as well as improving employee working conditions and income. Unlike in other sectors, it is difficult for the bamboo industry to retain and attract skilled labor. Moreover, even entrepreneurs lack updated knowledge of business administration and financial management which are the essential skills for running a business of larger-scale production. However, the quality of the labor force can be enhanced by the training courses sponsored by the local authorities and international organizations (Appiah-Kubi et al., 2014; Tekpetey et al., 2015).

Most enterprises have difficulty in accessing external finance resources. Personal savings and cash income are the two main sources of financing their production and business activities. While a number of enterprises are afraid of the business risks involved in securing bank loans and expanding production, other companies really need bank loans but do not have collateral. The relationship between business owners and banks is considered as an important factor in facilitating the loan process. The diversification of financial instruments and the assistance of local government in fulfilling the loan process are two feasible solutions to the problem of loan access (Ramalho et al., 2018).

Associations are believed to bring about a number of benefits for enterprises, especially if the enterprise belongs to a representative association or umbrella organization with a strong voice in policy-making and national policy process (Macqueen et al., 2006). One concern is the limited interaction between bamboo enterprises and associations such as the handicraft village association and bamboo association. Associations are generally short of the finance required to organize business platforms for enterprises, such as workshops and seminars on bamboo processing technology, product design trends, and market analysis.

Innovation in product design and materials is considered an effective tool for enterprises to enter the market and establish competitive advantage against local competitors. For small enterprises, investing in innovation is of high cost, and even risk of failure since it is unlikely that they will catch up with the level of product research and development of major international competitors. Bamboo product research and development centers must play their role in assisting enterprises in product research and development, as well as transferring advanced technology of bamboo processing (Zhaohua and Wei, 2018).

Waste from bamboo product manufacture poses a threat to the local environment. This waste includes chemical wastewater from bamboo material processing and waste from the production of votive papers and chopsticks. Small enterprises with outdated technology often face tremendous difficulties in processing production waste. In order to attract investment into the bamboo industry, the local governments and NGOs should support enterprises in implementing waste treatment.

International organizations play important roles in assisting enterprises to upgrade; i.e., GRET helped bamboo enterprises in Thanh Hoa province in not only transferring bamboo processing technology but also connecting with international customers. Most enterprises have little or no financial ability to invest in marketing activities and develop distribution channels and face tremendous difficulties in expanding their markets. Bamboo trade promotion centers should be established to support enterprises in connecting with international markets and implementing marketing activities.

The shift from the traditional business model to the industrial model faces challenges, since the conditions that can foster industrial bamboo production are uncertain in Vietnam. These conditions include high-quality material resources, modern bamboo processing technology, and investment capital. In order to realize the ambition of an industrial production model, it is necessary to have development strategies at the national level that include large-scale plantations of bamboo, research and development of bamboo processing technology, financial instruments, and promotion programs for bamboo products.



## **8.2. Limitations of the research and suggestions for further research**

This study employed a case study approach, and the study units were small-scale enterprises. Therefore, case study findings are not possible for statistical generalization to a broader population. Further studies should be conducted with different production scales to facilitate comparison and generalization of the findings.

The resources affecting enterprise upgrading are diverse and vary according to timescale and business environment of each region as well as each enterprise. The research did not sufficiently investigate competitor analysis and the consumer perspective, so could not fully examine the effects of competitors and consumers on enterprise development. Future studies should focus on market research to assess market potential, the target customers, and competitors.

Although the research attempted to collect financial statements from enterprises, it was impossible for the researcher to compile all the financial data in such a short amount of time due to the complexity of the financial figures and the consecutive time period of five financial years from 2012 to 2016. The enterprises were quite reluctant to share their sensitive financial numbers. To overcome this difficulty, the financial figures were not only consulted from the financial experts, but also cross-checked and verified by the tax department. Although the financial indicators were analyzed for a 5-year period from 2012 to 2016, the analysis failed to incorporate the factor of the inflation rate. The analysis of value-added at farmer level did not include opportunity costs such as land usage and plantation. These aspects should be investigated in further research.

The structured analysis approach is an effective method to understand the relationship between factors and the effect of each variable on the entire system, as well as to identify key factors affecting enterprise upgrading. The identification of important factors and rank of influence level of each factor on enterprise development are often assessed subjectively by business owners, and this can pose potential rejection by non-participants. These types of uncertainty can be minimized by the involvement of diversified stakeholders including policymakers, governmental staff, and experts in evaluating the factors.

Although this study demonstrated the contribution of value-added among chain actors, it did not fully analyze the value chain governance and mechanisms of access to benefit along the value chain. Future research should focus on investigating value chain analysis to further understand the structure, functioning and performance of the bamboo value chains.

Some companies have failed to upgrade successfully despite receiving substantial external support. For example, NGOs supported Case-III with export and import procedures and 50% of the cost of chopstick processing machines imported from China. However, the enterprise has not developed further due to lack of product innovation and marketing campaigns. Thanks to innovative technology of bamboo processing, other companies have upgraded without receiving external support and have been successful without a developed marketing strategy. These findings illustrate the complexity and peculiarity of factors and conditions that lead to the upgrade of enterprises, which research cannot fully capture.

The study did not organize a participatory scenario workshop to discuss the research findings and options for the future development of bamboo enterprises. Instead, the upgrading scenarios were proposed based on empirical results, observation, and literature review. These scenarios were developed using qualitative analysis, while quantitative analysis including investment costs, cost structure, estimation of revenues and profit for each scenario was not employed. Future research should develop scenarios by using quantitative analysis to examine the effect of every single variable on every scenario. A participatory scenario workshop should be organized to discuss the research findings and challenges of the enterprises, in order to propose an alternative development strategy for the bamboo enterprise.

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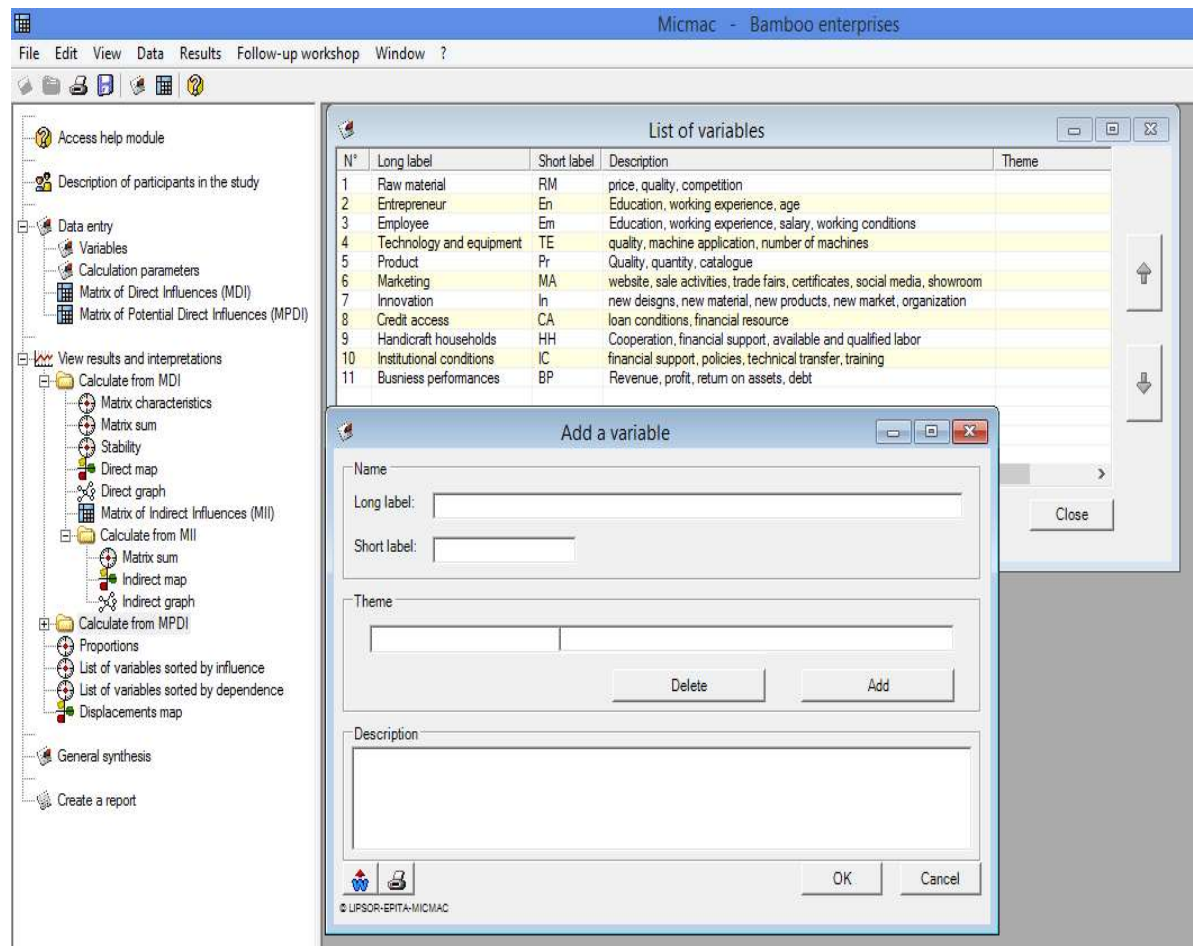
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# APPENDICES

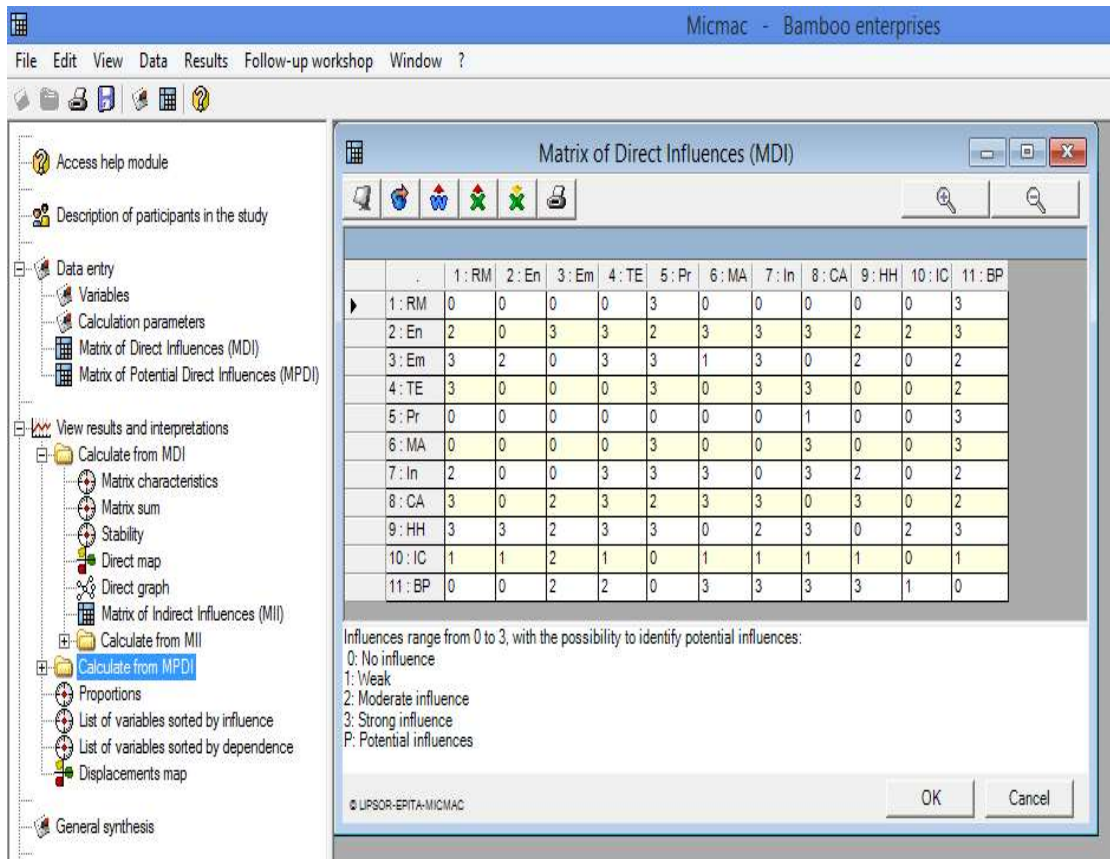
## Appendix 1. MixMac computer software

- Detecting the factors that influence bamboo enterprise upgrading is based on empirical results and focus group discussion (cf. section 3.3, Chapter 3). The selected factors affecting bamboo enterprises are entered into the list of variables (Figure P-1).



**Figure P-1. Screenshots of the analysis process in MicMac software: enter the list of factors**

- Capture a matrix of direct influences that describe the relation of direct influence between the factors. This matrix is filled out with values with the following scale (Figure P-2): 0: no influence; 1: limited influence; 2: strong influence; 3: crucial influence (ranking factors in detail in section 3.3, Chapter 3).



**Figure P-2. Screenshots of the analysis process in MicMac software: fill out the matrix of direct influences**

## Appendix 2. List of key informant interviews

<b>ID</b>	<b>Date</b>	<b>Interviewee</b>	<b>Organizations/Districts</b>
KI-1	10/8/2015	District officer	Department of Economics, Chuong My district
KI-2	10/8/2015	Commune leader	Dong Son Commune
KI-3	10/8/2015	Commune leader	Phu Nghia Commune
KI-4	11/8/2015	Village leader	Ha village
KI-5	3/4/2017	Village leader	Quyet Ha village
KI-6	3/4/2017	Village leader	Luong Son village
KI-7	3/4/2017	Village leader	Phu Vinh village
KI-8	12/8/2015	Handicraft association officer	Hanoi Handicraft association
KI-9	4/4/2017	Handicraft association officer	Hanoi Handicraft association
KI-10	14/8/2015	Master artisan	Chuong My district
KI-11	17/4/2017	Master artisan	Chuong My district
KI-12	17/4/2017	Master artisan	Chuong My district
KI-13	20/8/2015	Provincial officer	Department of Agricultural and Rural Development, Thanh Hoa province
KI-14	16/5/2017	Provincial officer	Department of Foreign Affairs, Thanh Hoa province
KI-15	16/5/2017	Provincial officer	Department of Foreign Affairs, Thanh Hoa province
KI-16	18/5/2017	District officer	Department of Economics and Infrastructure, Quan Hoa district
KI-17	21/8/2015	District officer	Department of Agricultural and Rural Development, Ba Thuoc district
KI-18	25/5/2017	District officer	Department of Agricultural and Rural Development, Ba Thuoc district
KI-19	25/5/2017	Commune leader	Thiet Ke commune
KI-20	25/5/2017	Village leader	Chay Ke village
KI-21	25/5/2017	Village leader	Cha village
KI-22	21/8/2015	Bamboo association officer	Thanh Hoa province
KI-23	18/5/2017	Bamboo association officer	Thanh Hoa province

### Appendix 3: List of focus group discussions

Sr.	Date	Location	Topic of discussion
1	19/8/2015	Phu Nghia, Chuong My district, Hanoi	Opportunities and challenges for enterprise upgrading: innovation, credit access, the technology of bamboo processing, market access, human resources
2	18/4/2017	Case-I, Chuong My district, Hanoi	Issues and solutions: innovation, credit access, the technology of bamboo processing, market access, human resources
3	18/4/2017	Case-II, Chuong My district, Hanoi	Issues and solutions: innovation, credit access, the technology of bamboo processing, market access, human resources
4	19/4/2017	Dong Son, Chuong My district, Hanoi	Role of chain actors: collaboration, information sharing, benefit-sharing.
5	19/4/2017	Phu Nghia, Chuong My district, Hanoi	Role of chain actors: collaboration, information sharing, benefit-sharing,
6	21/8/2019	Phu Nghia, Chuong My district, Hanoi	Case study results, identification of key factors and influence level between pairs of factors
7	24/8/2015	Hoi Xuan, Quan Hoa district, Thanh Hoa	Opportunities and challenges for enterprise upgrading: innovation, credit access, the technology of bamboo processing, market access, human resources
8	31/5/2017	Case-III, Quan Hoa district, Thanh Hoa	Issues and solutions: innovation, credit access, the technology of bamboo processing, market access, human resources
9	31/5/2017	Case-IV, Quan Hoa district, Thanh Hoa	Issues and solutions: innovation, credit access, the technology of bamboo processing, market access, human resources
10	1/6/2017	Nam Xuan, Quan Hoa district, Thanh Hoa	Role of chain actors: collaboration, information sharing, benefit-sharing,
11	1/6/2017	Thiet Ke, Ba Thuoc district, Thanh Hoa	Role of chain actors: collaboration, information sharing, benefit-sharing,
12	26/8/2019	Hoi Xuan, Quan Hoa district, Thanh Hoa	Case study results, identification of key factors and influence level between pairs of factors

## Appendix 4: Semi-structured questionnaire for interviews with enterprises

### BASIC INFORMATION OF ENTERPRISES

Name company: .....

Address: .....

Name of interviewee: .....

Position: .....

Gender: .....

Which year starting operation?.....

### FORMALIZATION

Does your enterprise have a business registration certification?

If yes: how many years?

If no: why?

### PRODUCTS OF THE ENTERPRISE

What are your products?

Industrial products                       Handicraft products                      If Industrial

products, pls. elaborate

Chopsticks                       Paper                       Flooring                       Others

Toothpicks                       Charcoal                       Furniture

If handicraft products, pls. elaborate

Basket                       Vase                       Tray

Box                       Tradition toy                       A 11

### TECHNOLOGY

To what extent is the technology important?

High                       very low

Medium                       Others

Low

Does your enterprise apply technology in the production process?

Yes                       No

If an application, Pls. Elaborate to what extend the technology is applied?

1% - 10%                       30% - 40%

10% - 20%                       > 40%

20% - 30%



How much does your enterprise spend on technology compared to sale volume per year?

What types of tools and equipment used for bamboo processing?

- Machine       Saw  
 Scissors       Knife       All

### **EMPLOYEE CHARACTERISTICS**

How many regular workers are there in your enterprise

At starting operation or 5 years ago:

- 1 – 10 workers       10 – 20 workers  
 20 – 30 workers       > 30 workers

At time of interview:

- 1 – 10 workers       10 – 20 workers  
 20 – 30 workers       > 30 workers

How many seasonal workers are there in your enterprise

At starting operation or 5 years ago:

- 1 – 10 workers       10 – 20 workers  
 20 – 30 workers       > 30 workers

At time of interview:

- 1 – 10 workers       10 – 20 workers  
 20 – 30 workers       > 30 workers

Pls. provide the proportion of different categories of employees in your enterprise:

- Female employees:.....  
 Ethnic employees:.....  
 Employees from other provinces:.....

Salaries/wages of employees are paid:

- on hour basis       On daily basis  
 on a monthly basis       based on No of products

On average, how much are employees paid?

At 5 years ago: .....

At time of interview:.....

Percentage of employees having

To what extent are the working conditions in your company?

- High  
 Medium  
 Very low (pls elaborate)

At starting operation or 5 years ago:

- Postgraduate or beyond:.....%
- Graduate (university education/middle-level education): .....%
- Vocational education (short or long term) before working for you: .....%
- High school graduate:.....%
- Secondary school graduate:.....%

At time of interview:

- Postgraduate or beyond:.....%
- Graduate (university education/middle-level education): .....%
- Vocational education (short or long term) before working for you: .....%
- High school graduate:.....%
- Secondary school graduate:.....%

How do you evaluate the quality of employees in your enterprise?

At starting operation or 5 years ago:

- Completely meet the demand/requirements
- Partially meet the demand/requirements
- Not meet demand, in general speaking
- Completely not meet demand/requirements

At time of interview:

- Completely meet the demand/requirements
- Partially meet the demand/requirements
- Not meet demand, in general speaking
- Completely not meet demand/requirements

### **CREDIT ACCESS**

Where can the company access financial resources?

- Government
- Bank
- NGOs
- self-finance
- other

If loan from banks, to what extent is your enterprise able to fulfill requirements from banks?

- High
- Medium
- Very low

The interest rate of bank per month or year .....

What are the major obstacles to borrowing from the bank?

- Mortgaged property
- Corruption
- Lending conditions
- Relations with banks

Interest rates

## MARKET ACCESS

Does your enterprise have any certification?

If yes, how many?.....

Does the enterprise attend an exhibition?

Yes

No

If Yes, how many exhibitions does the enterprise attend over the last 5 years? .....

How many domestic traders does your enterprise have?

At 5 years ago: .....

At time of interview:.....

What is the sale volume rate in the domestic market? (as % of total sales)

At 5 years ago: .....

At time of interview:.....

How many international traders does your enterprise have?

At 5 years ago: .....

At time of interview:.....

What is the sale volume rate in the international market? (as % of total sales)

At 5 years ago: .....

At time of interview:.....

Does the enterprise have any marketing activities

Yes

No

If Yes:  Exhibition  Website  Catalogue  Showroom  All

How you rate the following obstacles in accessing the market (*the biggest obstacle given one, if smallest obstacle given five and if your view is in between give values within this range*)

Obstacles	1	2	3	4	5
Lack of capital					
Poor quality of an entrepreneur					
Lack of market information					
Poor innovation in production					
Unstable Environmental business					
Highly depending on some big distributors					
High transportation cost/ Location					
Strong competition in the international market					
Low proficiency in the foreign language					
Poor support from government/institutions					

## STATE OF INNOVATION

Pls elaborate on the quality of the following statement in the last 5 years

Innovation type	How many (No)
New products	
Improved products	
New customer	
New market	
New distribution	
New machine	
Production cost reduction	
New labeling and parking	
New certification or quality standard	

How you rate the following issues affecting the innovation in your enterprise (*the strongest affection given one, the lowest affection given five, and if your view is in between give values within this range*)

Issue	1	2	3	4	5
Finance					
Capacity/skills of employee					
Competitive market					
Government/institutions support					
Technology					
Quality of entrepreneur					

## ENTREPRENEUR CHARACTERISTICS

Education qualification and experience of the enterprise owner

- Graduated from University/college
- Graduated from Vocational program
- Has Post-graduate degree in business administration
- Without training and doing business with your personal experiences

Does your family do business before?

Before becoming an entrepreneur, you are?

- Be leaders in Govt. agencies
- Be military officer
- Work as a manager in State enterprise
- Be an officer in State enterprise

If yes, how many years did you work in that sector?

How does your personal network play an important role in the following factors? (*the most important given one, the lowest important given five, and if your view is in between give values within this range*)

Factors	1	2	3	4	5
Financial support					
Sharing information					
Market access					
Technical support					

How you rate the following obstacles in your business (*the biggest obstacle given one, if smallest obstacle given five and if your view is in between give values within this range*)

Obstacles	1	2	3	4	5
Lack of capital					
Difficult to access market					
Low qualification of workers					
Quality of entrepreneur					
Lack of market information					
Poor innovation in production					
Depending on households in providing semi-finished products					
Depending on some big distributors					
Poor technology					
High transportation cost					
Uncertain price of bamboo material					
Bureaucracy					
Corruption					
Shortage of skillful workers					
Strong competition in the international market					
Decreased availability of bamboo material					
Low proficiency in the foreign language					
Poor support from government/institutions					

## FINANCIAL STATEMENT

The total asset of your enterprise

At starting operation or 5 years ago

- |  |   |
|--|---|
| <input type="checkbox"/> < 0,5 billion VND           | <input type="checkbox"/> From 0,5 to 1 billion VND  |
| <input type="checkbox"/> From 1 to 5 billion VND     | <input type="checkbox"/> From 5 to 10 billion VND   |
| <input type="checkbox"/> From 10 to 50 billion VND   | <input type="checkbox"/> From 50 to 200 billion VND |
| <input type="checkbox"/> From 200 to 500 billion VND | <input type="checkbox"/> > 500 billion VND          |

At time of interview:

- |  |   |
|--|---|
| <input type="checkbox"/> < 0,5 billion VND           | <input type="checkbox"/> From 0,5 to 1 billion VND  |
| <input type="checkbox"/> From 1 to 5 billion VND     | <input type="checkbox"/> From 5 to 10 billion VND   |
| <input type="checkbox"/> From 10 to 50 billion VND   | <input type="checkbox"/> From 50 to 200 billion VND |
| <input type="checkbox"/> From 200 to 500 billion VND | <input type="checkbox"/> > 500 billion VND          |

Annual average revenue in your enterprise?

At starting operation or 5 years ago

- |  |   |
|--|---|
| <input type="checkbox"/> < 0,5 billion VND           | <input type="checkbox"/> From 0,5 to an 1 billion VND |
| <input type="checkbox"/> From 1 to 5 billion VND     | <input type="checkbox"/> From 5 to 10 billion VND     |
| <input type="checkbox"/> From 10 to 50 billion VND   | <input type="checkbox"/> From 50 to 200 billion VND   |
| <input type="checkbox"/> From 200 to 500 billion VND | <input type="checkbox"/> > 500 billion VND            |

At time of interview:

- |  |   |
|--|---|
| <input type="checkbox"/> < 0,5 billion VND           | <input type="checkbox"/> From 0,5 to an 1 billion VND |
| <input type="checkbox"/> From 1 to 5 billion VND     | <input type="checkbox"/> From 5 to 10 billion VND     |
| <input type="checkbox"/> From 10 to 50 billion VND   | <input type="checkbox"/> From 50 to 200 billion VND   |
| <input type="checkbox"/> From 200 to 500 billion VND | <input type="checkbox"/> > 500 billion VND            |

Annual profit in your enterprise?

At starting operation or 5 years ago

- |  |   |
|--|---|
| <input type="checkbox"/> Losses                      | <input type="checkbox"/> Breakeven                    |
| <input type="checkbox"/> < 0,5 billion VND           | <input type="checkbox"/> From 0,5 to an 1 billion VND |
| <input type="checkbox"/> From 1 to 5 billion VND     | <input type="checkbox"/> From 5 to 10 billion VND     |
| <input type="checkbox"/> From 10 to 50 billion VND   | <input type="checkbox"/> From 50 to 200 billion VND   |
| <input type="checkbox"/> From 200 to 500 billion VND | <input type="checkbox"/> > 500 billion VND            |

At time of interview:

- |  |   |
|--|---|
| <input type="checkbox"/> Losses                  | <input type="checkbox"/> Breakeven                    |
| <input type="checkbox"/> < 0,5 billion VND       | <input type="checkbox"/> From 0,5 to an 1 billion VND |
| <input type="checkbox"/> From 1 to 5 billion VND | <input type="checkbox"/> From 5 to 10 billion VND     |



## **Appendix 5: Semi-structured questionnaire for interviews with bamboo traders**

### **Basic information on bamboo traders**

Name of interviewee.....

Gender.....

Age.....

Position/Occupation: .....

Level of education: .....

Interview time and date: .....

Interview location.....

### **Bamboo characteristics**

Where do you collect bamboo?

What are the main difficulties in collecting bamboo?

How much do you pay for a culm/ton?

How is the price of bamboo varied?

If varied, which period? (harvesting season, which months...)

Who are your customers?

How many customers do you have?

Is there any requirement of customers about the age of bamboo?

How does the age of bamboo impact on price/quality of bamboo or sale volume?

How many tons of raw bamboo do you sell per month/year?

What is the average revenue per month or year?

What types of main transportation means you use for transporting bamboo culms?

Do you own any transportation means? Or hire?

How much do you spend on transportation per year?

How does transportation impact on your business?

How does structure cost evaluate per ton/year? (*labor cost, transportation, interest, storage, depreciation, tax, and other costs*)

How do you compete with competitors to sell bamboo?

### **Pre-processing**

Is bamboo pre-processed before selling?

If no, why?

If yes,

Which pre-products?



Which technology?

How much do you invest in pre-processing per ton?

Which price compared with unprocessed products?

How does demand differ from unprocessed bamboo?

What are the difficulties in pre-processing?

How many tons of pre-processed bamboo do you sell per month/year?

### **Cooperation**

Do you receive any support from local government or bamboo enterprises?

If Yes, Since when? What kind of support have you received?

Do you cooperate with bamboo growers/bamboo enterprises?

If Yes, Since when, and where? And what kind of cooperation?

What are the main advantages of cooperation with them?

What are the main obstacles in cooperation? Pls. Explaining and ranking the obstacles?

How do you do to handle these obstacles?

How do you develop the cooperation with them?

How does cooperation play an important role in developing your business?

## **Appendix 6: Semi-structured questionnaire for interviews with handicraft households**

### **BASIC INFORMATION OF HOUSEHOLD**

Name of interviewee.....  
Gender.....  
Age.....  
Position/Occupation: .....  
Level of education.....  
Interview time and date: .....  
Interview location.....  
Family size.....

### **HOUSEHOLD CHARACTERISTICS**

#### **Products:**

What do you produce?  
How are the products designed (by your own or customers or others)?  
How satisfied are your customers with the quality of your products?  
What do you have any quality criteria used for bamboo products? National/ international standard, quality certificate, etc.  
How much waste/reject products do you observe during the production process?  
Have your products ever been rejected by customers because of poor quality?  
If Yes, how do you deal with these issues?

#### **Raw bamboo:**

Which raw bamboo source do you collect?  
How do you assess the quality of raw bamboo?  
What are the main difficulties in collecting raw bamboo?  
How is the price of bamboo varied?  
If varied, which period? (harvesting season, which months...)

#### **Production:**

How many processing steps do you perform?  
How many of these steps do you use machinery? Equipment?  
How long does it take to produce a product?  
What types of tools and equipment used for bamboo processing? How much did you invest?  
What are the biggest challenges with machinery?  
How do you cope with these challenges?

How has machinery changed compared to 5 years ago?

How does machinery increase productivity?

What is the utilization rate of bamboo material?

Which new products have you introduced during the past 5 years?

How did they differ from previous products?

How have you developed these products?

How does structure cost evaluate for a bamboo bowl? (*Bamboo material, accessories, processing cost, transportation, electric, depreciation, tax*)

**Innovation:**

Which new products have you introduced during the past 5 years?

How did they differ from previous products?

How have you developed these products?

Which important factors will contribute to successful innovation?

Which main barriers to your innovative production effort?

How you rate the following issues to innovation (*if you strongly agree give one, if strongly disagree give five and if your view is in between give values within this range*)

Issue	1	2	3	4	5
Innovation is my priority					
Business survival not innovation is my priority					
Innovation is part and parcel of the business					
Innovation is essential for business development					
Innovation obtained by chance					

**Customers:**

Who are your customers?

How many customers do you have?

Is there any requirement of customers about age of bamboo/quality of pre-finished products?

**Family members:**

How many members of your family produce bamboo handicraft products?

How many years of working experience do you have?

Does your family make the handicraft products before? Where? since when?

If yes, what have you learned from your family?

How many hours did you spend on producing per day?

Do you or your family members get education/training in production skills?

If yes,

How many times over the last 5 years?

How much have you been paid?

Where has your training been organized?

How long does it take?

Which contents in your training?

What type of training? practical training or classroom/theory

Who is the trainer? (bamboo enterprise, local government, NGOs)

What benefits do you get from training skills?

How useful was the training?

How do you rate the quality of the training? (1 – lowest...5 - highest)

**Collaboration:**

How do you collaborate with bamboo enterprises? *Short-term(how many years), long – term (how many years) business contract...*

What kind of advice/finance/raw bamboo... do you receive from bamboo enterprise?

If Yes, pls elaborate

How do you rate the following factors receiving from bamboo enterprises or institutions? (*if you strongly agree give one, if strongly disagree give five and if your view is in between give values within this range*)

Factors	1	2	3	4	5
Financial support					
Sharing information					
Knowledge transfer					
Market access					
Technical support					
Training support					
Bamboo supply					

**Income:**

How much do you earn per month/product?

How do you compare income from handicraft bamboo with other incomes: rice income, livestock income, off-farm income, and income from other sectors per year?

Types	Revenue	Input/cost	Net income
Rice			
Livestock			
Off-farm income			
Other sectors			

What are the main difficulties in producing pre-finished products and providing your products to bamboo enterprises?

How do you deal with these issues?

## Appendix 7: Semi-structured questionnaire for interviews with bamboo growers

### BASIC INFORMATION OF BAMBOO GROWERS

Name of interviewee.....

Gender.....

Age.....

Position/Occupation: .....

Level of education: .....

Interview time and date: .....

Interview location.....

Family size: .....

### CHARACTERISTICS OF BAMBOO RESOURCE

#### Bamboo areas:

How many bamboo areas in hectare do you have?

#### Disease:

What main disease does your bamboo suffer?

At which age is your bamboo infected?

How do these diseases affect the quality and productivity of bamboo? (*rate of bamboo died by disease, a low quality of bamboo by disease, low price...*)

How do you deal with these diseases?

#### Plantation and harvesting:

Do you spend on fertilizer for bamboo?

If yes, how much do you spend per month or year/ hectare?

From where you harvest bamboo (natural forest, private bamboo garden, other)?

How many tons of bamboo harvested per year/ hectare?

At which age do you harvest bamboo?

How does the age of bamboo impact on price/quality of bamboo?

How much do you spend on bamboo management/planting/protection per year/hectare?

How much do you spend on harvesting per year/hectare?

Which tools do you use to harvest bamboo? And how much did you invest?

Which machines do you use to harvest bamboo? And how much did you invest

Where is bamboo sold after harvesting? (*garden gate, local market...*)

What types of main transportation means you use for transporting bamboo culms from harvesting points to sale points? (*shoulders, waterways, animal cars...*)

Do you own any transportation means? Or hire?

How much do you spend on transportation from harvesting points to sale points per year/ ton?

Do you hire local labors to harvest bamboo?

If Yes, how much do you pay for local labors/ton?

What are the difficulties in hiring the local labors?

How many tons of bamboo culms do you sell into the market per year?

How are bamboo plantation and harvesting affected by a shortage of capital?

How much do you sell per culm/ton?

How does the selling price change according to the quality?

**Pre-processing:**

Is bamboo pre-processed before selling?

If no, why?

If yes,

Which pre-products?

Which technology?

How much do you invest in pre-processing per ton?

Which price compared with unprocessed products?

How many tons of pre-processed bamboo do you sell per month or year?

How does demand differ from unprocessed bamboo?

What are the difficulties in pre-processing?

**Customers:**

Who are the customers?

What do your customers require for the quality of bamboo? Such as age of culm used...

To what extent is the certain price of bamboo culm?

What are the main difficulties in selling your bamboo?

How do you depend on the buyers?

How do you cooperate with bamboo collectors or bamboo enterprises?

**Income:**

What is the average price for a culm?

How much do you earn from the sale of bamboo per year?

How is your income affected by uncertain price?

How is your business affected by the shortage of market information?

How do you compare income from bamboo with other incomes: rice income, sugarcane income, and livestock income per year?

Types	Revenue	Input/cost	Net income
Bamboo			
Rice			
Sugarcane			
Livestock			
Off-farm income			

**Policies:**

How do you know about policies for bamboo management?

How are these policies important to you?

Which deficits does the policy have?

Which aspects of the policy are not feasible?

How effective is monitoring and enforcing?

What should be done to make it more effective?

**Training services:**

Do you or your family members get education/training in bamboo management/ planting skills?

If yes,

- How many times over the last 5 years?.....
- What type of training?.....
- Who is the trainer? (bamboo enterprise, local government, NGOs)
- What benefits you get from training skills?.....
- Have you applied it after trained?
- If you have not applied? Why not?

**Cooperation:**

Do you receive any support from the bamboo collector or bamboo enterprises?

If Yes, Since when? What kind of support have you received?

Do you cooperate with the bamboo collector or bamboo enterprises?

If Yes, Since when, and where? And what kind of cooperation?

What are the main advantages of cooperation with them?

What are the main obstacles in cooperation? Pls. Explaining and ranking the obstacles?

How does your company do to handle these obstacles?

How do you develop the cooperation with them?

How does cooperation play an important role in plantation and harvesting?

## Appendix 8: Photos

*Case studies: Small handicraft bamboo enterprises in Chuong My, Hanoi*



**Photo 1.** Natural bamboo forest in Hoa Binh Province



**Photo 2.** Bamboo traders in Chuong My, Hanoi



**Photo 3.** Artisan, Chuong My, Hanoi



**Photo 4.** Artisan, Chuong My, Hanoi



**Photo 5.** Seagrass handicraft production, SBEs, Chuong My, Hanoi



**Photo 6.** Bamboo handicraft production, SBEs, Chuong My, Hanoi



*Case studies: Small semi-industrial bamboo enterprises in Thanh Hoa province*



**Photo 7.** Bamboo garden, Ba Thuoc, Thanh Hoa



**Photo 8.** Bamboo damaged by insects, Quan Hoa, Thanh Hoa



**Photo 9.** Bamboo overexploited, Ba Thuoc, Thanh Hoa



**Photo 10.** Manual transportation at garden gate, Quan Hoa, Thanh Hoa



**Photo 11.** Bamboo transported by small trucks, Quan Hoa, Thanh Hoa



**Photo 12.** Bamboo stored by local traders, Quan Hoa, Thanh Hoa



**Photo 13.** Bamboo traders, Thanh Hoa city



**Photo 14.** Bamboo poles for construction, Thanh Hoa city



**Photo 15.** Bamboo chopstick production, Quan Hoa, Thanh Hoa



**Photo 16:** Chopstick production waste for producing votive paper, Quan Hoa, Thanh Hoa



**Photo 17.** Semi-finished chopsticks, Quan Hoa, Thanh Hoa



**Photo 18:** Bamboo votive paper production, Ba Thuoc, Thanh Hoa

## **Note on the commencement of the doctoral procedure**

(1) I hereby assure that I have produced the present work without inadmissible help from third parties and without aids other than those stated; ideas taken directly or indirectly from external sources are identified as such.

(2) When selecting and evaluating the material and also when producing the manuscript, I have received support from the following persons: Prof. Dr. Jürgen Pretzsch, Prof. Dr. Dietrich Darr, and Dr. To Xuan Phuc.

(3) No further persons were involved in the intellectual production of the present work. In particular, I have not received help from a commercial doctoral adviser. No third parties have received monetary benefits from me, either directly or indirectly, for work relating to the content of the presented dissertation.

(4) The work has not previously been presented in the same or a similar format to another examination body in Germany or abroad, nor has it - unless it is a cumulative dissertation - been published.

(5) If this concerns a cumulative dissertation in accordance with §10 Section 2, I assure compliance with the conditions specified there.

(6) I confirm that I acknowledge the doctoral regulations of the Faculty of Environmental Sciences of the Technische Universität Dresden.

Tharandt, 18.02.2021

Tran Van Hiep  
Doctoral student