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Factory-Level Value Chain Analysis of Cambodia's Apparel Industry

September 2007

This publication was produced by Nathan Associates Inc. and Werner International for review by the United States Agency for International Development.

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Acknowledgments

The factories participating in this study generously dedicated senior managers' time, explaining their company operations and providing extensive detail of their income and expenditure. In order to maintain the confidentiality of their commercial information, especially the selling price of their services, the companies are not named here. In addition, the data of each company have been adjusted in this report so that the individual companies cannot be identified directly.

The support of the Garment Industry Productivity Center (GIPC), a Project of USAID, and the Garment Manufacturers Association in Cambodia (GMAC) were essential in obtaining permission to visit the factories and carry out the interviews and verifications. GMAC data have also been applied in this report.

This report was produced by Mr. Don Feeney of Werner International and Mr. Peter Minor of Nathan Associates Inc. Mr. Feeney conducted the field work and drafted initial analysis and Mr. Minor was responsible for project design, data analysis, and the writing of the final report.

Executive Summary

This report is intended to broaden the scope of the World Bank value chain study published in 2003 (Konishi 2003).¹ That study addressed costs external to the firms in Cambodia up to the point of embarkation at the port and included import and export transaction costs for apparel. This report includes transaction and trade costs but concentrates on the costs internal to an apparel firm and expands on value-adding activities. This report also provides additional supporting information and context to the productivity analysis study conducted by Nathan Associates Inc. in 2005, which identified productivity improvements as a key factor in making Cambodia more competitive and attractive to investors.²

The core information in this report defines the financial and human resource requirements of a typical apparel factory and is based on data collected and interviews at six apparel manufacturers in the Phnom Penh area.

FINDINGS

The Cambodian industry is estimated to have contributed US\$1.6 billion in purchases of labor, rent payments, and services in 2004. This accounts for an estimated 18 percent of reported Cambodian gross domestic product (GDP). The Cambodian industry continues to grow at a rapid pace of between 25 and 33 percent per year. The United States continues to be the largest buyer of Cambodian-made apparel, with the proportion of Cambodian exports destined to the United States now nearing three-quarters of total Cambodian exports of apparel. The proportion of Cambodia's exports to the United States continues to grow, while exports to other markets have declined or are stagnant. With the entry of Vietnam into the WTO and the expectation that safeguards on China will be lifted at the end of 2008, Cambodia can expect continued downward pressure on prices for apparel exports, along with increased competition. Today, Cambodia's wage rates are among the lowest in the region, but not the world. However, low productivity, falling prices and labor market rigidity continue to exert downward pressure on wages, while labor continues to increase costs through strikes and work stoppages. This is a serious threat to continued growth and industrial upgrading.

The largest cost in the Cambodian supply chain is that of direct labor in making-up activities, which comprise approximately 39 percent of the cut, make, trim, trade and transport (CMTT) costs in Cambodia (excluding the costs of fabrics and trims). The cost of labor in Cambodia was found to be lower than that in Vietnam, but only after basic wage payments were adjusted for the total number of hours worked per month. The minimum wage in Cambodia, after adjusting for vacation pay, holidays, overtime, and other mandated or common benefits, was

¹ http://www.moc.gov.kh/sectoral/cambodia_value_chain.pdf

² Competitiveness of Cambodia's Garment Industry 2005, <http://www.nathaninc.com/?bid=422&PubID=911>

estimated to be 34 cents per hour, or US\$2.71 per day. In contrast, the minimum wage in Vietnam was estimated to be 41 cents per hour. Productivity in Cambodian factories was found to be low, and the difference in the wages between Vietnam and Cambodia could easily be recuperated by higher productivity in Vietnam. Incentive pay in Vietnam is common, and capacity utilization rates appear to be higher in Vietnam than in Cambodia, where work stoppages are common and labor is not always paid according to an output-dependent incentive system, such as piece rates. Instead, mandatory vacation pay is higher in Cambodia, along with the number of holidays and overtime payments. Therefore, entitlements make up a higher proportion of the Cambodian garment workers' income than Vietnamese workers', a crucial distinction when trying to increase productivity in apparel plants, since incentives are low and entitlements are high.

Indirect labor (managers and supervisors) was found to comprise less than 5 percent of CMTT costs. However, indirect labor plays a crucial role in defining the factories' productivity levels, worker relations, potential for upgrading, and service performance. The factories in this survey mirrored evidence found in the 2005 Nathan study: the vast majority of middle managers and supervisors are foreign. These middle managers bring experience critical to the rapid establishment of apparel production in Cambodia; however, they now pose a challenge to the industrial upgrading and productivity improvement of Cambodia's apparel industry.

Foreign managers in Cambodia's factories are rarely trained in process controls or industrial engineering, and instead draw on raw experience to drive production. These foreign managers have one goal: to maintain production levels, even if they are much lower than their potential. Changes to the production processes are viewed as risky, especially since these managers and supervisors have never been trained in industrial production processes. The transmission of knowledge to the Cambodian worker is also slowed by language difficulties, so what little learning might be possible probably does not take place. This affects Cambodian workers' perceptions of their opportunities in the workforce, where they see little potential to improve wages and salaries on the basis of skills and management development.

If the production efficiency in many Cambodian factories could be improved from the estimated current levels of 35 percent to 55 percent, the wages and income of Cambodian workers could potentially double, while factories could earn over 10 percent more. The potential benefits to Cambodia of solving these challenges are substantial for all stakeholders.

The cost of energy in Cambodian factories is estimated at 5–7 percent of CMTT costs. For an industry that demands little more than power for low-voltage sewing machines, lights, fans, and small offices, these costs are high. The cost of electricity in Cambodia is estimated to be more than double that of regional and global competitors. Many Cambodian factories forgo connecting to the national power grid because supply and distribution are unreliable. This has resulted in a high proportion of factories operating on their own power generation systems. Outside of Phnom Penh, the cost of power is often prohibitively high, and thus, self power generation is normal.

Trade and transport costs are also high, at 12–16 percent of total CMTT costs. This value has changed little since the 2003 World Bank report despite some success in reducing inspections and fees.

RECOMMENDATIONS

The Cambodian apparel industry has been studied frequently. This report updates aspects of earlier reports and provides new information about the value-creating structure of the Cambodian apparel industry. Efforts to enhance the competitive and value-adding environment of Cambodia's garment industry will require a multifaceted approach addressing issues at the national, industry, firm, and worker levels—no one factor can have maximum impact alone. Table E-1 outlines the current challenges to the Cambodian industry and the roles each actor could undertake.

Table E-1.
Summary of Interventions

Interventions	National	Industry	Firms	Labor
Productivity and management transition and skill upgrading	Support workforce development, basic and vocational education	Support vocational training and provide information and awareness	Execute factory interventions, address limitations of foreign management, advocate change to foreign owners	Support labor policies that result in higher productivity and skill upgrading and reduce work stoppages (support incentive pay over basic wages)
Raising capacity utilization and lowering average costs in existing factories	Improve labor regulations to reduce the number of short term, wild cat strikes. Coordinate with industry and labor unions to improve awareness of growth, productivity, and the need for consistent production levels	Improve worker-factory relations and the importance of linking output, productivity and incentive payments to workers	Engage with workers to mediate disputes; implement modern management practices, which include tying output to incentive pay (output)	Labor unions must target methods for reducing strikes; improved mediation and organization; adopt policies to encourage training and workforce flexibility
Trade and transport costs	See Forthcoming World Bank report	See forthcoming World Bank report	See forthcoming World Bank report	See forthcoming World Bank report
Electric costs	Work with international lenders to improve access, quality, and cost of electricity	Identify critical areas (geographic and technical) for targeted upgrading of electric grid	--	--

Source: Nathan Associates Inc. and Werner International.

The multifaceted nature of Cambodia's garment industry suggests that a coordinated approach, engaging all stakeholders, must be incorporated into a national and industrial strategy in order to maintain focus and coordinate efforts where needed the most.

Introduction

WHAT IS VALUE CHAIN ANALYSIS?

A value chain analysis is a diagnostic tool that helps identify constraints to competitiveness and industry growth. Value chain analysis, like scissors, has two edges that cut simultaneously. First, value chain analysis seeks to identify the main cost components driving an industry. Here, a rigorous accounting method is employed to identify crucial outlays by a typical firm and areas where cost reductions may be made. In the case of the Cambodian apparel industry, costs typically include labor, electric, logistics, raw materials, and rent. The second area of analysis is the identification of value-adding activities that are not well represented by their costs alone; their end result is likely to hold value in the marketplace and is therefore revenue enhancing rather than cost driven.

Typical value-adding activities in the Cambodian apparel industry include special finishing of jeans or casual pants, printing or embroidery on an otherwise plain shirt, design, logistics, and product financing. These are items for which customers will pay a premium if executed professionally.

This is not to say value-adding activities do not have accompanying costs, but that the value added dominates cost and therefore increases the firm's profit. Many value-adding activities are risky, and risks are not easily identified in accounting ledgers, but when the two blades of a scissor are aligned correctly, there is a positive result, and such is the case when cost and value are brought into alignment: the return is a more competitive industry.

This report provides a rigorous analysis of a typical firm's costs in Cambodia. Any cost analysis, of course, is tied closely to a manufacturing method and a given supply chain. For example, an apparel producer in the United States or Europe is likely to employ far more capital-intensive methods of production to reduce labor costs than a factory in Cambodia would rationally employ. In our analysis, we contrast Cambodian costs and production methods, not with ideal norms in a developed country, but with the levels achievable using the labor-intensive technologies and methods found in countries at a level of development similar to that of Cambodia.

Similarly, the dominant form of the supply chain will have implications for the costs and manufacturing processes in an industry. The dominant supply chain paradigm in Cambodia's garment industry is one in which fabrics are produced in East Asia and sent to Cambodia for

cutting, sewing, and packaging. This abbreviated supply chain is reflected in the value-adding potential of the Cambodian industry and cannot be ignored.³

PRIOR CAMBODIAN VALUE CHAIN REPORTS

Cambodia is not a newcomer to value chain analysis. The World Bank conducted a value chain analysis of several Cambodian economic sectors in 2003 and 2004, including the garment industry, and is updating that study for a forthcoming report. However, the 2003/2004 World Bank study examined primarily the costs incurred outside the factory gate; this is reflected in the report's findings and recommendations. There is, therefore, an opportunity to add significant depth and breadth of analysis to the World Bank's work that is highly relevant to the Cambodian industry today. The new elements will address the detailed costs of the manufacturing process, to give insight into where costs can be reduced and value-added maximized.

Information gathered in this report illustrates that the majority of industry costs occur inside the factory gate, on the production floor, and in the manager's office. More detailed information developed through an analysis of these costs and value-adding opportunities could contribute to the ability of industry strategists, and individual factories, to chart a course toward better economic performance and long-term stability. Therefore, this report complements the World Bank value chain study by inserting the most significant components of cost and value adding in Cambodia back into the analysis.

This two-part approach has its advantages. Analysis conducted outside the factory gate is more or less general to all business in Cambodia and so has cross-cutting implications for all industries. It also allows these issues to be debated in a general forum by all industries and stakeholders. Where appropriate, this report illustrates some of these ex-factory costs, but does not provide details. Interested readers will be able to look to the World Bank's update, scheduled for release in early 2008, and will be rewarded with greater detail, analysis, and insight.

A focus on the whole value-adding chain in Cambodia, including enterprise-level activities, results in some divergence of conclusions and recommendations from the 2004 value chain study conducted by the World Bank. In that report, two areas were identified for enhancing the competitive development in the Cambodian garment industry. First, it recommended the backward integration of the value chain into cotton growing and textile mills. Second, the report recommended collaboration among public and private interests to facilitate trade and reduce the costs associated with importing materials and exporting finished products. Some progress has been made in response to the findings on trade facilitation.

To date, few firms have integrated backward into textile manufacturing. This is because backward integration is time and capital intensive; it may be accomplished over many years but has little potential for short-term impact. Moreover, it may never be a practical

³ Value chain analysis is often associated with recommendations on restructuring the supply chain to enhance value. Restructuring the supply chain in the current context is a considerable exercise that is not likely in the near future. Therefore, we consider the supply chain as largely fixed and restrict our analysis and recommendations to working within the current system, in which fabric is generally supplied from outside Cambodia.

commercial option for the Cambodian industry, which imports the vast majority of its materials.

The World Bank study did stimulate public and private sectors to cooperate on trade facilitation and reduced some administrative expenses. However, the impact of these reductions on the finished cost of a garment is generally less than 1 percent of the export value of a garment. It is helpful but will not boost competitiveness significantly.

By focusing on the supply chain and the activities behind the factory gate, this report suggests a broader set of policy and industrial options. In this broader field of options, most stakeholders will find an array of interesting areas with potential to increase value, wages, efficiency, education, profits, and the potential to reduce friction between labor, government, and industry.

USES OF VALUE CHAIN ANALYSIS

The value chain analysis in this report is not a strategic analysis, but with additional effort from stakeholders, it can lay the foundation for sound strategy and industry planning. In fact, the information can be used for a number of purposes, including

- A better understanding of the strengths and weaknesses of Cambodian industry;
- A road map to competitiveness and interventions, including a basis for understanding problems and solutions for main stakeholders in Cambodia (factories, labor, government, NGOs); and
- Cost-benefit analysis for project interventions (national, sector, or factory level).

It is probable that different stakeholders will find different purposes in line with their interests. A factory manager, for example, can use the information in this report to understand how investment in training could affect profit. Labor organizations may find the information transforms how they negotiate with employers, illustrating where labor can help boost productivity to raise wages without jeopardizing the jobs that workers rely on to meet their basic needs. Nongovernmental organizations and donors may find it useful in identifying interventions that are appropriate to their goals.

IMPORTANT CAVEATS FOR USING THE STUDY

Readers with a keen eye will notice that references to profits are largely omitted in this report. It is not because firms operating in Cambodia do not contribute to the profit-making activities; they do, or they would surely move to other locations or close down. The calculation of profit is inherently a difficult task; in fact, many managers in the same company can assert different measures of profits that lead to vastly different conclusions about the operating performance of an enterprise. This is especially the case, as it is in Cambodia, when the factories themselves may be closely related to the purchasing parties, agents, or investors. The price agreed on for the conversion of fabric into a garment is sometimes a matter of convenience, dictated by taxes or accounting practices. No effort is made here to resolve this age-old problem of operational performance. Instead, the focus is on the cost of production, for which there is an unambiguous measure, at least in the total. Accounts may differ on the allocation of costs, but in sum, they must match outlays. The same cannot be said for profit.

Finally, this study is based on a sample of factories that represent “typical” factory operations in Cambodia. Any given factory's costs will differ somewhat, depending on the product produced, manufacturing methods, and other factors. We have made distinctions between key market segments by separating knit garments from woven and including the example of finishing. A wider range of products and processes will certainly be found in practice.

REPORT OUTLINE

Constraints to growth and competitiveness are organized in this report according to the following concept areas:

- **National** factors, such as customs fees, transportation and infrastructure, basic education, job opportunities, the general health of the economy, legislation affecting the ability of firms to hire and fire workers or otherwise maintain an optimal labor force level and financing costs;
- **Industry** factors such as the availability of vocational or specialized training and education institutions, supply chain structures, raw material costs, length of production runs and availability of local trims and supplies;
- **Firm** factors, such as management, productivity, process controls, innovation and service, worker relations, consistency of orders, capacity utilization;
- **Workforce** factors that are particular to the labor force, such as basic education, motivation, collective bargaining and health.

In reality, many of these factors interact and they are not clearly independent from one another. Levels of basic and vocational education interact with firm-level productivity programs and can reach down to the individual worker levels and provide motivation when supported by good management and governance systems. Still, the basic categories provide important organizational and analysis structure. The first section of the report describes the Cambodian industry, including the markets for its goods, value added in the industry, and organizational structure of existing supply chains. Next, the firm-level survey information is provided, outlining the major cost- and value-adding activities of the firms. Finally, each cost- or value-adding activity is discussed, and areas of constraints and opportunities are identified.

1. Description of Cambodian Industry

GLOBAL CONTEXT

The international market for apparel dominates Cambodia's apparel industry, with a small and generally low-income local market. The Cambodian apparel export industry is relatively young, having sprung up in the late 1990s as a response to restrictive quotas applied to the most efficient global apparel producers by importing countries. In 1998, the U.S. government began negotiations with Cambodia to establish quotas for garment exports. That agreement applied quotas to Cambodia but granted significant annual growth in quota levels if Cambodia adopted sound labor policies and demonstrated progress in labor conditions. To gain the benefits of access to the U.S. market, the Cambodian industry agreed to a program of monitoring by the International Labor Organization (ILO). The ILO, through its ongoing presence, has helped Cambodia achieve unusually high standards for labor compliance, an important consideration for international buyers.

In 2005, textile and apparel quotas were eliminated from all World Trade Organization (WTO) member countries in accordance with the WTO Agreement on Textiles and Clothing (ATC). Cambodia, a new member of the world trade body, no longer had any quantitative limits on exports to the U.S., but neither did most competitors. Importantly for Cambodia, two of its most aggressive competitors, Vietnam and China, continued to be subject to restraints. Vietnam, not yet a WTO member, was not eligible for elimination of textile and apparel quotas until January 2007. China, the world's largest producer of textiles and apparel, had agreed to special safeguards that limited exports of key apparel products through December 2008.

Cambodia's industry continued to grow through 2006, sheltered from competition with its most capable neighbors. But the landscape is beginning to change. Vietnam is now an acceding member of the WTO, and the textile and apparel safeguards restricting China are set to expire at the end of 2008. It is in this context that this value chain analysis must be considered.

Most experts agree that China will continue to be the preferred supplier for textiles and apparel in the near term. As a matter of importance to the Cambodian industry, it also seems likely that China will continue to dominate the textile and trim supply chain, reaping enormous economies of scale from its high production capacity and utilization due to recent investments in modern textile machinery, coupled with abundant local cotton and manmade fiber sources.

Vietnam is now attracting investment as an alternate production base for both textiles and apparel in the region. Outside the region, Bangladesh offers advantages in labor cost, labor market size, and proximity to services and materials from India.

Cambodia's position in this context is as a supplier of cut, make, and trim (CMT) services and as alternative suppliers. Backward integration into services to some extent, and into textile manufacturing to a greater extent, is limited by the sheer economies of scale enjoyed by regional competitors such as Vietnam, Thailand, and Indonesia. Backward integration of the Cambodian industry is possible, but it faces a steep hurdle to which any potential investor must give serious consideration.

The following sections provide a brief picture of the Cambodian industry. We have summarized data on exports, the number of factories, and employment, and offer an estimate of value added within Cambodia, an important measure of the industry's contribution to income, poverty alleviation, and economic development.

VALUE OF APPAREL EXPORTS BY DESTINATION

Table 1-1 provides two estimates of the value of Cambodia's apparel exports for the period 2004–2006. The first sets of values are import statistics from Cambodia's trade partners as reported by the UN COMTRADE database. The second set of figures shows export figures as reported by the Cambodian government. Both are measured free-on-board ship (f.o.b.), that is, export value including all costs up to lading onto the exporting carrier, but the values differ significantly. In every case, the values reported by Cambodia's trading partners exceed Cambodia's trade statistics by a margin of about 25 percent. It is unclear why either party might under- or over-report Cambodia's trade in apparel.

Although there are differences in magnitude, the trend in both sets of data demonstrates that Cambodia's apparel exports have been rising rapidly, even with the elimination of textile and apparel quotas in 2005. Depending on the data source, Cambodia's exports of apparel have grown in value by 25–33 percent from 2004 to 2006.

Table 1-1
Cambodian Apparel Exports, 2004–2006 (million US\$)

Destination	Trade Data Reported by Partners*			Trade Data Reported by Cambodia**		
	2004	2005	2006	2004	2005	2006
Total	2,446.1	2,707.2	3,135.1	1,981.0	2,190.0	2,645.0
United States	1,520.0	1,818.3	2,270.8	1,272.1	1,564.6	1,899.7
European Union	733.6	674.2	668.7	580.0	490.8	571.0
Canada	105.1	106.3	128.6	96.9	92.3	116.5
Other	87.4	108.3	67.0	33.7	42.5	57.9

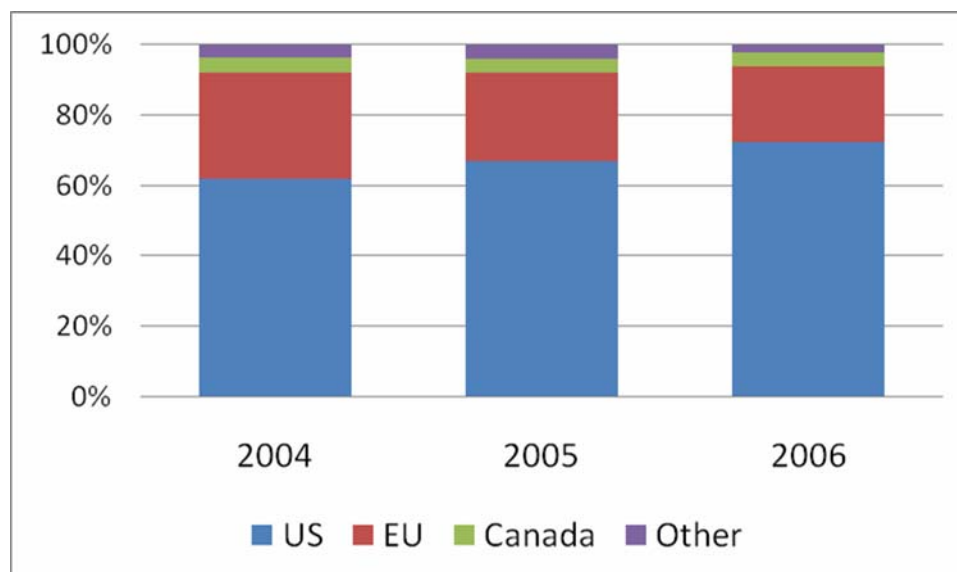
Source: *Data from UN COMTRADE database for SITC 65 and 84 categories, f.o.b. values. **Data as reported by Cambodia to COMTRADE, fob values

The composition of Cambodia's exports also changed in this three-year period, with the U.S. market increasing in importance as a destination for Cambodian exports, from 62 percent in 2004 to 72 percent in 2006. This is interesting, because Cambodian apparel is usually eligible for duty-free entry into the European Union and Japan but not into the United States. Yet

Cambodia's exports to all other destinations were constant or fell during the three-year period (Figure 1-1).

Figure 1-1

Composition of Cambodian Apparel Exports by Destination (Percent of Total Exports)



Source: See Table 1.

NUMBER OF FIRMS, OWNERSHIP, AND EMPLOYMENT

The data from the Garment Manufacturers Association in Cambodia (GMAC) for November 2006 lists 290 firms producing apparel. At any given time, a number of factories are identified as temporarily closed, so if these factories come back into operation, the number of firms producing in Cambodia exceeds 300. The number of firms has increased steadily, in line with the growth in exports since 2004, and employment of Cambodian workers has followed closely. The average number of Cambodians employed per firm has remained relatively constant at approximately 1,100 employees per firm.

Table 1-2

Number of Firms, Employees and Average Employees per Firm

	2004	2005	2006
Number of Active Firms	206	230	290
Number of Cambodian Employed (1,000)	246	258	326
Average Employees per Firm	1,192	1,122	1,124

Source: Analysis by Nathan Associates from GMAC data. Note: includes only firms currently open.

Of the 290 firms active in Cambodia's apparel industry, slightly less than half are either Hong Kong or Taiwanese owned (Table 1-3 and Figure 1-2). Nearly 9 percent of Cambodian apparel firms are owned by Cambodians. If employment of operators is a measure of size, the picture changes somewhat; over half of the industry, as measured by employment, is owned by Hong Kong or Taiwanese interests. In contrast, a little more than 3 percent of employment

is accounted for by Cambodian-owned firms.⁴ This result is also seen in the average size of firms, with Cambodian-owned firms operating with an average of 577 workers in contrast to the industry's average size as measured by employment, i.e., 1,124 per firm (see Table 1-2).

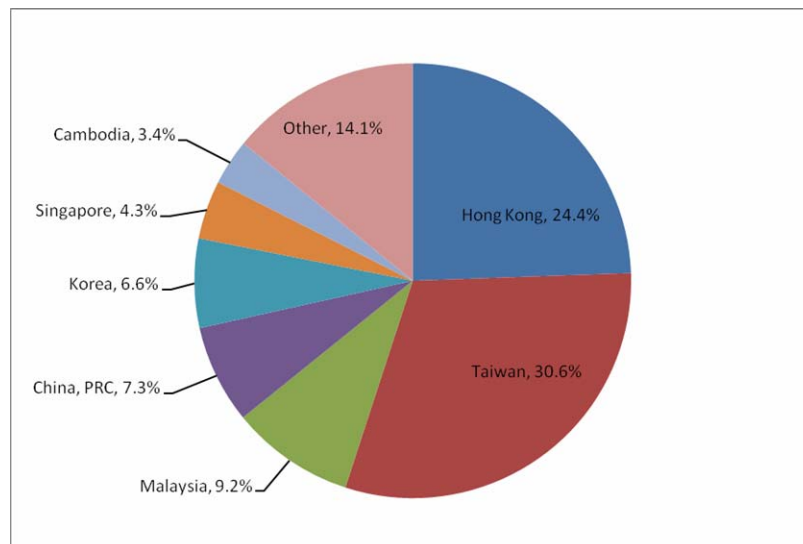
Table 1-3
Firms by Source of Ownership and Employment in Cambodia

Country of Ownership	Percent of		Number of Operators	
	Firms	Employment	Average	Maximum
Hong Kong	20.7	24.4	1,201	6,410
Taiwan	24.5	30.6	1,445	9,272
Malaysia	5.9	9.2	1,682	4,656
China, PRC	13.1	7.3	651	2,280
Korea	11.0	6.6	802	2,179
Singapore	3.4	4.3	1,355	3,892
Cambodia	8.6	3.4	577	1,747
Other	12.8	14.1	1,134	9,272

Source: GMAC November 2006 database.

Note: Jointly owned firms are included in "other." Some firms owned by a single holding company are not accounted for here.

Figure 1-2
Ownership and Employment in Cambodia's Apparel Industry (Based on Percent of Workers)



Source: Analysis by Nathan Associates. Data from November 2006 GMAC report.

The average size of firms surveyed in this report for value chain analysis is 1,400 employees per factory, slightly higher than the average-size factory in 2006. The smallest firm in our survey had approximately 900 employees and the largest approximately 2,000. These sizes are well within the typical operating size of a Cambodian apparel firm.

⁴ Ownership and management are not always of the same nationality. It is not uncommon for a firm to be owned by Hong Kong interests and operated by a national from another country. The GMAC database does not identify the nationality of management.

According to GMAC data, foreign employees in Cambodian factories comprise less than 2 percent of the garment industry workforce. At the same time, foreign labor comprises approximately 10 percent of wage payments—a significant proportion. Data from the firms included in this report confirmed this result. This is probably due to the fact that foreign laborers hold management and supervisory positions and that few Cambodians are trained to take on these roles. It indicates an area where upgrading of Cambodian skills and experience could result in higher wages for Cambodian workers.

VALUE-ADDED AND GDP CONTRIBUTION ESTIMATES

Any analysis of value chains is based necessarily on a sample, because not all firms can be interviewed. Nevertheless, the topic of value added arises because value added is a measure of the industry's importance to Cambodia. Any value-added figure is an estimate, imputed from general data such as export value. However, as was seen in Table 1-1, there is not always consensus on the exact size of the industry. With this important caveat in mind, three measures of “value-adding” or importance can be used:

- Value added imputed as exports of apparel minus imports of fabric and trim;
- Value added imputed by local expenditure based on data collected in this study; and
- Contribution to GDP.

Although all of these measures are based on different estimating techniques, the underlying conclusion is the same—the apparel industry is important to Cambodia.

Imputed (Exports of Apparel Minus Imports of Fabric and Trim)

Table 1-4 compares Cambodia's exports of apparel and imports of fabric and trim (textiles), along with the calculation of value-added based on subtracting the value of textile imports from apparel exports. Given the data for 2004, again, comparing data based on reported Cambodian exports and imports, and the same values as measured by Cambodia's trading partners, estimates of net value added in Cambodia range from US\$1,114.0 million (based on data reported by Cambodia), to US\$1,662.7 million (based on data reported by Cambodia's trading partners). The difference is based primarily on the valuation of Cambodia's apparel exports, because the value of fabric imported by Cambodia is of a similar magnitude in both sets of statistics.

Value Added Relative to GDP Estimates

An alternative method for illustrating the importance of Cambodia's apparel industry is demonstrating its contribution to gross domestic product (GDP). The calculation of GDP requires national income accounts for the year in question. The Global Trade Analysis Program (GTAP), supported by the major donors, including the World Bank and the Asian Development Bank (ADB), provides a measure of GDP and industrial activity in Cambodia for 2004, measured in US\$. According to the GTAP data, the Cambodian textile and apparel industries support US\$908 million in direct wages and rents and another US\$708 million in purchases of services and food. Combined, the textile and apparel industries in Cambodia are

responsible for US\$1,616 million of labor, goods, and services purchased.⁵ This estimate supports the US\$1,662 million value-added figure derived in Table 1-4. As a means of comparison, the GTAP database estimates 2004 GDP in Cambodia to be US\$4,884million.⁶ Therefore, wage and rent payments in the Cambodian textile and apparel industries contributed 18.6 percent to measured GDP. The industry's contribution to the economy is likely much larger.

Table 1-4

Estimation of Value Added in Cambodia Based on Reported Imports and Exports of Textiles and Apparel (US\$ million)

	2004	2005	2006	2004	2005	2006
	Data Reported by Partners*			Data Reported by Cambodia**		
CAMBODIAN APPAREL EXPORTS						
Total	2,446.1	2,707.2	3,135.1	1,981.0	2,190.0	2,645.0
CAMBODIAN TEXTILE IMPORTS						
Total	783.3	908.3	965.5	867.0	N/A	N/A
China, PRC	286.0	344.4	434.1	--	--	--
China, HK	305.3	329.5	347.6	--	--	--
Korea	51.3	69.1	89.7	--	--	--
Malaysia	34.5	47.8	53.7	--	--	--
Thailand	46.0	55.6	N/A	--	--	--
Pakistan	10.0	10.2	13.7	--	--	--
Other	50.2	51.6	26.6	--	--	--
DERIVED VALUE ADDED IN CAMBODIA***						
Total	1,662.7	1,798.9	2,169.7	1,114.0	N/A	N/A

Source: Analysis by Nathan Associates, Inc.

N/A - Not available.

*Data from UN COMTRADE database for SITC 65 and 84 categories, f.o.b. values.

**Data as reported by Cambodia to COMTRADE.

***Derived value added is calculated as Cambodian apparel exports minus Cambodian textile imports.

Note: Sewing thread, trim, and textile-based accessories are included in the textile figures. Buttons and zips are not included (estimated at about US\$10 million in 2004, based on trade data).

STRUCTURE OF INDUSTRY

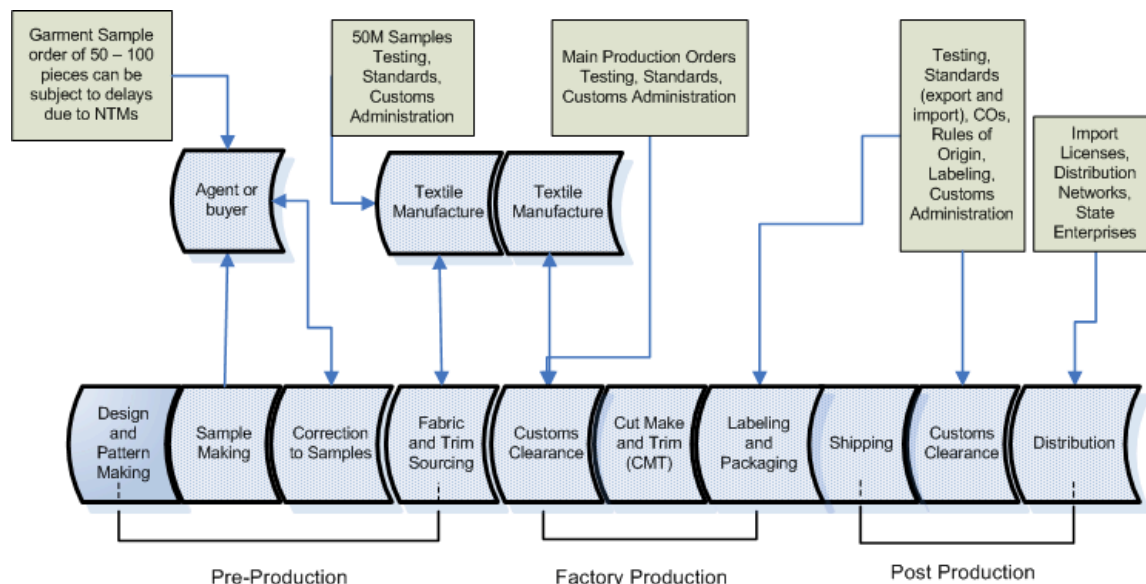
Apparel firms may engage in a wide range of activities in the garment value chain. These activities include product design, fabric sourcing, finance services, manufacturing, logistics, and even retail operations (Figure 1-3). In practice, firms focus on what they are best at, and

⁵ Local services and goods may have imported content. Service firms may depend on imported computers, chairs, and desks. Rice may be grown from imported seed or imported directly. Therefore, the industry's contribution to GDP should be limited to wage and rent payments to avoid overstatement.

⁶ This figure is similar to the values provided by the International Monetary Fund and the Australian government but is significantly lower than the figure of US\$6.6 billion reported by the U.S. State Department. Differences may be accounted for by measurement of the informal economy. The U.S. State Department does not report the source of its data or the basis of measurement.

what their customers and the supply chain dictate. Most Cambodian firms are known for providing a limited range of garment manufacturing or making-up services, sometimes referred to as cut-and-sew, but firms engaged in a broader range of activities do operate in Cambodia today.

Figure 1-3
Apparel Supply Chain



Source: Nathan Associates Inc.

Table 1-5 lists GMAC officials’ observations regarding the makeup of the Cambodian garment industry business structure.

Table 1-5
Business Structure of Cambodian Industry (estimated)

Structure	Proportion of Firms
Subcontract	15%
Cut-Make and Trim (CMT)	60%
Full-Package or FOB	25%

Source: Estimates based on GMAC interviews

The level of value added, and hence management requirements, increases from subcontractor to full-package or FOB producer. Of the six firms that provided data for this report, two were FOB or full package, two are CMT, and two are a mix of subcontract and CMT. Table 1-6 illustrates the significant financial requirements that distinguish these operations. As a cut and sew operation, a firm is responsible for cash costs that account for approximately 25-30 percent of the FOB cost, or export sale value. In contrast, the FOB supplier finances the full FOB costs, a significant operating risk and financial burden.

The Cambodian producer may also be responsible for ocean shipping costs to the foreign port. The following sections outline the responsibilities of the major types of Cambodian firms.

Table 1-6
Summary of Cambodian FOB Costs for Denim Jeans and Polo Shirt (US\$)

Item	Denim Jeans		Polo Shirt	
	Cost per Piece	% of FOB Value	Cost per Piece	% of FOB Value
Fabric, trims, thread and packaging	4.14	75.2	1.39	74.0
CMT (35% efficiency)	1.15	20.9	0.43	22.8
Trade and inland transport	0.22	3.9	0.06	3.3
FOB (Sihanoukville)	5.51	100.0	1.88	100.0
Ocean Shipping	0.15	2.7	0.06	3.2
U.S. Import Duty	0.91	16.5	0.32	17.0
Landed Duty Paid (LDP)	6.56	119.3	2.26	120.2

Source: Interviews.

Full Package (FOB)

The FOB company purchases fabric, trims and materials and, in the strict definition of FOB, is fully responsible for importing and exporting costs up to loading onto the export carrier. It may also be involved in the sample making and negotiations with the buyers (see Figure 1-3). This is a significant distinction because the financing of fabric purchases and payment of import and export costs requires financial resources and the sourcing of fabric, and the development of samples requires competencies and management skills beyond cutting and sewing. The end product is fully packaged and labeled for distribution. Buyers include wholesalers and even direct retailers. FOB companies often maintain a presence in important sourcing hubs such as Hong Kong and Singapore.

Producers capable of FOB manufacturing may receive a better price for their product because of the enhanced level of service. However, FOB suppliers also take on a high level of financial risk and can incur significant losses when an order is not completed as planned (see Table 1-6, FOB value compared to CMT cost). Entrants to the FOB market risk bankruptcy if a buyer defaults on payment for a single large order. Therefore, the higher returns of the FOB manufacturer are balanced by higher risk, service costs, losses, and greater cash flow requirements.

An important resource for an FOB supplier is access to low-cost capital. Borrowing costs in Cambodia are reportedly high, and most Cambodian FOB suppliers use operating cash flow or foreign sources of capital. Greater access to low-cost capital could provide a competitive boost to Cambodian FOB suppliers, but a large increase in the number of FOB suppliers would still be unlikely. Access to capital is one of several demands of the FOB firm, which would still have to overcome the need for knowledge-based competencies in the areas of selling, fabric sourcing, and other product development capabilities as well as the capacity to manage greater risk.

The ability to source fabrics gives the FOB supplier more flexibility in meeting price competition. The manufacturer has a much larger list of expenses to manage, beyond labor costs, so savings may be found in materials sourcing and other areas of operations. However, the FOB supplier may not have the option to purchase materials from the fabric mill of its choice. Often, FOB suppliers must purchase materials from prequalified sources. The buyer specifies the material sources, at prices previously set by the buyer and the mill. The process

of buyer-selected material sourcing is known as “nomination.” Buyers nominate fabrics and material suppliers for a number of reasons, but chiefly to ensure consistency and quality in their product lines and to manage purchasing costs by increasing volumes at designated mills. FOB suppliers that are required to purchase fabrics from a nominated source may lose a key option for cost control. GMAC estimates that approximately 25 percent of firms in Cambodia operate on an FOB basis.

Cut, Make and Trim

CMT companies do not own or purchase fabric; nor do they sell the made-up garment to the buyer. The CMT company performs cutting, sewing, and often packaging under instruction and supervision from overseas intermediaries who are responsible for the purchase of fabric, financing, international logistics, and the delivery of the final garment to the foreign purchasers. The CMT manufacturer is often responsible for managing the importation of fabric and for exporting the finished garment. It is also responsible for quality control. The design, sample, pattern and marker making,⁷ and financial expertise and resources are consolidated at one point and the buyer is relieved of the responsibility for direct negotiation with and supervision of all the factories with production.

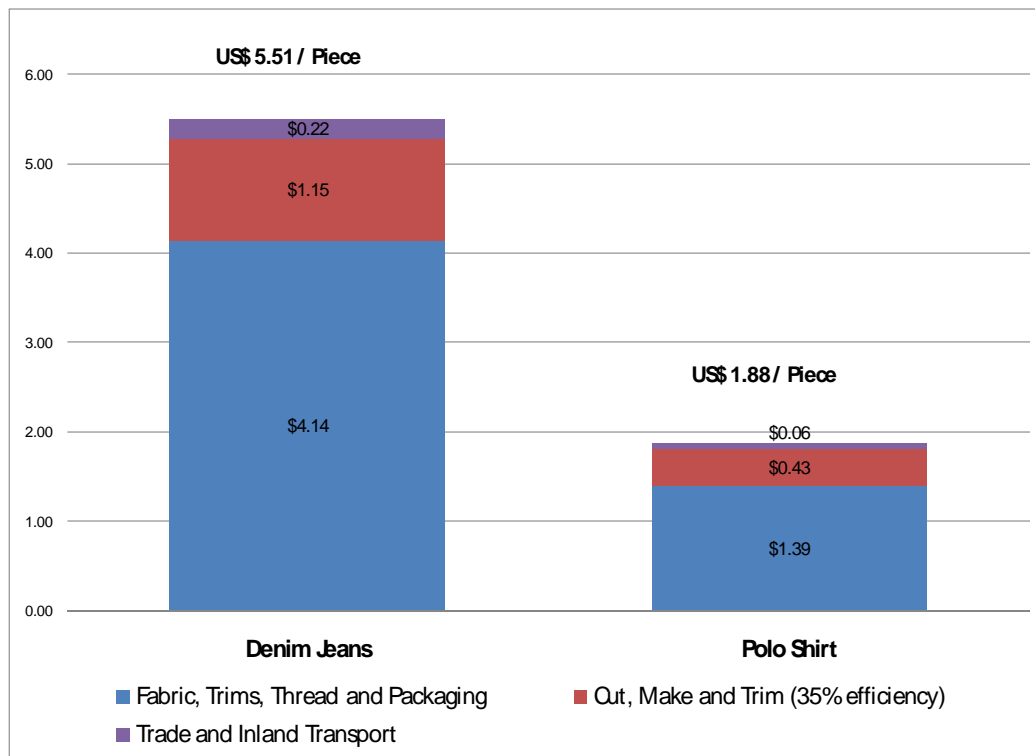
CMT companies can be hired on a contract basis or they may be directed by overseas holding companies that reimburse the factory for costs. In most cases, the CMT firm quotes services using a pre-agreed price for cutting, sewing, finishing, and packaging—exclusive of fabric or trim costs. The fact that the firm is not financially responsible for fabric purchases greatly reduces the company’s financial risk, but exposes the company to greater market risk and competition, because CMT manufacturers can be found in abundance throughout the world. CMT manufacturers have limited options for reducing costs in the face of increasing competition. Figure 1-4 illustrates the relatively constrained options a CMT firm has in reducing costs—the costs of trade, inland transport, and the CMT operations. The largest cost factor (fabrics and materials) is outside the scope of the CMT firm’s operations.

The following section illustrates that the largest cost facing a CMT firm is that of direct labor on the sewing line. CMT firms may incorporate some additional services, short of fabric purchases, such as pattern, sample, marker making and finishes. GMAC estimates that approximately 60 percent of garment firms in Cambodia operate on a CMT basis.

⁷Many CMT producers in Cambodia

Figure 1-4

Costs for Denim Jeans and Polo Shirt Constructed in Cambodia (US\$ per piece FOB)



Subcontract Manufacturers

CMT or FOB apparel firms may manage business risk by taking on orders that exceed their peak capacity levels. To manage the overflow, they may subcontract some of the cutting and sewing work to outside firms. In fact, many Cambodian CMT firms do some subcontract work for other CMT or FOB firms. This mixture has its advantages in that it helps firms maintain consistent capacity utilization. The important distinction is that subcontracted firms usually do not get involved in the export and import of the merchandise or materials. They perform specified operations and return the finished work to the contracting Cambodian factory (CMT or FOB), which manages these aspects and, perhaps, quality control. A firm engaged in subcontracting has the lowest financial risks but the highest market risk, because any downturn in orders impacts them most. Firms engaged wholly in subcontracting have even more limited means for responding to price competition, since they manage only the cutting and sewing operations. Subcontracting firms may strive to upgrade their capabilities to full CMT operations, because it requires only incremental financial risk while reducing market risk substantially. The subcontracting of finishing (washing and sand blasting) and embroidery is common in Cambodia, as it is throughout the world, because it maintains higher capacity utilization and hence lower average costs in the centralized firms. GMAC estimates that approximately 15 percent of apparel firms in Cambodia are engaged in subcontracting, and many of these are Cambodian owned.

ROLE OF FOREIGN INVESTORS

An apparel industry generally develops along one of two tracks. In the first, a domestic industry provides clothing for the local market and over time may expand into exports. The second track, common in smaller developing countries, occurs when foreign investors bring capital and management into a country with the intent of manufacturing garments for export. Some countries that developed export-oriented garment industries through foreign investment

subsequently experienced a transition to local ownership, but the Cambodian industry remains largely in the hands of foreign interests. As a result, the viability of the industry hinges not only on the performance of the Cambodian factories, but on whether they continue to serve the business strategies of foreign owners.

Many investors were originally attracted to Cambodia between 1999 and 2005, when quotas limited their ability to export from other countries. Low wages, plentiful labor, proximity to Asian materials, and favorable tax treatment have continued to attract investors, and lingering trade restraints on apparel exports from Vietnam and China provided some ongoing protection from direct competition with the region's bigger competitors.

The foreign investors have been a powerful engine for employment and economic growth, but Cambodia may be only one of several countries where they have interests, which may be a constraint on the vertical development of the industry. These multinational producers are able to leverage the skills and expertise of their home offices for value-adding activities such as product development, materials sourcing, and finance. For many, this strategy ensures the highest return on existing resources, provides flexibility, and reduces the need for capacity-building and investment in Cambodia. In effect, this maintains the role of Cambodia as a CMT producer.

An important benefit developing countries receive from foreign direct investment is knowledge transfer. In Cambodia, the labor force is still almost exclusively confined to basic operations in the factory, and some have questioned whether this is attributable to the foreign investors' unwillingness to employ Cambodians in higher-level work. However, participating factories expressed eagerness to hire Cambodians (in fact, non-production work, including human resources and compliance management was assigned largely to Cambodians), but could not find the technical skills and attitudes needed in the local population. This corroborated the findings of a 2006 assessment of workforce issues by Nathan Associates/USAID. Recently, international donors have sponsored technical training through projects such as USAID's Garment Industry Productivity Center, or AFD's GMAC-based training, but the Cambodian education system offered nothing to prepare students for manufacturing careers. In fact, the Nathan/USAID assessment found that educated Cambodians were unaware of the 20,000 to 30,000 supervisory and management jobs in the industry. The shortage of skilled managers has acted as another constraint on foreign investors' interest in building vertical management, or production, capacity in Cambodia.

Multinational investors and suppliers play another critical role in the industry: in most cases, they control the relationships with the buyers. Increasingly, buyers call their suppliers "partner," assigning the supplier a larger share of the responsibility for financing and order management, and even liability for product safety risks. A 2005 survey of buyers conducted by Nathan Associates for DFID, found that the leading retail and wholesale buying organizations in the United States favor strategies based on fewer suppliers, fewer producing countries, and a larger role for the suppliers. Many stated explicitly that they look to their suppliers and known sources to identify specific factories and countries for production. Clearly, the supplier-buyer relationship has been another important contribution of foreign investors.

The Cambodian industry relies heavily on foreign investment and will continue to do so for the near future. This value chain analysis was undertaken, in part, to understand the comparative advantages Cambodia offers to investors, as well as the areas of opportunity, to

ensure the country continues to offer sound strategic opportunities to multinational investors. At the same time, greater participation in the industry by Cambodian investors would contribute to the stability of the industry and to the vertical development necessary to bring more value-adding activities to Cambodia.

2. Cambodian Value Chain

OVERVIEW OF SURVEY METHOD

Six firms were interviewed for this study. Two provided only summary data expressed as percentages, and four factories provided detailed cost data. Each factory had a different accounting system, and each engaged in at least some activities that were not common across firms. For example, an FOB firm might engage in finishing a garment to the client's specifications, or a CMT operator might be responsible for purchasing some basic, though costly, supplies, such as packaging or thread. The variations in firm cost structure are as numerous as there are firms. Nevertheless, a standard can be specified to allow for comparison of costs across firms.

For this report, three major activities are included directly in the analysis: (1) Cut, make and trim; (2) finishing and/or embroidery; and (3) internal trade and transport costs for importing and exporting. Subcontractors, however, do not engage in the import, export, and transportation of goods to port and so do not incur trade costs in the same way as CMT or FOB firms—subcontracting costs for sewing, as opposed to finishing, are, therefore, excluded. The cost basis employed here will be referred to as cut, make, trim, trade and transport or CMTT. The value contributions of activities are shown in U.S. dollars per garment (piece) and as a percentage of these standard costs.

CONSOLIDATED ANALYSIS OF CAMBODIAN FACTORY COSTS

Table 2-1 includes the major standardized cost components derived from our sample of Cambodian factories. The largest expense is for direct labor, at a little over 39 percent of CMTT costs. There is little variability between the knit and woven products in that both require similar amounts of indirect labor (absolute levels as measured per garment is, however, different), energy, rent, and other general and administrative costs.⁸ Trade costs rank as the second-highest cost, ranging from 13 to 16 percent. Export fees were considerably greater than import fees and comprised more than half the trade and transport fees in Cambodia. Export fees comprised 8 percent of total CMTT costs.

Since the elimination of U.S. and EU textile and apparel quotas, products of importance to Cambodia have come under increasing price pressure. Figure 2-2 illustrates price indexes for U.S. imports of selected apparel products from all countries. Rather than rising with inflation, which is common, the price of the illustrated apparel products has either been constant or has fallen. Figure 2-2 shows that Cambodian producers, under pressure, probably will reduce

⁸ In absolute dollar terms, the construction of a pair of five-pocket denim jeans requires significantly more labor.

delivered prices. The index includes all countries, and Cambodian producers may experience more or less pricing pressure, depending on their position in the market.

Table 2-1

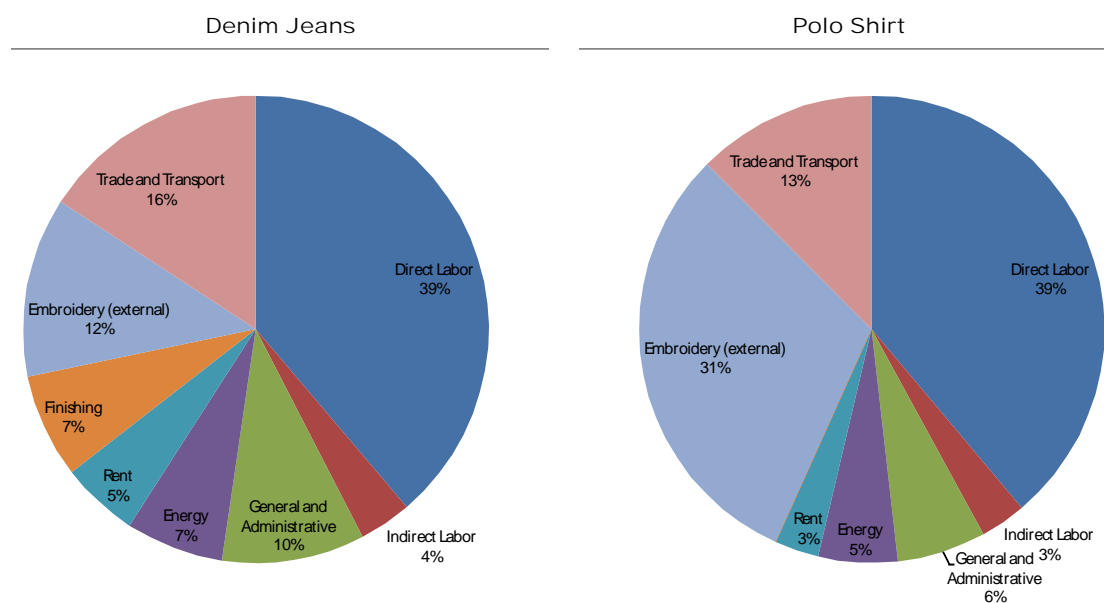
Summary of Cambodian CMT Costs for Denim Jeans and Polo Shirt (US\$ per piece)

Item	Denim Jeans		Polo Shirt	
	US\$ per Piece	% of CMT Value	US\$ per Piece	% of CMT Value
Labor	0.58	42%	0.21	42%
Direct	0.53	39%	0.19	39%
Indirect	0.05	4%	0.02	3%
General and Administrative	0.14	10%	0.03	6%
Energy	0.09	7%	0.03	5%
Rent	0.07	5%	0.02	3%
Finishing	0.10	7%	--	--
Embroidery (external)	0.17	12%	0.15	31%
Trade and Transport	0.22	16%	0.06	13%
Import fees	0.06	5%	0.02	3%
Inbound Transport	0.02	2%	0.00	1%
Export fees	0.11	8%	0.04	8%
Outbound Transport	0.02	2%	0.00	1%
Total	1.36	100%	0.49	100%

Source: Interviews. Numbers may not add due to rounding.

Figure 2-1

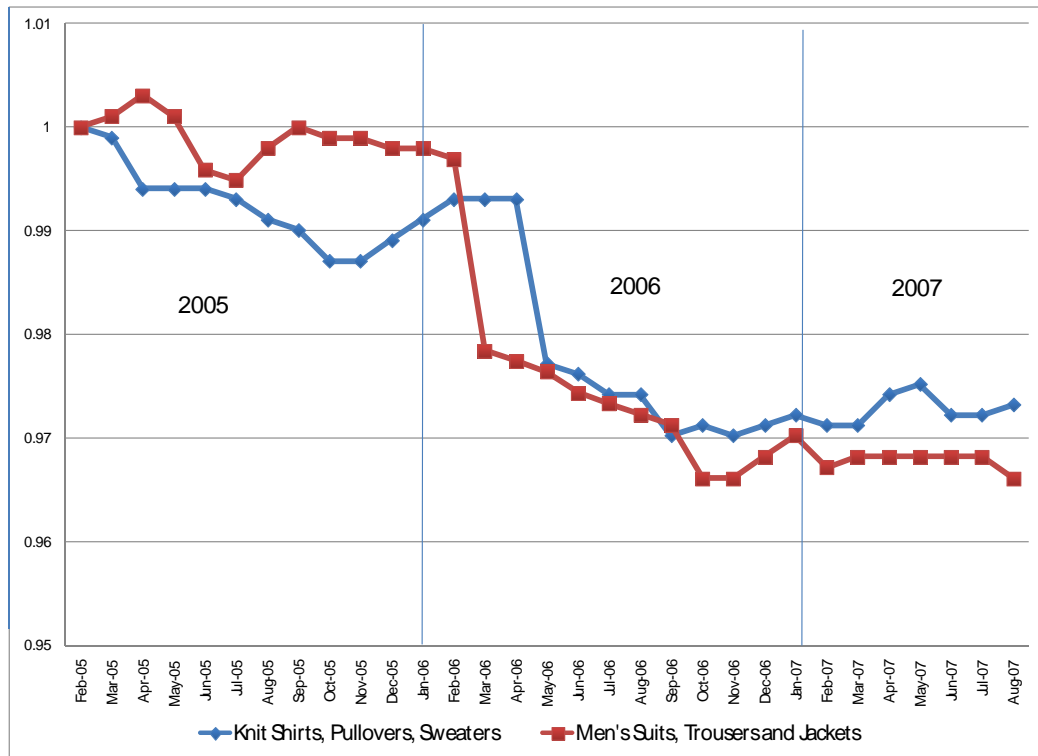
Standard Operating CMT, Trade and Transport Costs (Percent)



Source: See table 6.

Note: Finishing includes washing, but not trimming, pressing and packaging included in direct labor.

Figure 2-2
 Monthly U.S. Import Price Indexes for All Countries, Selected Apparel Products (Jan 2005 Base)



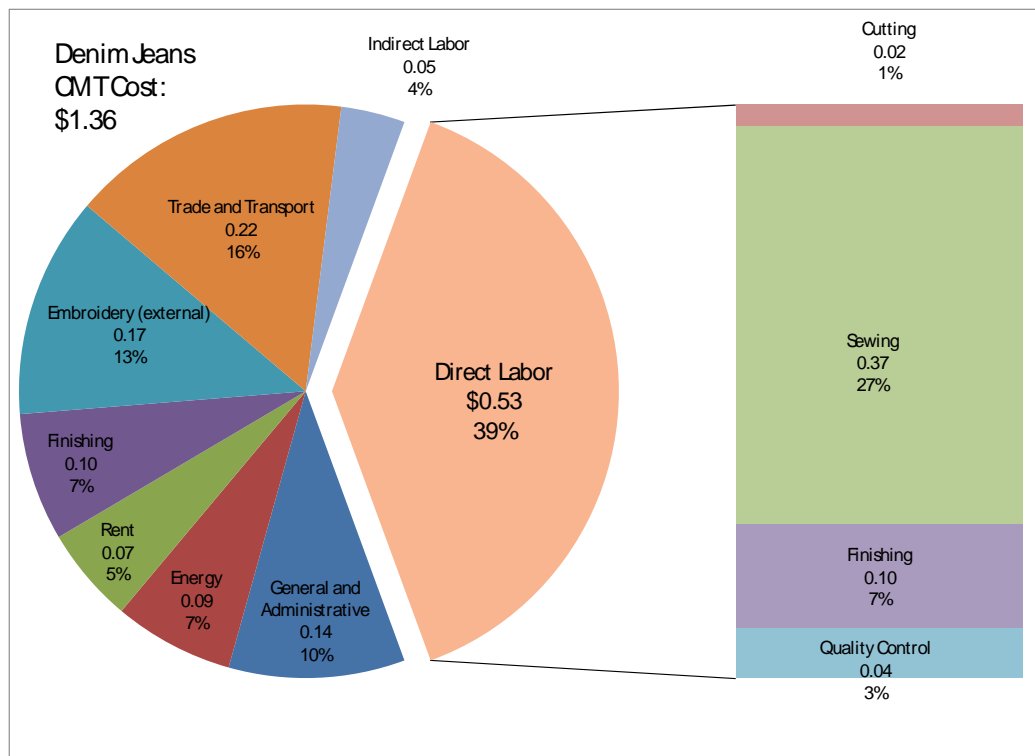
Source: U.S. Department of Labor, Import Price Indexes, all countries.

3. Analysis of Major Cost- and Value-Creating Elements

DIRECT LABOR

The most significant cost incurred in Cambodian apparel manufacturing is direct labor in production—cutting, sewing, finishing, inspection, and packing. This represents an estimated 39 percent of CMTT costs incurred by the factories surveyed (Figures 3-1 and 3-2).⁹ Sewing operations comprise nearly 70 percent of this direct labor cost and the largest cost component excluding fabric. Sewing operations are followed by finishing (pressing, trimming, packing), which comprise approximately 19 percent of direct labor costs.¹⁰ Quality control comprises nearly 8 percent of direct labor, followed by cutting room-operators, comprising less than 5 percent of direct labor costs.

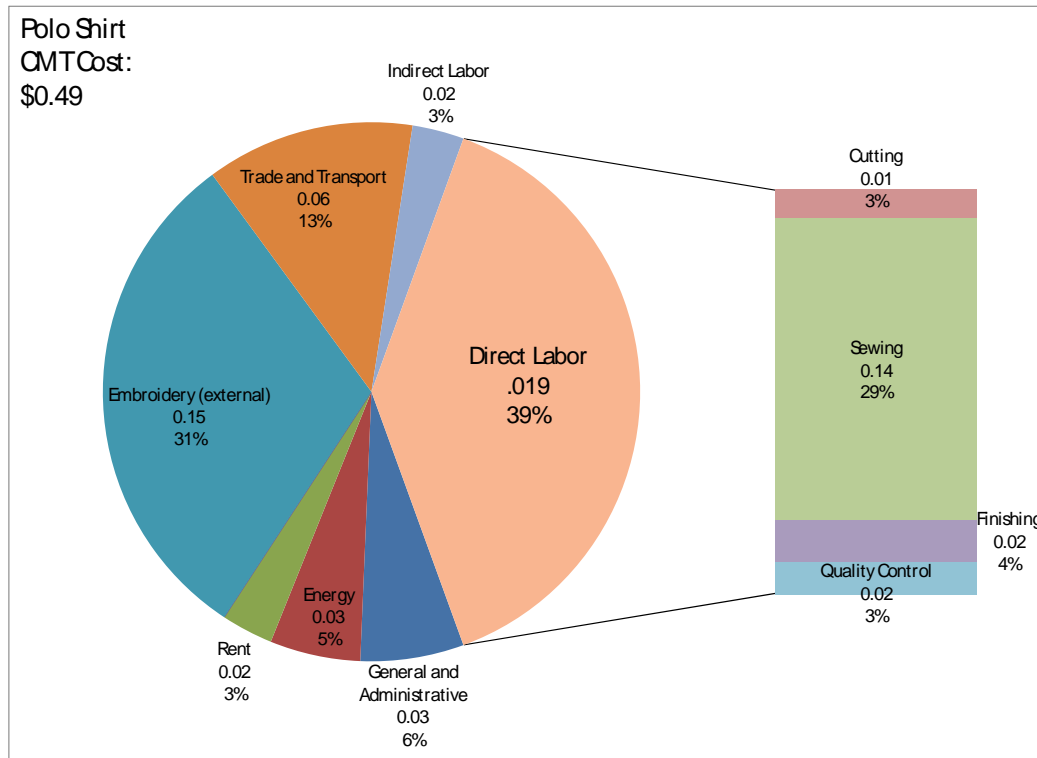
Figure 3-1
Direct Labor in CMT Operations One Pair of Denim Jeans



⁹ This estimate includes the estimated value of subcontracting.

¹⁰ We assume basic finishing operations that exclude sand blasting, acid washes, and other high value-added components. High-end finishes can add substantial value to a garment—rivaling the cost of fabric and labor.

Figure 3-2
Direct Labor in CMT Operations One Polo Shirt



Source: Factory Survey

Although cutting and quality control make up a minority of direct labor costs, their role in creating value and efficiency are far greater than the cost percentages suggest. Few of the factories surveyed had the minimum processes and controls in place in the cutting rooms. Often, fabric was cut without first being inspected, a basic procedure that affects the downstream activities significantly, since fabric rolls often contain defects, and these defects should be identified early in the production process, before value is added through cutting, and sewing and before final quality controls identify the problem. In effect, the inefficiencies of improper fabric inspection were magnified through the whole production line. Additionally, fabric waste can be substantial. Although no measures of fabric waste were taken for this study, the 2005 Competitiveness report found that reducing fabric waste by using proper cutting procedures could reduce fabric costs by 10 percent. For fabric reduction alone, this could reduce the typical cost of constructing a pair of denim jeans (see Table 2-1) by US\$0.31, or 23 percent of the CMTT value.

Similarly, quality controls were not systematic, and too often, defects were identified at the end of production instead of in the production line. No quantitative analysis was carried out to measure the impacts of these system failures on the productivity of the factories surveyed here, but it would not be unusual for the improper implementation of these processes (cutting and quality control) to result in defect rates as high as 10 percent or more, resulting in a more-than-proportional decrease in productivity as the number of saleable pieces is reduced (often these pieces can be sold as seconds for a much lower price) or more operator time is required to fix defective garments. The impacts of improper cutting and quality control procedures are compounded for garments made of expensive fabrics, such as jeans, and pose a barrier to the ability of some Cambodian firms to upgrade to higher value-added products.

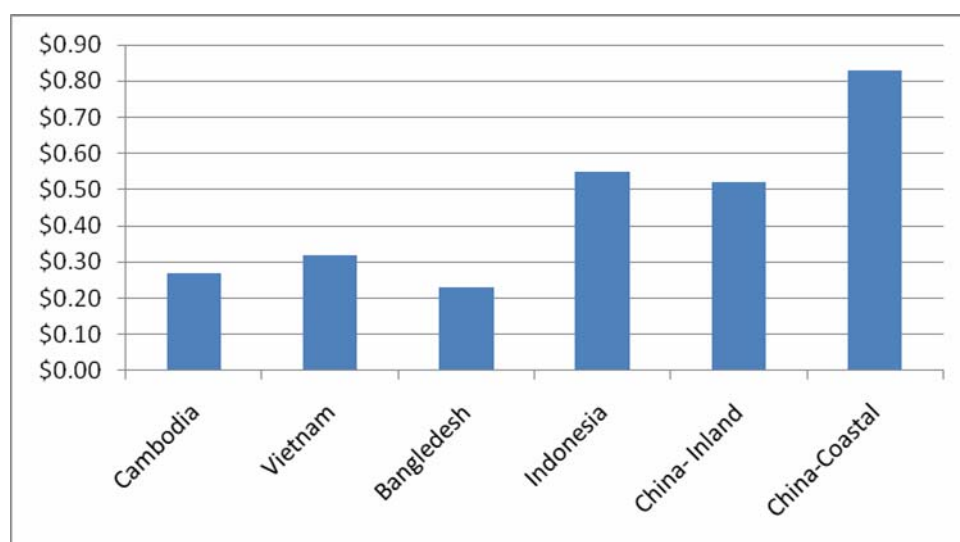
The base minimum wage for a production worker in Cambodia is US\$50.00 per month, which is US\$1.92 per day if 26 days are worked each month (8 hours of work per day, 6 days per week) (see Table 3-1). The average hourly wage is US\$0.24, which compares favorably with the wages of other producers in the region (Figure 3-3). Labor costs, including legally mandated benefits, often diverge significantly from base wages.

Table 3-1
Average Cost of Labor in Cambodia, Including Hourly Rate and Benefits (US\$)

	Monthly Base Rate (US\$)	Days /Month	Hours /Year	Average Rate (US\$)	
				Daily	Hourly
(a) Base Rate	50.00	26	2496	1.92	0.240
Attendance pay	5.00	--	--	0.19	0.024
Seniority pay	4.00	--	--	0.15	0.019
(b) Base rate w/attendance and seniority	59.00	26	2,496	2.27	0.284
Holidays (23 days per year)	--	-1.9	-184	0.18	0.023
Vacation (18 days per year)	--	-1.5	-144	0.14	0.018
(c) Adjusted for vacation and holiday	59.00	22.6	2,168	2.61	0.327
Overtime (1.5 x base rate x 2 hours)	16.29	5.6	542	0.05	0.007
(d) Average monthly pay with overtime	75.29	28.2	2,710	2.67	0.333
Holidays (11.5 x 2.0 x base rate)	3.69	1.0	92	0.04	0.005
(e) Total, including holiday compensation	78.97	29.2	2,802	2.71	0.338

Source: Based on data from Nathan 2005 and public regulations reported by the ILO (Guide to the Cambodian Labor Law 2005). Calculations assume an employee has completed three years of service.

Figure 3-3
Base Hourly Wage of Textile and Apparel Workers (US\$ per hour)



Source: Werner International Textile and Apparel Wage Survey April 2007. Rates quoted are for base pay plus legally mandated payments for seniority and attendance, but not vacation, holiday, or overtime regulations. Labor costs incurred can vary substantially, depending on labor laws and regulations affecting working hours, overtime, holidays, and severance payments. The actual cost to a factory depends on the management of factory production and hours worked.

In Cambodia, the base wage must be supplemented by an attendance bonus of US\$5.00 per month. Seniority can add another US\$2.00–5.00 per month. For a worker with three years of

service, these payments lift the average daily rate to US\$2.27 (see Table 3-1, line b), or US\$0.274 per hour. Benefits include 23 holidays and 18 days of paid leave per year. Including the cost of vacation and holidays, Cambodian workers receive an average wage of US\$2.61 per day worked (see Table 3-1, line c). Overtime work at one-and-a-half times the base pay has become obligatory in the factories surveyed, but varies factory by factory (see Table 3-1, line d).¹¹ Including overtime lifts the rate to US\$2.67 per day. Finally, holidays are often worked (given the number of holidays, it is difficult to avoid) at double time, but for 8 hours, rather than 10 hours, per day. So, assuming 11.5 holidays worked and paid at the holiday rate, holiday pay adds an average of \$3.69 per month to a worker's pay, resulting in an average daily wage of US\$2.67, or US\$77.10 per month—39 percent higher than the nominal daily rate of US\$1.92 or the monthly base rate of US\$50.00.

Table 3-2 illustrates the cost of labor in Vietnam. Although the base monthly salary in Vietnam is the same as that in Cambodia—US\$50 per day—the Vietnamese workweek is 5 days (compared to 6 days in Cambodia), which makes the base hourly cost of labor in Vietnam US\$0.29 per hour (compared to US\$0.24 in Cambodia). It is not customary to give Vietnamese workers attendance pay, but factories and workers are required to pay social security taxes of 17 and 6 percent, respectively. This raises the base rate of pay to US\$0.39 per day. Ten holidays a year are mandated in Vietnam (compared to 23 in Cambodia). Vacation pay is also lower, 15 days of vacation for a worker with 3 years of service (compared to 18 days in Cambodia). Finally, overtime is paid at 150 percent of the base rate and is limited to 300 hours per year, with no restriction on when the overtime is worked. These nonwage costs increase the basic Vietnamese wage to US\$0.41 per hour if all hours of overtime are worked. This is equivalent to a 42 percent increase over the base wage.

In both Cambodia and Vietnam, basic wages may be supplemented with incentive or output-dependent pay or piece rate payments. According to a survey of Cambodian industry in 2005, only 28 percent of Cambodian factories supplemented income with some type of incentive or output-dependent payments. Selected producers in Vietnam estimate that piece-rate (incentive) payments make up a substantial portion of cash payments to workers, ranging from an additional US\$50 to US\$100 per month. In contrast, Cambodian factory managers that pay piece rates or incentive pay based on production report about half that amount paid to Cambodian workers.

Factories surveyed for this study indicated that staffing levels were often much higher than they would like, but conditions in the labor market encourage low productivity and high levels of staffing. This was consistent with the findings of the 2005 Cambodia Productivity Report that indicated that most firms were overstaffed as a result of

- Poor recruitment practices;
- Retention and turnover problems;
- Untrained or ineffective supervisors;
- Lack of organizational charts and planning; and
- Lack of use of standard times and little attention paid to time lost by workers.

¹¹Many Cambodian factories, including some interviewed in this survey, furlough workers for about two months per year because of insufficient orders. Furloughed workers are reportedly paid half the base monthly wage. The factories interviewed said they were reluctant to furlough workers for extended periods for fear of losing the workers to other factories; the factories therefore maintained much higher employment levels than required so they keep their workers.

Table 3-2
Average Cost of Labor in Vietnam, Including Hourly Rate and Benefits (US\$)

	Monthly Base Rate (US\$)	Days /Month	Hours/ Year	Average Rate (US\$)	
				Daily	Hourly
(a) Base rate* (included sonority and attendance)	50.00	21.6	2,073	2.32	0.289
Social security tax (17% paid by factory)**	8.5	21.60	--	0.39	0.049
(b) Base rate with attendance, seniority and tax	63.5	21.60	2,074	2.7	0.338
Holidays (10 days per year)	--	-0.8	-80	0.21	0.027
Vacation (15 days per year)***	--	-1.3	-120	0.38	0.048
(c) Adjusted for vacation and holiday****	63.50	19.5	1,874	3.26	0.408
Overtime (1.5 x base rate x 2 hours)	10.84	3.1	300***	0.02	0.003
(d) Average monthly pay with overtime	74.34	22.6	2,174	3.29	0.411
(e) Total	74.34	22.6	2,174	3.29	0.411

Source: Interviews with Vietnamese producers. Note: Numbers may not add due to rounding.

*Three minimum monthly wages are applied in Vietnam, depending on location—urban, \$55; suburban, \$50; and rural \$45.

**Vietnamese workers pay 6 percent of their salary in addition to the factories' payment for social security.

***Vietnamese workers start with 12 days of vacation and earn 1 extra day for each year of service. The analysis assumes a worker with 3 years of service.

****Vietnamese workers are limited to 300 hours of overtime per year.

Tables 3-1 and 3-2 illustrate this potential overstaffing in Cambodian factories as is indicated by the standard number of working hours. In Cambodia, a typical worker's work year in the factories surveyed entails 2,836 hours of work, including overtime (in part because of workers' desire to earn 1.5 times the normal rate) and the six-day work week. In contrast, a typical Vietnamese worker attends work for only 2,174 hours per year. For a Cambodian factory to reduce working hours to the level of a Vietnamese factory without affecting its competitive position (and the jobs it supports), the Cambodian firm's productivity would have to increase by at least 23 percent (productivity is discussed in the next section).

Chronic overstaffing and low productivity do not of themselves pose a barrier to competitiveness, as long as the cost of labor is low enough to compensate for lower productivity, more work hours, vacation days, and overtime. However, chronic overstaffing and low productivity can limit the ability of the workforce to improve its living conditions (shorter work week and higher pay) and upgrade skills. With increasing global competition, in which prices may decline (see Figure 2-2), wages can easily be squeezed to below a subsistence, or "reservation," wage. At this point, workers will choose to strike, stay home, or return to farms or rural communities rather than do factory work. In such a way, chronic overstaffing can quickly turn into unemployment—sustainability (not to mention welfare) is compromised by complicity.

Not all developing countries with high levels of unemployed, unskilled labor fall into the situation described above. Other conditions are usually present, and these should be of crucial importance to government officials, policymakers, and the development community. Pack (1987), from his analysis of productivity in developing countries, suggests this is the result of a multiplicity of problems.¹² However, the result, Pack suggests, is that workers withhold

¹² Pack, Howard, Productivity, Technology and Industrial Development: A Case Study in Textiles, World Bank Research Publications, 1987.

basic advancements in productivity gains in direct relation to their perception of job opportunities and advancement. It is recognized that Cambodian workers have very few opportunities to advance in the garment industry labor market, from line operators, to line supervisors, to midlevel management. Middle and senior management positions are held almost exclusively by expatriate (foreign) staff. If Pack's observations are correct, knowledge transfer or education alone may be a necessary, though not a sufficient, condition to produce sustainable gains in wages, industrial upgrading, and competitiveness in the Cambodian garment industry. More must be done to address the public and industrial policy issues that create this industrial structure and these labor market rigidities—as opposed to education and engineering problems. Training and education alone may be frustrated by underlying barriers to industrial upgrading caused by the current structure of the industry with its expatriate management and no systematic approach for overcoming the associated limitations.

A review of literature on the Cambodian labor force emphasizes fair labor practices, corporate social responsibility, and consumers' and buyers' willingness to pay premiums for socially responsible production. But this approach does nothing to address this structural limitation and potentially diverts attention from more systemic issues regarding the sustainability of Cambodian garment exports, but suggests a continuation of the status quo in terms of productivity and the labor force. At the same time, the encouragement of fair labor practices in Cambodia has no doubt resulted in Cambodia being recognized as a safe haven for producers concerned with the risks of substandard labor practices in neighboring countries.

INDIRECT LABOR

Indirect labor includes managers, line supervisors, mechanics, and office staff. The value of indirect labor to the production process goes well beyond its cost, which is 4 percent or less of CMTT costs. Managers and supervisors determine the efficiency of the cutting room, sewing operations, quality control, finishing, packaging, and logistics. When an order is late or a product is not made to specification, or fabric is wanted, it is the management that intervenes to meet targets, ensure delivery, and achieve profitability. However, good management provides more than intervention and remediation. For a factory to operate at an efficiency level of 50 percent or more, management must be able to implement production models that go beyond experience alone. Training and education of managers and supervisors are required, as well as a flexible labor force.

Modern process controls—such as time and work study—are required. Managers in the factories surveyed here were all foreign (the 2005 Competitiveness Report found that 80 percent of managers were foreign and that nearly all production managers and planners were expatriate staff), and from a review of processes and controls on the factory floor, management could be improved.

Likewise, productivity was correspondingly low, especially in when frequent product and line changes were required, because the lack of systematic controls greatly increases the learning time needed to reach efficient levels of production and quality control.

The challenge to the Cambodian apparel industry is to restructure factory organization and apply processes and controls that achieve higher productivity. A very significant effort is required to improve—and to maintain the improvements—so an evaluation of the potential benefits can be considered.

Figure 3-4
Indirect Labor in CMT Operations One Pair of Denim Jeans

Denim Jeans
 CMT Cost:
 \$1.36

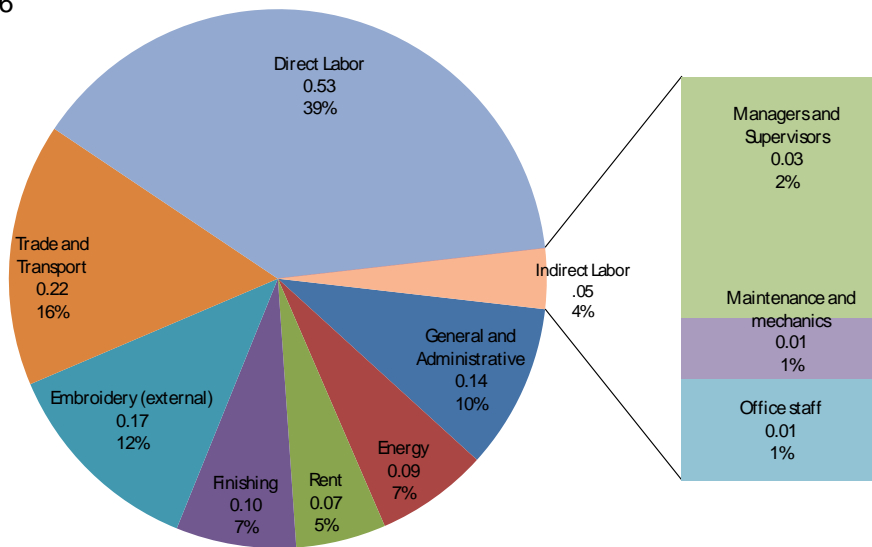
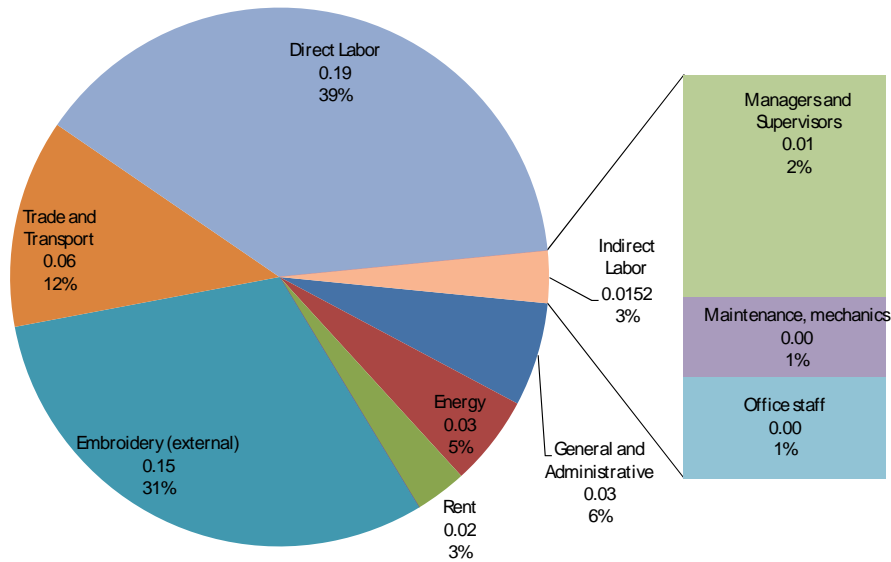


Figure 3-5
Indirect Labor in CMT Operations Polo Shirt

Polo Shirt
 CMT Cost:
 \$0.49



Source: Factory Survey

Existing levels of productivity were assessed in the 2005 competitiveness report and it was found that many Cambodian factories operated at efficiency rates of 30% to 35% of standard international times. At the same time, some factories in Cambodia, although in the minority, were found to be operating at efficiencies of 60 to 80 percent (Competitiveness Report 2005).

Table 3-3 illustrated the standard time for standard five-pocket denim jeans based on best practice worldwide. The standard values refer normally to 100% achievement or efficiency,

an unattainable goal; the normal high achievable production rate in a well-run factory is between 60–80 percent of the standard. In a typical Cambodian factory that does not employ modern management practices, the time required for constructing this benchmark item is 92 minutes, or 35 percent efficiency. In contrast, top-ranked firms in Cambodia, and elsewhere in the world, are operating at efficiency levels of 65–75 percent and take 43 minutes—less than half the time of less-efficient factories—to construct the same pair of jeans.

Table 3-3

Efficiency Measured in the Time Required for Constructing a Pair of Basic Five-Pocket Denim Jeans, (% of International Standard Time)

Operation	100	80	60	50	40	35
Cutting	2.8	3.5	4.7	5.6	7.0	10.0
Sewing	18.0	22.5	30.0	36.0	45.0	64.0
Finishing and Packaging	5.0	6.25	8.3	10.0	12.5	18.0
Total	25.8	32.5	43.0	51.6	64.5	92.0

Source: Werner International.

On a typical production line with 65 operators, 35 percent efficiency would result in 61 jeans produced per hour (Table 3-4). The benefits of increased efficiency and hence productivity are substantial: increasing from 35 percent to 40 percent efficiency results in an increase in productivity of 42 percent, or 26 more jeans produced per hour.

Table 3-4

Number of Five-Pocket Denim Jeans Produced on a 65 Person Line, Efficiency and Productivity

Efficiency— %of International Standard Time	Number of Jeans Produced per Hour	Cumulative Increase in Number of Jeans Produced**	Improvement in Productivity (Output / Direct Labor)**
35	61	--	--
40	87	26	42%
50	108	47	77%
60	130	69	113%
80	173	112	183%
100	--	--	--

Source: Werner International.

**Relative to 35 Percent efficiency level.*

These increases can be achieved only through better production management, which is achieved through indirect labor. The result of such productivity increases will be not only to lower the manufacturing cost, but also to increase the level of service and on-time delivery, as well as to help factories avoid costly air freight charges for late deliveries.

FIXED AND VARIABLE COSTS—IMPROVING CAPACITY UTILIZATION

To fully account for costs (or benefits) of productivity, all firm-level costs must be accounted for, including energy, rent, and general and administrative costs. Table 3-5 illustrates the average cost of producing a garment in a given factory under two scenarios: 1) A labor

efficiency of 35 percent and; 2) with a labor efficiency of 55 percent. Costs are further classified into fixed and variable costs; variable costs change proportionally with output and fixed costs remain the same. For illustrative purposes, and not insignificantly, direct (operator) labor costs (normally a variable cost) are held constant at US\$0.53 per pair of jeans, while in case 2 output per worker doubled from 61 jeans to 122 jeans per hour. In the first case, the operators are paid on average US\$0.49 per hour and in case two, the operators would earn US\$0.98 per hour—double the wage and income of the worker in case 1, with lower productivity.

At the same time that operator wages have doubled, the average cost per garment has fallen by 12 percent from US\$ 1.36 per pair of jeans to US\$1.19 per pair of jeans. The reason for the fall in price is that average fixed costs for rent, electricity, and G&A have fallen, as these fixed costs are now spread over a larger volume of output. Therefore, the benefits of productivity are greater than the wage payments to operators.

Table 3-5
Average CMT, Trade and Transport Costs for Denim Jeans (US\$ per piece)

Item	Cost Type	Case 1 Efficiency of 35 Percent (Actual)		Case 2 Efficiency of 55 Percent (Estimated)	
		US\$ / Piece	% of CMT Value	US\$ / Piece	% of CMT Value
Labor	N/A	0.58	42%	0.556	47%
Direct	Variable	0.53	39%	0.530	44%
Indirect	Fixed	0.05	4%	0.026	2%
General and Administrative	Fixed	0.14	10%	0.070	6%
Energy	Fixed	0.09	7%	0.045	4%
Rent	Fixed	0.07	5%	0.035	3%
Finishing	Variable	0.10	7%	0.100	8%
Embroidery (external)	Variable	0.17	12%	0.170	14%
Trade and Transport	Variable	0.22	16%	0.220	18%
Total	N/A	1.36	100%	1.195	100%

Source: Interviews. Numbers may not add due to rounding.

Table 3-5 also illustrates the opposite effect, occurring from lower capacity utilization, since fewer orders and lower output and sales increase average fixed costs. Owners of the factories interviewed in this study reported that several months a year their factories experienced drops in orders to less than half the optimal level. This underscores a virtuous circle that is not being addressed in the Cambodian garment firms interviewed: the reduction of costs through competitiveness and better capacity utilization. Instead, the firms interviewed were in a cycle of decreasing output and higher average fixed costs.

Trade unions and frequent strikes have compounded the problem of raising capacity utilization, and hence have played a significant part in raising the cost structure of the Cambodian firms they strike against (Table 3-5 illustrates how lower volume raises the cost structure of a firm). There are 1,000 unions and 290 operating apparel companies in

Cambodia. Official reports show that 330,000 working hours were lost in 2006 to strikes, excluding time lost for short-term strikes.¹³ The factories surveyed for this report reported that strikes are all too common. Negotiation is also reported to be difficult. Productivity is lost to strikes, and average costs rise. Moreover, foreign decision makers evaluating the reliability of delivery can only observe these numbers with concern. The perception of instability presented by frequent labor actions can lead to a moderation of orders placed in Cambodia, lowering capacity utilization and raising average costs more. Ultimately, this is double jeopardy: the industry experiences losses on existing orders and faces higher costs and reduced capacity utilization in the future.

ELECTRICITY

The cost of electricity to a firm depends on three main factors: (1) the availability and ease of hooking up to the local power grid; (2) the reliability of the power supply (spikes, surges, and outages); and (3) the cost of power per kilowatt-hour (kWh). According to a recent Asian Development Bank (ADB) loan to improve the Cambodian power transmission grid, Cambodia ranked near the bottom among regional competitors on all indicators:

The total installed capacity (not all of which is available at any one time) is about 247 MW. The country's load centers are disparate, small, and unconnected, and, as a result, the cost of producing electricity is among the highest in the region. This situation hinders Cambodia's ability to attract investment and promote sustainable economic activities, which are critical in reducing poverty.

In Cambodia's power sector, supply falls significantly short of demand. The country's installed capacity of some 247 MW, not all of which is available at any one time, and cannot meet the energy needs of its 13 million people. Consumption is driven by availability of supply, and any additional supply is almost immediately used up, leaving little effective reserves in the system. Blackouts are common, especially at midday peak times. The recent increase in supply in Phnom Penh and Siem Reap has only moderately eased this scarcity. EDC relies on self-generators, such as hotels and industries, to stay off its system so that it can supply residential customers, who have no access to captive generation.¹⁴

The experience of factories interviewed in this survey echoed this finding.

The energy demands of an apparel company in Cambodia are primarily for low-power equipment such as lighting, sewing machines, overhead fans, and some air conditioning in office areas (consumption normally occurs during the working day—6 days each week, 10 hours per day). Yet, electric energy from diesel-powered generators makes up an estimated 7 percent of a pair of denim jeans' CMT operating cost and 5 percent of a polo shirt's CMT cost. This is certainly due to the excessively high cost per kWh of either self-generating electricity or taking electricity from the grid.

One of the companies interviewed for this report indicated it is evaluating the option of hooking up to the national power grid, but the price for a substation will add approximately

¹³ Source GMAC statistics

¹⁴ Asian Development Bank, Proposed Loan to Cambodia Power Transmission Project, June 2007.

\$50,000 to the cost of grid hook up. This level of investment might be justified if the electricity supply is reliable, but the power supply is well known to be unreliable. Power outages are frequent and long. Therefore, companies are forced to maintain power generators as backup systems. The result is that many factories cannot justify additional costs for accessing the grid and maintaining backup generators, so they remain independent from the grid, using their own generators—a costly option. Access to the grid will depend on local conditions and varies across the country.

For companies already linked to the grid, published rates for electricity usage in the Phnom Penh area are given in Table 3-6. From interviews it was determined that the basic daytime rate is US\$0.16 per kWh, rather than the most recently published rate of \$0.15 per kWh. According the 2007 ADB report, the cost of electricity generation in outlying areas of Siem Reap and rural areas can exceed US\$0.20 per kWh, at which point most large energy consumers will generate their own electricity from generators.

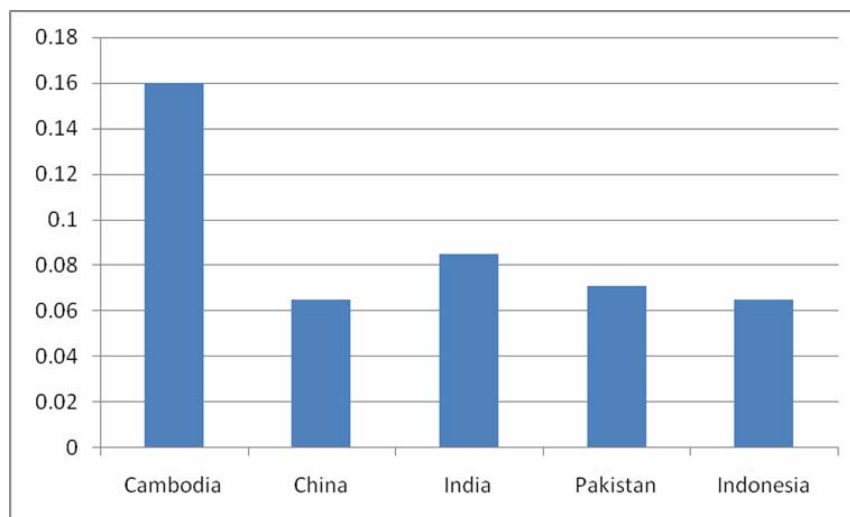
Table 3-6
Electricity Rates for the Phnom Penh Area, 2007 (US\$ / kWh)

Industrial sector	Power usage kWh/month	Tariff (US\$ per kWh)	Riel per kWh
Daytime rates	<45,000	0.15	600
	45,000–80,000	0.1375	550
	80,000–130,000	0.1375	550
	>130,000	0.125	500
Night-time rate	650/600 of day rate		

Source: Electricite du Cambodge (EDC) - The council for the development of Cambodia 2007.

The cost of electricity from the Cambodian power grid, when it can be obtained, is at best, more than double its regional competitors' costs (see Figure 3-6). Although this stands as an important element of competitiveness in the Cambodian apparel industry, the apparel industry has far lower power requirements than the closely related textile industry, where heavy machinery and high power requirements are normal. Therefore, the cost of electricity, with low skill and low productivity, as an obstacle to industry upgrading and backward integration.

Figure 3-6
International Costs of Electricity, 2007 (US\$/kWh)



Source: Werner International

According to the ADB, over 96 percent of the energy sold in Cambodia is generated by the use of diesel fuel. The price of diesel fuel at gas stations is close to 75 cents per liter (3,100 riel). Some company data indicate that companies are paying 73 cents per liter. Diesel fuel prices have almost doubled in the past 4 years. In the 2003 World Bank value chain analysis, the price of diesel was reported to be 42 cents per liter. Therefore, the cost of energy using generators has almost doubled in the past 4 years and has become a much more important cost for apparel companies in Cambodia. Meanwhile, FOB prices for garments have largely declined (see Figure 2-2).

A high priority for national competitiveness and the apparel industry should be upgrading the distribution and access to power off the grid while lowering the costs of power generation. If the cost, access and reliability of the national power grid could be improved it would have cross cutting effects for almost all apparel firms in Cambodia, encouraging industrial upgrading and the development of other industries.

IMPORT AND EXPORT CLEARANCE

Three highly significant costs that are described by the industry as excessive and contentious relate to import and export charges and documentation (trade and transport charges). Together they total 16 percent of CMTT costs for denim jeans and 12 percent for a polo shirt (Figures 3-4 and 3-5). These values were analyzed in detail in the 2003 World Bank report. Data collected for this report confirm the continued relevance of these costs, as the total charge for import clearance has changed little—from US\$858 to \$859 per 40-foot container (Table 3-7).

Table 3-7
Cost of Importing via Sihanoukville (US\$)

Import Clearance Item	Cost (US\$)
Import clearance	200
Trucking from Sihanoukville to factory	210
Lo Lo Fee	118
National Road No 4 toll	39
Scanner fee	80

Import permit (one for each product)	45
Non insurance fee	20
Customs blue receipt	5
Paid to other logistics company	171
Cam control charge, at 0.1%	10
Total payable to freight forwarder	898

Source: Reproduced from an actual debit note dated May 8, 2007.

The apparel companies, through GMAC, have been looking for reductions in these fees and charges. Some adjustments have been made in the three years since the World Bank report was published—export no longer requires a CP charge. Double inspection when exporting has been reduced to a single inspection. But at the same time, diesel prices have nearly doubled.

A 10 percent reduction in import and export fees (excluding transportation) incurred by a CMT company would result in a 1.3 percent reduction in the FOB price of a typical garment (see Table 1-6).

FACTORY RENT

In our analysis of six companies, four were renting the factory while two had outright ownership. The typical factory is 10,000 to 15,000 square meters. The cost for rental ranges from \$10,000 to \$20,000 per month.

EXPATRIATE WORKERS

All the factories interviewed employed foreign nationals as production supervisors and managers, to a greater or lesser extent. The practice of recruiting experienced workers from countries with established garment industries allowed the Cambodian industry to grow without an educated and experienced industrial labor force. Cambodians have advanced, but primarily in human resources and compliance management, office functions, and maintenance. Other management positions are still generally held by foreign nationals.

Several factory managers participating in this study said that employing expatriates in supervisory and management positions is a significant cost. Participants were generally unwilling to provide specific figures segregating expatriate salaries and Cambodian salaries, but acknowledged that, in addition to their salaries, expatriates generally receive a living allowance, travel time, and bonuses to return to their homelands at regular intervals, and similar benefits not paid to Cambodian supervisors and managers.

USAID and GIPC provided support for a salary survey of the garment industry conducted by Phnom Penh-based HR (Cambodia), Inc., a human resources consulting and recruiting company. That study has not been finalized, but preliminary results show that expatriate workers sometimes receive a significant premium—as much as 30–40 percent—over salaries of Cambodian workers at the same levels. Moreover, managers interviewed for this value chain analysis expressed little enthusiasm for the skill levels of expatriates, who have more experience than Cambodians but lack formal technical training. They also expressed concern that the inability of foreign supervisory personnel to talk directly to workers may be a barrier to higher productivity.

The data of the various companies revealed another pattern. Management costs were found to range from lows of 3.5% to 8% to as much as 17%-18% of costs. If the high cost of management is attributable to the use of expatriates, one might expect that the highest costs would be found in factories with a high ratio of expatriate supervisors and managers to Cambodians. However, the highest costs were found in the companies employing the lowest relative numbers of expatriate workers. In short, a Cambodian supervisor may be less costly than an expatriate supervisor but management costs will be high or low as a percentage of overall costs for reasons other than the national origin of the managers.

Manufacturers can reduce costs by moving towards qualified local supervisors and managers, but the overall impact on cost will be relatively small. However, if the presence of more Cambodians in line supervisory and management roles helps to motivate workers to higher productivity, or to improve their skills and abilities to qualify for such positions, the overall benefits could be very important.

4. Conclusions and Recommendations

The Cambodian garment industry contributes over one billion dollars in value added to the Cambodian economy, or about 18 percent of GDP. The Cambodian industry has been researched in prior reports, including the World Bank's 2003 value chain analysis (which focused on trade costs) and the USAID\Nathan Associates Productivity Report (2005). This report has filled a gap in understanding and presents a more comprehensive (if less detailed) picture of the two topics—productivity and trade costs. The level of analysis in this report is the firm, as the analysis focuses on firm-level costs and value adding as it takes place behind the factory gate. A report on trade costs will be released by the World Bank in 2008.

In contrast to the 2003 World Bank report, this value chain analysis finds that the largest costs and value-adding activities affecting firms in Cambodia are the costs of direct labor and of the management expertise of indirect labor. The greatest potential for firm-level improvement in competitiveness and value adding can be found in these areas. This is consistent with the 2005 Nathan competitiveness report. In contrast to the 2005 report findings, the factories in this study indicated a complex set of relationships between Cambodian labor, foreign owners, expatriate supervisors, and managers and a lack of basic and vocational training in Cambodia that limits advances in productivity and industrial upgrading in Cambodia.

As the World Bank report found, this report also found that the second-highest cost in Cambodia is for trade and transport. Although progress has been reported in these areas since 2003, it appears to be limited and has been overwhelmed by the cost of fuel and transportation, leaving total costs relatively constant.

Finally, electricity costs were found to be exceptionally high in Cambodia compared to costs in other regional and global suppliers in the apparel industry. The high cost of electricity no doubt reduced competitiveness but also limits industrial upgrading, as it puts more capital-intensive (and electricity-intensive) industries at an increasing disadvantage. The challenges of Cambodia's electric system are multifaceted, extending from cost per kWh to distribution networks and consistency of supply.

Table 4-1
Summary of Interventions

Interventions	National	Industry	Firms	Labor
Productivity and management transition and skill upgrading	Support workforce development, basic and vocational education	Support vocational training and provide information and awareness	Execute factory interventions, address limitations of foreign management, advocate change to foreign owners	Support labor policies that result in higher productivity and skill upgrading and reduce work stoppages (support incentive pay over basic wages)
Raising capacity utilization and lowering average costs in existing factories	Improve labor regulations to reduce the number of short term, wild cat strikes. Coordinate with industry and labor unions to improve awareness of growth, productivity, and the need for consistent production levels	Improve worker-factory relations and the importance of linking output, productivity and incentive payments to workers	Engage with workers to mediate disputes; implement modern management practices, which include tying output to incentive pay (output)	Labor unions must target methods for reducing strikes; improved mediation and organization; adopt policies to encourage training and workforce flexibility
Trade and transport costs	See forthcoming World Bank report	See forthcoming World Bank report	See forthcoming World Bank report	See forthcoming World Bank report
Electric costs	Work with international lenders to improve access, quality, and cost of electricity	Identify critical areas (geographic and technical) for targeted upgrading of electric grid	--	--

Source: Nathan Associates Inc. and Werner International.