

Value Chain Analysis of the Construction Materials Sector in Tajikistan

Mateja Dermastia, Nana Adeishvili, Darja Radić, Gulnora Beknazarova
and Abduaziz Kasymov.

2017

The publication of this study has been made possible through a grant from the Jobs Umbrella Trust Fund, which is supported by the Department for International Development/UK AID, and the Governments of Norway, Germany, Austria, the Austrian Development Agency, and the Swedish International Development Cooperation Agency.

© 2017 International Bank for Reconstruction and Development / The World Bank.

1818 H Street NW, Washington, DC 20433, USA.

Telephone: 202-473-1000; Internet: www.worldbank.org.

Some rights reserved

This work is a product of the staff of The World Bank with external contributions. The findings, interpretations, and conclusions expressed in this work do not necessarily reflect the views of The World Bank, its Board of Executive Directors, or the governments they represent. The World Bank does not guarantee the accuracy of the data included in this work. The boundaries, colors, denominations, and other information shown on any map in this work do not imply any judgment on the part of The World Bank concerning the legal status of any territory or the endorsement or acceptance of such boundaries.

Nothing herein shall constitute or be considered to be a limitation upon or waiver of the privileges and immunities of The World Bank, all of which are specifically reserved.

Rights and Permissions



This work is available under the Creative Commons Attribution 3.0 IGO license (CC BY 3.0 IGO)

<http://creativecommons.org/licenses/by/3.0/igo>. Under the Creative Commons Attribution license, you are free to copy, distribute, transmit, and adapt this work, including for commercial purposes, under the following conditions:

Attribution—Please cite the work as follows: Mateja Dermastia, Nana Adeishvili, Darja Radić, Gulnora Beknazarova and Abduaziz Kasymov. “Value Chain Analysis of The Construction Materials Sector in Tajikistan” 2017. World Bank, Washington, DC. License: Creative Commons Attribution CC BY 3.0 IGO.

Translations—If you create a translation of this work, please add the following disclaimer along with the attribution: This translation was not created by The World Bank and should not be considered an official World Bank translation. The World Bank shall not be liable for any content or error in this translation.

Adaptations—If you create an adaptation of this work, please add the following disclaimer along with the attribution: This is an adaptation of an original work by The World Bank. Views and opinions expressed in the adaptation are the sole responsibility of the author or authors of the adaptation and are not endorsed by The World Bank.

Third-party content—The World Bank does not necessarily own each component of the content contained within the work. The World Bank therefore does not warrant that the use of any third-party-owned individual component or part contained in the work will not infringe on the rights of those third parties. The risk of claims resulting from such infringement rests solely with you. If you wish to re-use a component of the work, it is your responsibility to determine whether permission is needed for that re-use and to obtain permission from the copyright owner. Examples of components can include, but are not limited to, tables, figures, or images.

All queries on rights and licenses should be addressed to World Bank Publications, The World Bank Group, 1818 H Street NW, Washington, DC 20433, USA; fax: 202-522-2625; e-mail: pubrights@worldbank.org.

Images: © World Bank China. Further permission required for reuse.



VALUE CHAIN ANALYSIS OF THE CONSTRUCTION MATERIALS SECTOR IN TAJIKISTAN

*Jobs in Value Chains: Construction Materials and Tourism in
Tajikistan*

September 2017

DISCLAIMER

The views expressed in this report are those of the authors and do not necessarily reflect the views and policies of the World Bank Group, its Board of Executive Directors or the governments they represent.

TABLE OF CONTENTS

EXECUTIVE SUMMARY.....	7
CHAPTER 1: INTRODUCTION	10
CHAPTER 2: GLOBAL TRENDS IN CONSTRUCTION MATERIALS INDUSTRY	15
CHAPTER 3: VALUE CHAIN ASSESSMENT.....	17
3.1 SECTOR OVERVIEW	17
3.2 CONSTRUCTION MATERIALS VALUE CHAIN MAPPING.....	19
CHAPTER 4: MAIN FINDINGS	31
4.1 CHARACTERISTICS AND CONSTRAINTS TO VALUE CHAIN DEVELOPMENT.....	31
4.2 JOBS IN THE CONSTRUCTION MATERIALS VALUE CHAIN	40
CHAPTER 5: SCENARIOS FOR GROWTH AND JOB CREATION IN THE CONSTRUCTION MATERIALS VALUE CHAIN	44
CHAPTER 6: POLICY RECOMMENDATIONS	47
6.1 PRIORITY AREAS FOR IMPROVEMENT.....	47
Annex I: Overview of survey instrument: construction materials	
Annex II: Sample Design and Weighting Procedures for the Tajikistan Jobs in Value Chains for Construction Materials and Tourism	

Figures

Figure 1: Step two - short-listing six high-potential sectors for analysis.....	12
Figure 2: Methodology overview	13
Figure 3: Sampling strata for construction material VC and distribution of responses by node (formal sector only)	14
Figure 4: Future growth opportunities are highest in Asia	15
Figure 5: Construction sector growth (USD)	17
Figure 6: Construction materials value chain map.....	21
Figure 7: Cost structure of the manufacturing node	23
Figure 8: Number and composition of clients	24
Figure 9: Workforce composition of the marketing node by size of firms	25
Figure 10: Hires by education level and experience (past 3 years).....	26
Figure 11: Example of the volatility of the cargo transportation price to Tajikistan.	27
Figure 12: Distribution of companies by size in the distribution node of the CMVC	27
Figure 13: Factors for supplier selection contracts.....	29
Figure 14: More than 55 percent of firms in distribution rely on written contracts	29
Figure 15: Client distribution by node.....	30
Figure 16: Construction materials market size by main product segments.....	31
Figure 17: Cost structure by product segment	32
Figure 18: Age distribution by node.....	32
Figure 19: Size of firms for each node of the value chain	33
Figure 20: Distribution of firms by size and manufacturing product	34
Figure 21: Market size by firms	34
Figure 22: Productivity by size of firm.....	35
Figure 23: Share of Value Added by Size of Firm in Cement and Cement Products	35
Figure 24: Sales structure in manufacturing by value-added	36
Figure 25: Geographic distribution of firms by node	36
Figure 26: Where construction materials are manufactured	37
Figure 27: Capacity Utilization in manufacturing (percent)	38

Figure 28: Expectations about the next year output	38
Figure 29: Top obstacles reported by firms in the CMVC	39
Figure 30: Employment and workforce composition by node	40
Figure 31. Employment by size of firm	41
Figure 32. Top hiring obstacle for firms along the value chain	42
Figure 33: Educational levels of hires for last 3 years	42
Figure 34: Breakdown of job creation potential related to doubling of output - by job type and node	45
Figure 35: Average cost of the new capital equipment required to meet the labor increase for doubling of output	46

Tables

Table 1. Sample size and number of interviews.....	13
Table 2. SWOT for the sector at a glance	19
Table 3. MINT data on construction materials production in 2014-2015	22
Table 4. Distribution of companies by size and main construction products	23
Table 5. Sales estimates by product.....	36

Boxes

Box 1: Singapore's business linkage program	49
Box 2: Slovenian Program to Strengthen Enterprise Networking and Cooperation	52

Acknowledgements

The Value Chain Analysis of Construction Materials and Tourism Sector in Tajikistan was prepared as part of a program of analytical work to support efforts for job creation and competitiveness in Tajikistan.

This report was prepared by Anteja ECG in cooperation with Z Analytics and with valuable contributions from World Bank staff. The core team led by Mateja Dermastia was comprised by Nana Adeishvili, Darja Radić, Gulnora Beknazarova and Abduaziz Kasymov.

The report benefited from discussions and consultations with governmental officials, private sector representatives, civil society, development partners, and from earlier work conducted by the World Bank, international agencies, and donors. We particularly value the keen interest and guidance from the State Committee on Investment and State Property Management, Secretariat of the Consultative Council on Improvement of Investment Climate, Ministry of Economic Development and Trade, Ministry of Labor, Migration and Employment, Ministry of Industries and New Technologies, for their collaboration at different stages of the survey and report preparation.

The team is grateful to the Agency of Statistics under the President of Tajikistan (TajStat) for providing the data from the Business Register and to the Tax Committee under the Government of the Republic of Tajikistan for their assistance.

We gratefully acknowledge the excellent support of the WBG's Jobs Group for providing tools, and analytical inputs in all stages of the survey, and for review of the report. The study would not be complete without the insightful inputs and guidance of Victoria Strokova, Task Team Leader, as well as Vanya Pasheva, Anam Rizvi, Valerie Evans, David Megill, Ami Shrestha, Veselin Kuntchev and Maria Laura Sanchez Puerta. Finally, we would like to thank the WBG team in Tajikistan for facilitating our dialog and fostering collaboration with the government and other stakeholders. Sincere appreciation is extended to Sitara Sultanova, Ayshe Muratova, Komron Rakhmatullaev, and Gulru Azamova.

This work has been made possible through a Let's Work Partnership and a grant from the World Bank's Jobs Umbrella Trust Fund, which is supported by the Department for International Development/UK AID, and the Governments of Norway, Germany, Austria, the Austrian Development Agency, and the Swedish International Development Cooperation Agency.

Executive Summary

The construction value chain is fundamental to any economy. It deserves a special attention from low-income countries with rich natural resources, like Tajikistan, because it not only creates demand, but it can also provide a comparative advantage for locally manufactured construction materials. In Tajikistan, the construction industry contributes 11.1 percent to the country's GDP, which is 3 times higher than its contribution to the GDP of the EU. In 2011-2014 the construction industry demonstrated steady growth, stimulating demand for construction materials, driven by remittances and growing public investment. It reached the highest level in 2014 - \$944 million, which is still 10 times lower compared to the world per capita average construction output. In 2015 construction output stumbled as it was affected by the reduction in the residential construction market due to the downturn in the Russian economy followed by the fall in remittances to Tajikistan.

Given the scarcity of data on the construction industry, and on construction materials more specifically, the Jobs in Value Chains Survey, conducted for this study, provides estimates of jobs in the whole construction materials value chain (CMVC). The survey results provide estimated total sales of \$1.12 billion generated by approximately 8,000 firms operating across the six principal nodes in the construction materials value chain¹ (mining, manufacturing, marketing and promotion, transport and storage, distribution, and sales). These firms employ nearly 100,000 workers with an average wage across all its nodes of 1,200 somoni (\$140). Around 80 percent of these firms are micro firms with less than five employees (typically an individual entrepreneur (IE)). Almost 30 percent are engaged in transport, and almost all transport firms (97 percent) are micro firms. The most important nodes in terms of number of firms and employment are manufacturing (25 percent of firms) and distribution (21 percent of firms). These two nodes each account for an estimated 35 percent of employment in the value chain, creating a bi-modal distribution of employment. The distribution node consists primarily of construction companies, which are also the biggest buyers of construction materials, and that makes it the most powerful node in the value chain in terms of bargaining power with the suppliers.

CMVC development suffers from two sets of constraints: at the macro- and economy-wide level and at the value chain level. At the macroeconomic level, top constraints include volatility and susceptibility to external shocks, and the unfavorable business environment in Tajikistan that ranks 128 in the World Bank's Doing Business 2017 ranking. The analyses of these economy wide constraints are well presented in other studies and are not the objective of this paper, which focuses on value chain level constraints to the competitiveness, which impede job creation, as well as the composition of the workforce, which impedes the economic upgrading of the value chain.

At the value chain level the survey analysis and semi-structured interviews identified several facts and constraints to growth of the value chain and job creation:

(1) The mapping shows a narrow **value chain at the emerging stage of development** reflected in underdeveloped or altogether missing key nodes and low product sophistication. Firm specialization is low, the variety of products is limited, and firms provide low value-added products and services. The market is dominated by a few large vertically integrated producers that dictate prices for basic products such as cement, concrete, and bricks.

(2) **Microenterprises (including the self-employed) and small firms are important job generators in the VC, accounting for half of the employment in the sector and over 90 percent of firms – but these firms do not grow.** Half of all workers are in small and micro enterprises, with medium-sized firms accounting for another 30 percent of total employment. The flexibility of these micro and small firms allows them to operate under the "tax radar" and thus hold jobs and provide income for their families. To survive, they keep the number of permanent employees low and use temporary workers when demand increases. However, these firms lack the resources needed for upgrading and growth such as financial capital, information, or skills. They have no bargaining power with neither suppliers nor customers, and no access to finance, and face fierce competition for the limited domestic market. These firms are the first to be affected by the external shocks and go out of business.

¹ This estimate is higher than the official estimates due to the underreporting of sales in the presence of large grey economy.

(3) Informality and underreporting of wages could impede firms transition to higher value-added products and services. Family labor accounts for 42 percent of employment in micro firms. Overall, social security and payroll taxes as well as the cost of wages are named as a top hiring obstacle in the survey. Anecdotal evidence as well as the discrepancy between the official statistics on the number of firms and industry employment and the estimates based on the survey results suggest that firms underreport employment and wage data. Respondents in the semi-structured interviews pointed out that firms continue operating as IEs even after they grow beyond four employees to take advantage of the simplified tax regime that IEs benefit from. This tendency to avoid wages and payroll taxes pushes firms in a low equilibrium settling for low value-added activities that can be carried out by unregistered workers. Upgrading to higher value-added activities is technically challenging, and the difficulty of hiring qualified workers without paying their social taxes could create further barriers to upgrading in the value chain.

(4) Access to finance and macro volatility emerge as the top obstacles to growth. Companies lack access to finance, which is required to maintain or grow the businesses, especially in downturns. The high cost of doing business leaves companies without investment capital and could push some of them into informal economy.

(5) The limited demand for construction materials and the small size of the economy in Tajikistan force firms to integrate vertically to survive, especially in the construction industry, and to diversify outside of the core business to grow. Firms diversify into other products or businesses rather than invest in the core business. To control costs, firms try to integrate vertically, backward, and forward, for example into retail sales of certain inputs required for construction or manufacturing of construction products that are not available on the domestic market. The infrequent use of written contracts with customers and the low share of marketing and sales in the cost structure of firms may reflect the fact that many companies are vertically integrated. Interviews suggest that even small and medium enterprises (SMEs) diversify into a diverse range of business activities to mitigate risks.

(6) SMEs lack qualified personnel and market information, which is an obstacle for upgrading to higher valued added activities. While large companies can solve the problem by hiring foreign labor, SMEs struggle to streamline production and marketing processes. Lack of market information and managerial capabilities, coupled with the scarcity of highly qualified specialists, emerge as binding constraints for economic upgrading for products and jobs in the CMVC. Companies across all nodes and sizes lack general management skills. The perception among owners is that the local universities cannot provide an adequate quality of education, and their primary response is to seek managers educated in Russia.

(7) Linkages between large companies and independent small suppliers are very weak. Such linkages are important for technology transfer and spillover effects. Small companies do not supply large firms as they lack the capacity to provide adequate product quality or meet supplier schedules. Links to large foreign companies are even fewer, as they are newcomers in Tajikistan's construction industry and few are currently in operation.

(8) Increased demand in the sector can create substantial employment, largely through the distribution and manufacturing nodes. Simulations using survey data show that the distribution node also has the highest potential for job creation both due to large absolute contribution to employment in the sector and because of a relatively high elasticity of labor. Reported employment elasticity is lower for the other large employer – manufacturing – likely due to persistent low capacity utilization following the economic slowdown. A hypothetical analysis of the job creation potential, in a scenario assuming doubling of demand across the value chain, estimates that over 35,000 new jobs could be added, nearly half of them in the distribution node with another 30 percent in the manufacturing node. The required investment in terms of capital and equipment is estimated at approximately \$21 million.

The recommendations are proposed in order of their ease of implementation and those activities that can take place in the first 12 months and target those impediments to competitiveness and economic upgrading that are related to the lack of supplier linkages, skills, and market information. These would support the Government of Tajikistan's Program for Export Promotion and Import Substitution, which identified construction materials as one of the priority sectors. The recommendations target not only the manufacturing node of the CMVC but also other nodes. They are organized in the following three areas:

(1) Access to information. Information flow throughout the value chain is low, which impedes efficiency and creation of linkages. Tajikistan could adopt an accelerated information dissemination program using a virtual portal in two areas: technical and regulatory. Technical information would cover innovative products, the latest trends, energy efficient products, knowledge of working with these materials, access to updated information on export markets and detailed import structure of construction products. The regulatory area would include up-to-date information on changes in regulations, governmental decrees, and their interpretation. The virtual portal creates the opportunity to develop a forum where environmental issues are discussed and shared, and on-line training courses can be accessed. The administration of the web portal can be started within the State Committee on Investment and State Property Management and then moved to a quasi-governmental organization and can eventually even be privatized.

(2) Enabling the evolution of a vibrant SME sector in the CMVC through leveraging a natural resource base for construction materials processing, and the **development of supply chain linkages** that would increase efficiency of the construction sector, and develop a favorable environment for micro and small companies to grow. There are best practices from countries that have developed similar supply chains that can be followed. One of the possible ways is through a **matching grant scheme** which could enable companies to participate in the collaborative supply chain program for upgrading their skills, products, and processes. The scheme should involve a minimum of a few companies (and related institutions like universities) along value chains in the fields of marketing, product development, technology improvements, and the specialization in supply chains.

(3) Business development services (BDS) to strengthen management skills and build capacity to encourage deepening linkages within the value chain and upgrading to higher value-added activities. A possible approach would be to set up a program that allows managers to upgrade their skills and get acquainted with the best managerial practices in a very short period. The in-house training could be designed to run for 4-6 months, while the managers' secondment to enterprises abroad could be for up to 2 months. Based on similar programs in other countries, it is expected to have a positive effect on managerial skills. Such a program can be piloted and evaluated and be scaled up if proven successful.

Chapter 1: Introduction

Jobs need to be positioned at the center of economic development in Tajikistan. Although remittance-driven growth since the early 2000s has led to a steep decline in the poverty rate, poverty remains high. Strong economic growth in the last decade has not resulted from structural transformation that can lead to sustained improvements in the standard of living. Jobs have been created, but these are mainly in low-productivity activities, often in the informal sector. In addition, there are major inequalities in terms of labor market outcomes between population groups and across regions.

There are several jobs challenges that Tajikistan is facing²:

- **Insufficient job creation for its growing workforce, especially for the youth and women.** Between 2003 and 2013, GDP grew by an average of 7.2 percent per year while employment expanded only at 2.1 percent annually. At the same time, fertility rates in Tajikistan remain high and the population is very young, with an average of 40,000 people entering the labor force each year. As a result, youth who are neither employed nor in school (NEET), represent 40 percent of the total, which is high by international standards. Moreover, women are at a disadvantage in employment outcomes.
- **Lack of structural transformation and low productivity.** The share of employment in agriculture has remained virtually unchanged between since 2000 pointing to the lack of structural transformation in the economy. About two thirds of the employed work in agriculture – the sector with lowest labor productivity. Labor productivity overall remains substantially below many comparator countries.
- **Low quality of jobs and high informality.** Most jobs created domestically are of low quality in the informal sector. Almost 60 percent of all Tajik salaried workers are engaged in the informal sector. Since 2000, formal employment grew by only 0.3 percent annually and about half of all formal employment is in agriculture, where productivity and wages remain very low.
- **Weak private sector and formal business creation and growth.** The formal private sector, squeezed by the large public and informal sectors, is underdeveloped and the entry rate of new firms is low. In most countries, the creation of good jobs depends on a thriving formal private sector. In Tajikistan, formal wage employment in the private sector represents just 13 percent of total employment. The rate of entry of formal businesses remains low and there are indications that small businesses have difficulties or disincentives to grow formal employment. The share of latent entrepreneurs who try to start a business is very low at 11.8 percent, pointing to significant barriers to entrepreneurship.

To improve jobs outcomes, the Government of Tajikistan needs to rethink the role of jobs in achieving its development objectives. Beyond a growth strategy, the government needs to consider a jobs strategy that aims to achieve the following key objectives: i) facilitate the creation of more jobs, particularly in the private formal sector; ii) improve the quality of existing jobs, especially in the informal sector; and iii) facilitate better access to jobs including transitions from inactivity to employment and from low to higher quality jobs, with a focus on vulnerable workers. The latter include youth, women, residents of lagging regions, and the bottom 40 percent of the population. One of the promising venues to achieve these outcomes is developing and integrating value chains,³ in particular, offers the potential to create and improve the quality of jobs in rural regions and in urban areas alike, both to wage earners and the self-employed (small producers and microenterprises).

² Strokova, Victoria; Ajwad, Mohamed Ihsan. 2017. Tajikistan Jobs Diagnostic: Strategic Framework for Jobs. Jobs Series; No. 1. World Bank, Washington, DC. World Bank.

³ A value chain consists of the activities needed to bring a product from the initial idea and conception to its final market. These activities include design, production, marketing, distribution and support services, up to the final consumer.

• VALUE CHAIN ANALYSIS: OBJECTIVE AND APPROACH

The value chain approach to analyzing job opportunities makes it possible to look at value chain as a system and explore the relationship between demand and jobs at different nodes. A VC represents the value-creating flow of primary and support activities required to produce, transform, and deliver a good or service to end consumers. As a given product or service moves through each of these stages, value is added and jobs are created. Market and institutional failures, however, can constrain the development of value chains, reducing investments, precluding backward linkages, and lessening their potential for job creation.⁴ The value chain approach is not about picking winners; rather it analyzes and learns from high potential pilots to identify constraints and estimate impact at the level of the complete value chain.

The approach provides policymakers with insight to achieve two key policy objectives: *improved employment outcomes* and *improved firm-level competitiveness*. In terms of employment outcomes, by mapping the entire value chain, the analysis identifies the activities that best catalyze job creation, highlights gaps that could allow firms to capture more value (e.g., by upgrading skills or addressing supply chain challenges), and looks for opportunities for creating more inclusive jobs, for instance by integrating small firms in the supply chain of large downstream firms. In terms of supporting firm-level competitiveness objectives, the value chain approach helps understand the market in terms of competitive pressures and key trends in demand, identifies constraints based on shared challenges along the VC, and estimates the skills gaps required to sustain successful business models.

• VALUE CHAIN PRIORITIZATION

This study analyzed two value chains (VCs) in Tajikistan from a jobs perspective: *construction materials* and *tourism*. This report presents the results of the value chain assessment in construction materials. The two pilot value chains, construction materials and tourism, were prioritized as a result of a three-step selection process as follows.

1. First, a rapid review of various sectors of the Tajikistan economy was conducted which revealed 12 main subsectors with potential for value chain development.⁵ Error! Reference source not found. These were assessed along three main dimensions that enhance job opportunities: competitiveness potential, impact on target groups, and readiness and change potential, according to a conceptual framework developed by the World Bank Group (WBG)'s Jobs Group.
 - *Competitiveness potential* considers the scale and intensity of the sector (e.g., critical mass, geographical concentration), its competitiveness on regional and global markets and the dynamics of the global value chain. It also assesses the potential to improve productivity and move up the value chain
 - *Jobs potential* takes into account the jobs intensity, reach to target groups, poverty impact and local economy impact of the value chain. The analysis prioritizes value chains with a large number of jobs and potential for spillovers to local economies where improved wages and/or prices are expected to have a major impact on poverty in households.
 - *Momentum* assesses the readiness of the sector for a donor intervention that engages the private sector (e.g., market linkages, skills training, etc.). It takes into account the degree of organization and mobilization in the sector, the political support it enjoys and any ongoing initiatives. This dimension also considers the impact for additionality – the degree to which investments are expected to be complementary (as opposed to crowd out other investment) – as well as the financial and political commitment of government and other stakeholders to ensure a sustainable initiative.
2. In the second stage, the six subsectors were short-listed based on potential for job creation and competitiveness improvement, while considering additionality and momentum. Those sectors were fruits

⁴ World Bank. 2015. Jobs in VCs: A Guidance Note for Assessing the Opportunities and Requirements for Job Creation and Earnings Growth in VCs. Washington, DC: World Bank.

⁵ These subsectors are cotton, fruits and vegetables, mining, livestock, textiles, food products, metal products, hydropower, tourism, ICT, construction materials, transport.

and vegetables (F&V), mining, hydropower, tourism, ICT, and construction materials. Figure 1 summarizes the visual rating of each of the 12 main sectors and the prioritization of the six short-listed sectors.

Figure 1: Step two - short-listing six high-potential sectors for analysis

40%	COMPETITIVENESS	Cotton	F&V	Mining	Livestock	Textiles	Food P.	Metal P.	HydroE	Tourism	ICT	Constr. materials	Transp.
	Existing scale and scope												
	Trade competitiveness												
	Value addition potential												
	Foreign Investment												
			✓	✓	✗	✗	✓	✗	✓			✓	✗
40%	JOBS												
	Jobs intensity												
	Reach to target groups												
	Poverty impact												
	Fostering stable jobs												
			✓	✓	✗	✓	✓	✗		✓			✗
20%	MOMENTUM												
	Organization and mobilization												
	Political will												
	Ongoing interventions												
		✗	✓	✓	✗	✗		✗		✓	✓	✓	✗

- In the final stage, the sectors most appropriate for a value chain study pilot were prioritized. The short list of six sectors was narrowed to four through a workshop with institutional stakeholders and private sector representatives. Following an elimination process, workshop participants rules out fruits and vegetables and hydropower. The existence of ongoing interventions in fruits and vegetables, and the long-term capital-intensive nature of hydropower, as well as its limited potential for direct job creation, justified this decision. The WBG team discussed the results of the workshop with Ministry of Economic Development and Trade (MoEDT) and the State Investment Committee and assessed the viability and impact potential of the four pre-selected VCs. Finally, tourism and construction materials were recommended for the pilot as they are both national priorities with high potential for job creation. In addition, 90 percent of enterprises in tourism are SMEs and the value chain reaches deep into rural areas. For construction materials, the growing exports and untapped potential made the value chain particularly attractive. ICT was deprioritized to be able to include a value chain that has both services and goods as a pilot and mining was deprioritized as it is a value chain that is capital intensive, favors large firms, and already receives donor support.

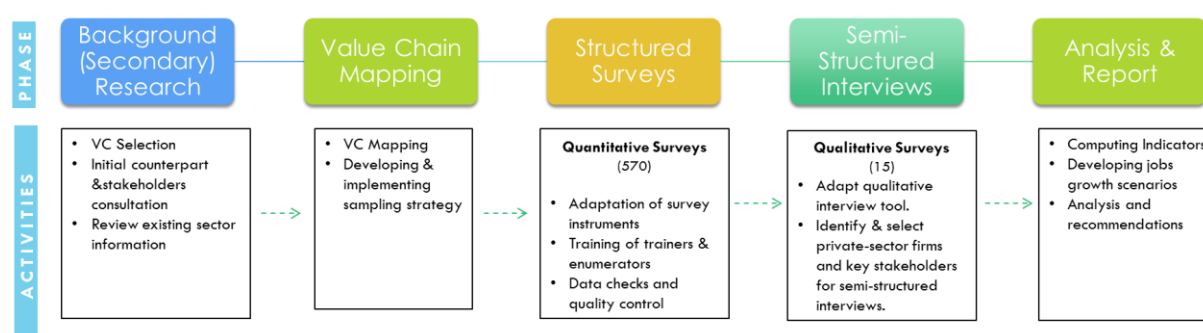
The jobs-focused value chain analysis presented here is intended to provide information about the current situation with jobs in these value chains, identify potential for job creation and constraints that would need to be removed to take advantage of these opportunities.

• METHODOLOGY

Figure 2 provides an overview of the methodological approach of the study, which included both quantitative assessment (structured surveys) and qualitative stakeholder, interviews (semi-structured interviews). The survey piloted a tool developed by the WBG's Jobs Group. An overview of the survey instrument is provided in Annex 1.

A total of 570 face-to-face surveys were conducted in the construction materials value chain focusing across all regions in the country (Figure 3). Tool adaptation and sampling strategy began in September 2016, and fieldwork was carried out between January 10 – March 31, 2017. A total of 15 semi-structured interviews were conducted with firms and key stakeholders including ministries and non-government associations. In addition, two consultations/focus groups with the private sector (in October 2016 and June 2017) and a consultation on preliminary results with the government (in June 2017) were held.

Figure 2: Methodology overview



Sampling framework for the structured surveys

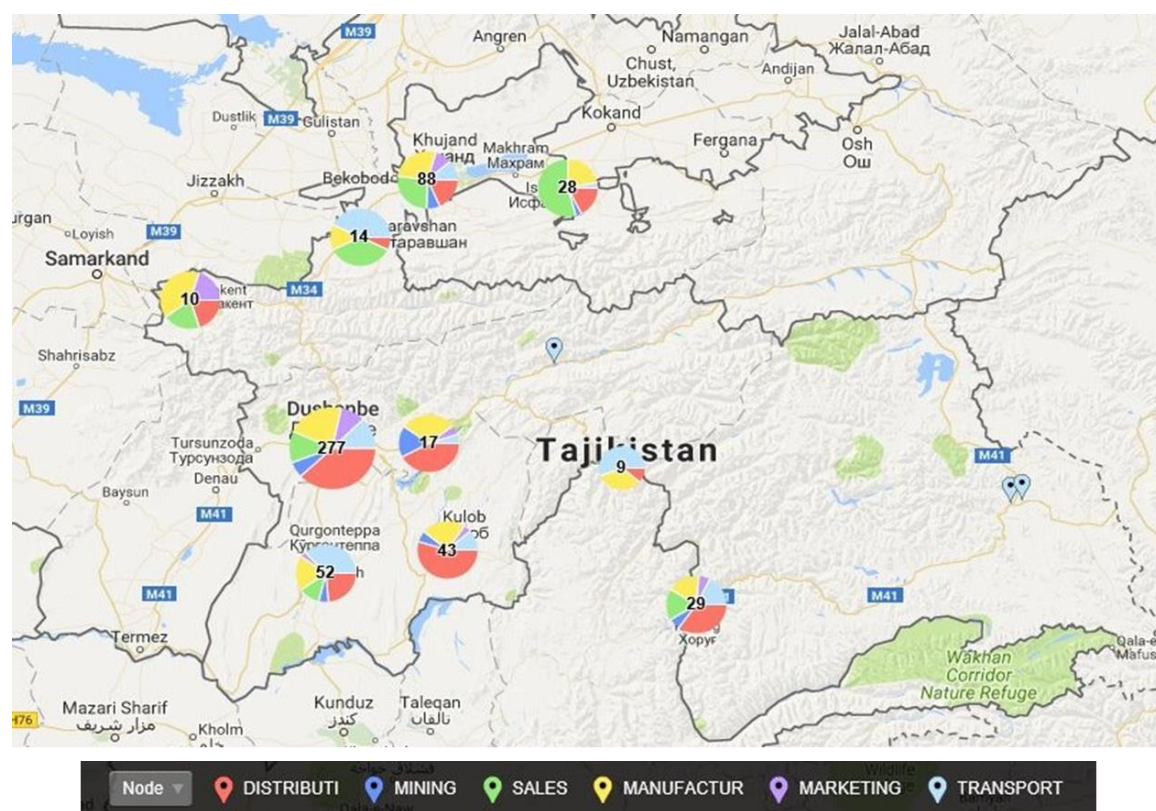
The unit of sampling and analysis for this study was the enterprise / business, which may include formal and informal, private, and state-owned enterprises. The list of firms was drawn from the official Business Register of Republic of Tajikistan maintained by the Statistical Agency under President of the Republic of Tajikistan (TAJSTAT). The sampling framework used the strata presented in Figure 3 to ensure that data was collected from each of the key nodes in the value chains. The stratification was ultimately done according to three characteristics: (1) economic activity (node of the VC map), (2) key region, (3) firm size. The resulting sample sizes and the results of the field work are summarized Table 1. More information on sample design and weighting procedures is available in Annex 2.

Table 1. Sample size and number of interviews

Value chain	Target Sample Size	Reserve Sample	Extra Reserve Sample	Total visited	Total interviewed
Construction materials	500	228	1,593	2,321	570

Along with adapting the tool for the tourism services sector (which only existed for the manufacturing and agriculture sectors), two of the main challenges of field work were the weak sampling frame including high number of inaccuracies and time lost during fieldwork and the harsh climatic conditions in the winter months in Tajikistan where road closures delayed fieldwork. Table 1 indicates that out of 2,321 visited firms, only 570 were successfully interviewed, which exceeded the target sample size, but nevertheless illustrates the challenges faced during the fieldwork.

Figure 3: Sampling strata for construction material VC and distribution of responses by node (formal sector only)



The remainder of the present report is organized as follows: Chapter 2 presents global trends in the construction material industry. Chapter 3 presents the results of construction material value chain assessment based on a survey conducted in 2017. Chapter 4 discusses the main findings of the assessment. Scenarios for growth and job creation in the construction materials VC are presented in Chapter 5. Finally, Chapter 6 outlines a set of policy recommendations to address the challenges for the Tajikistan value chain in terms of jobs and job creation.

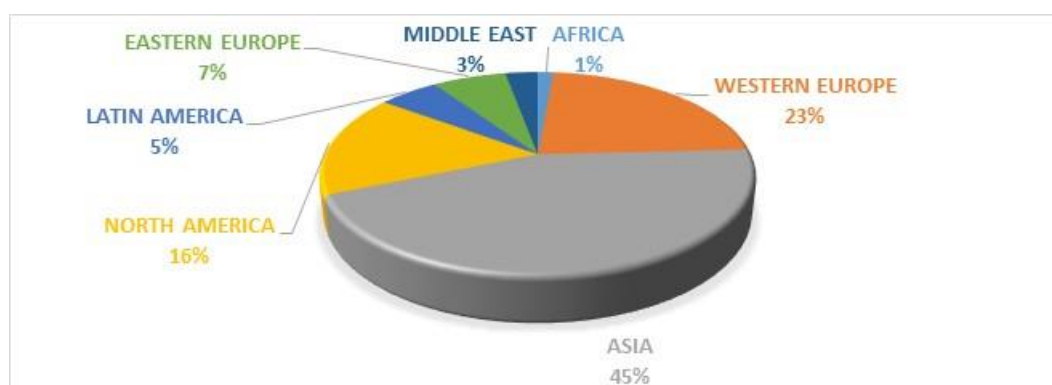
Chapter 2: Global trends in Construction Materials Industry

The construction value chain, to which the construction materials sector is closely linked, deserves special attention in low-income countries as it creates demand, but also comparative advantage for locally manufactured construction materials and quarry products.

When it comes to the size of the global construction materials market, the estimates by industry experts vary. It is believed that the construction materials market constitutes from 30 to 50 percent of the construction industry. The construction industry is globally very important for economic development as it is among the 50 largest industries. The World Economic Forum forecasts its growth globally from \$8.5 to \$10.3 trillion during 2016-2020 with over 3.9 percent annual growth rate driven by the improving world economic outlook and by the recovering construction activity in residential, commercial and infrastructure sectors⁶. According to this projection, the construction materials market will reach at least \$ 3 trillion. According to another estimate, it will only exceed \$1 trillion by 2020⁷.

The construction value chain is fundamental to any economy. It is especially important to the economies of developing countries as it contributes more than 10 percent to the countries' GDP. This is much higher than its contribution to the GDP of developed economies, which is around 3-4 percent. It deserves special attention from low-income countries with rich natural resources, like Tajikistan, because it not only creates demand, but can also lead to comparative advantage for locally manufactured construction materials and quarry products.

Figure 4: Future growth opportunities are highest in Asia



Source: World Economic Forum

In countries with growing economies, there is a need to source construction materials either domestically or internationally. For those who are also able to export such materials, the country's geographic location is very important. This is especially the case for the export of basic materials, as the ratio of value relative to the cost of transportation is very low. Tajikistan's locational advantage, centrally positioned among Central Asian countries, widens its potential role of being the regional player in the sector. Another advantage is the opportunity to exploit benefits of being a neighbor with China, the largest consumer in the world and a producer of construction materials and products. Together with India, UAE, and Indonesia, China is the major driver of the global industry. It is forecast that 45 percent of the demand for construction materials will be generated in the Asia-Pacific region. This region enjoys the highest growth rates, exceeding 10 percent despite the slowing rate of growth in China (see Figure 4 above).

6 <http://www.prnewswire.com/news-releases/global-construction-market-worth-103-trillion-in-2020-50-largest-most-influential-markets-292235961.html>

7 Construction Materials- a global strategic business report. Global Industry Analysts. Inc, May. 2015

The World Economic Forum estimated that the following global needs will be defining the demand for construction industry in the near future:

- Currently \$1 trillion of investments are needed to close the global infrastructure gap;
- 200,000 people are added daily to urban areas and need affordable housing;
- Aging infrastructure (1 in 3 German railway bridges are 100 years old);
- Bigger and more complex projects (i.e. two large airports in China); and
- Sustainability requirements and complex regulatory requirements to meet demand for green construction and energy efficient markets.

Another neighbor that will be playing a role in shaping Tajikistan's construction materials values chain (CMVC) is Afghanistan. Afghanistan's up to \$1.2 billion construction materials market is currently very important for widening Tajikistan's market for construction materials. This demand is likely to continue given the international assistance Afghanistan receives for economic recovery, and the poorly developed local enterprise sector. However, regional competition is also high, as the market attracts all regional exporters of cement such as Iran, Pakistan, Russia, and Turkey. Tajikistan is benefiting from certain competitive advantages in terms of location and cultural links⁸. Kyrgyzstan, with a construction market valued at \$612.1 million,⁹ is another current destination for exports of Tajikistan's construction materials (predominantly cement).

The following factors and trends in the global construction value chain have or will have direct or indirect impact on the development of Tajikistan's Construction Materials Value Chain (CMVC):

- There is a resource scarcity worldwide, which is becoming an important factor for the business models of companies. The construction materials industry is one of the top consumers of raw materials, much of which starts from quarries. Access to quarries involves heavy regulations and policies in all countries.
- International geographic diversification via divestiture and acquisition of local manufacturers is the predominant strategy for most of the big players, especially in cement, concrete, and brick manufacturing.
- Labor productivity in the construction sector has not changed much over the past 50 years. In fact, in the USA it has been falling.¹⁰ This implies that the burden for the improvement of total productivity must be carried by technological improvements, improvements in construction processes and improvements in the performance of construction materials.
- The industry lacks qualified labor and it does not attract a young workforce. Scarcity of skilled labor will be a continuing challenge. That also relates to the increasing sophistication of technology causing the demand for broader skill sets in all segments of the value chain.
- There is a global tendency for construction firms to outsource the supply of goods and services. This often leads to the development of companies with specialized services and with pre-fabricated construction products.
- In order to capture all of the potential of digitalization (including 3D scanning and printing and new construction techniques) a committed and concerted effort to digitize rapidly will be required across the industry, from technology to suppliers, operations, strategy, personnel, and regulation.¹¹
- The do-it-yourself (DIY) trend is also becoming an increasingly significant factor for the strategic orientation of the construction products portfolio.
- Innovative technologies,¹² such as self-healing concrete or poly-brick ceramic bricks, will also continue to penetrate the construction materials markets, presenting opportunities for moving up the value chain globally.

8 http://staging.afghanembassy.us/contents/2016/08/documents/TheNewAfghanistan_2016.pdf

9 2016 data, www.stat.kg

10 Shaping the Future of Construction. Breakthrough in mindset and technology, World Economic Forum, 2016

11 Ibid.

12 <https://www.weforum.org/agenda/2016/05/super-light-organic-and-self-healing-future-of-buildings>,
<https://www.raconteur.net/tag/disruptive-technology>, <http://www.strategyr.com/pressMCP-1018.asp>

Chapter 3: Value Chain Assessment

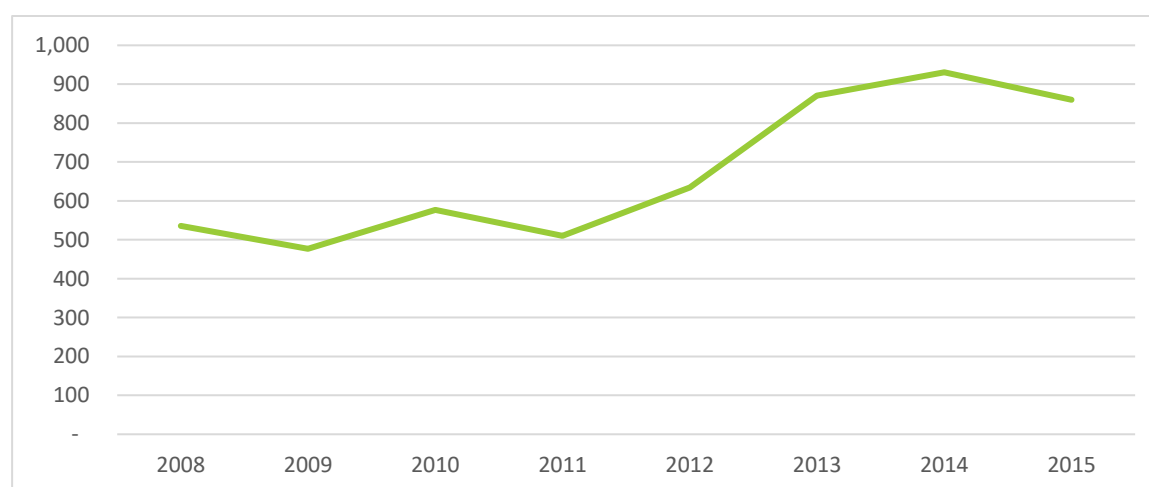
This Chapter presents major value-added activities required for bringing the products or services from their conception to sale in their final markets. It highlights how the value chain performs and assesses the strategic challenges and opportunities for job creation and competitiveness among firms in the value chain.

3.1 Sector overview

The construction sector of Tajikistan has enjoyed high rates of growth over the past decade and has shown great resilience amid the global crisis in 2009 and the consequent regional economic slowdown. It is susceptible to external shocks because of the high share of remittances from Russia in the GDP and highly specialized export structure, such as the reliance on unwrought aluminum and raw cotton which account for 80 percent of total exports.¹³ Because of the recent downturn in the Russian economy, remittance inflows fell by more than 30 percent, reducing consumption and thus affecting the residential construction market.¹⁴ However, the expanded activity on the Rogan Hydropower Plant, the net export position of cement, and the public investments stemming from the 25th anniversary of independence together spurred the construction sector and compensated for the contraction in private consumption.

The construction sector in Tajikistan has stimulated the growing demand for construction materials. From 2011 to 2015, the construction sector CAGR was 22.5 percent, while the average wage in the sector grew annually by 19.5 percent over the same period¹⁵ (see Figure 5).

Figure 5: Construction sector growth (USD)



The construction sector is an important segment in the economy of Tajikistan accounting for 11.1 percent of GDP in 2015, which is 3 times higher than its share in the EU. High levels of activity have been seen in 2013-2015 in the production of construction materials, for which the country has significant local raw materials in both variety and volume. However, construction output per capita is very low: 100 USD/capita, compared to Georgia – 600 USD/capita and to the world average – over 1,000 USD/capita. Therefore, the main reason for high growth rates is in the low base and underdeveloped construction sector. Consumption of cement is also low compared to

13 Trade in Transition. World Bank Group. Europe and Central Asia Economic Update, Office of the Chief Economist, May 2017.

14 There is no data for the residential construction market to assess the impact of the downturn, however this perception was formed based on the interviews.

15 www.stat.tj The data for 2016 is missing in all publications by Tajstat and the MINT.

emerging neighboring economies. In Tajikistan, it is 120-130 kg/capita, in India - 199 kg/capita and in China it is over 1,000 kg/capita.

The construction materials sector in Tajikistan consists of companies engaged in the mining, quarrying and primary processing of raw materials involved in road and building construction. The sector includes the extraction of sand, gravel, rock, clay, gneiss, granite, limestone, marble, slate, gypsum, and lime, and the production of cement, concrete, and bricks. The industry also performs filtering, bleaching, crushing, cutting, sizing and other stone-processing operations.

The Ministry of Industry and New Technologies (MINT) reports a steep increase in the number of enterprises manufacturing construction materials in the years 2011-2015: from 235 to 450 along with an increase in employment from 5,431 to 7,931. This increase – especially in the number of large companies – could be explained by the recent investment incentives policy introduced in the country. These include 61 investment incentives such as fiscal and financial incentives. Support in the form of grants is available to investors in manufacturing and construction sectors. The goal of the incentives was to meet the demand for construction materials created by the building of infrastructure and other public buildings. However, the procedures for being eligible for the incentives are not transparent and give discretionary power to the authorities to decide which company will enjoy access to the grant money or other incentives. Overall, the new policy appears to have been beneficial, in the sense that there is good evidence that some large and medium – and perhaps even small – companies were created after it was adopted. Nevertheless, it is likely that adopting a regulatory structure that limited such discretion would have spurred even faster growth, especially for smaller enterprises.

The industry is intensive in the usage of raw materials and energy. As per the MINT data, 400 deposits of minerals are undergoing excavation. Furthermore, these activities require high upfront investment. No statistical data is available neither on the investments nor on the output breakdown in the sector. The MINT has provided some data demonstrating a significant increase in the manufacturing of cement. Tajikistan has progressed from importing cement to being a regional exporter. The number of large and medium size cement companies has reached 13. The production quadrupled in 2011-2015 with Chinese investments in new modern plants of high productivity and de-dusting equipment¹⁶. Currently there is a global player in Tajikistan – Huaxin Cement Co. Because of the import substitution and increased competitiveness, the market price of cement in Tajikistan decreased from 240 USD/ton to 100 USD/ton.

Investments with much lower capital intensity were made in the production of other construction products. Medium-size modern plants were opened in the production of brick, glass, and plasterboard, employing 50-100 workers per enterprise. The productivity and capacity of brick production increased with the investments made by Korvoni Asr in modern technology. For the year 2015, the MINT reports increases in production of 14 construction materials that represent the dominant share of the sector.¹⁷ Thus, the country is capable of satisfying basic needs and does not need to import basic construction materials such as cement, sand and gravel, limestone, brick, and other minerals that have a high cost of transportation.

There are two sources of competition faced by companies in the construction materials sector in Tajikistan: from legally imported goods and from smuggled goods. Smuggling reportedly takes place on the border with Uzbekistan. Its intensity is high and the amounts involved are significant enough to distort the market and create fierce price competition for Tajik goods. For example, a company that produces construction nails imports steel wire coils from Russia to produce high quality nails that compete with Chinese nails, which are of inferior quality but priced 30 percent lower. The company has invested a significant amount in modern equipment, but this investment will not pay off if smuggled nails undercut their prices.

¹⁶ Information based on focus groups and semi-structured interviews.

¹⁷ The publication of the 2016 statistical yearbook on Industry of Tajikistan presents scattered data on several construction products for 2015 and does not have data on construction material sector for the years starting from 2011. The yearbook gives very limited information for analysis. The only data available to us, provided by the Ministry of Industry and new Technologies, is in their “Report of the Enterprises in the Field of Building Materials, in the period from 1991-2015”.

Since 2015, large companies started to export cement and even quartz sand and to neighboring countries. Currently, the largest export volume goes to Afghanistan. Tajik companies have locational advantages and a better business environment than those located in Afghanistan to serve the region in terms of certain construction materials. The opening of coal mining activities enabled the use of coal as a substitute for more expensive fuel in sub-sectors with energy-intensive production processes, such as clinker, brick production, etc. Table 2 provides a SWOT analysis of the construction materials space at a glance.

Table 2. SWOT for the sector at a glance

STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"> • Availability of extensive natural resource raw material supplies in almost all categories • Considerable growth potential • Cost advantages of locally available materials vs imported materials • Significant export advantages due to proximity to Afghanistan and transportation savings • Continued technical and financial support from the international community 	<ul style="list-style-type: none"> • Lack of technical expertise and skilled labor • Legal and regulatory framework not conducive to SME manufacturers • Access to finance • A small market with low demand for construction materials
OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> • Import substitution potential in many material and product categories • Export potential to neighboring countries and beyond for selected products • Technology adoption for new, faster, better, and higher value products • Enhanced business linkages between large companies and SME construction materials manufacturers • Increase employment in both urban and rural communities through small scale local production; • The potential to produce a greater variety of construction materials locally 	<ul style="list-style-type: none"> • A flood of cheap and poor-quality products from other countries (e.g. “dumping”) • A failure to meet international standards and to reverse the perception that locally made products are of poor quality • Skills drain of Tajikistan’s young and most capable labor emigrating to Russia • A failure to adjust and enforce the legal and regulatory framework to create an enabling environment

Source: Author analysis, based on interviews

3.2 Construction materials Value Chain Mapping

The construction materials value chain (CMVC) is diverse. It includes several product value chains that have different business dynamics, cost structures, governance structures and business models, all requiring different capabilities and resources. For the purposes of this report, CMVC is understood as the description of all the relationships between economic actors that are involved in the production and delivery of construction material products to end customers. Figure 6 presents a simplified map of the value chain.

The central chain on the map consists of the six nodes that are the focus of this report: mining, manufacturing, marketing, transportation, distribution, and sales. The numbers in the boxes indicate the number of companies according to the survey estimates. Each node represents activities which add value to the product and services. These activities can be carried out by vertically integrated companies or outsourced to specialized firms.

The survey estimates that there are approximately 8,000 firms operating across the six central nodes in the construction materials value chain, employing nearly 100,000 workers with estimated total output of \$1.1 billion. Around 80 percent of these are micro firms with less than five employees (typically an individual entrepreneur).¹⁸ Almost 30 percent of the 8,000 firms are engaged in transport, and almost all transport firms (97 percent) are micro firms. The most important nodes in terms of the number of firms and employment are manufacturing (25

¹⁸ The difference between survey estimates and MINT data is in large part due to the fact that the survey includes 80 percent micro firms which are not monitored by MINT.

percent of firms) and distribution (21 percent of firms). These two nodes each account for an estimated 35 percent of employment in the value chain, creating a bi-modal distribution, and are highlighted in red on the value chain map. The distribution node consists primarily of construction companies, which are also the biggest buyers of construction materials, and that makes it the most powerful node in the value chain in terms of bargaining power with suppliers.

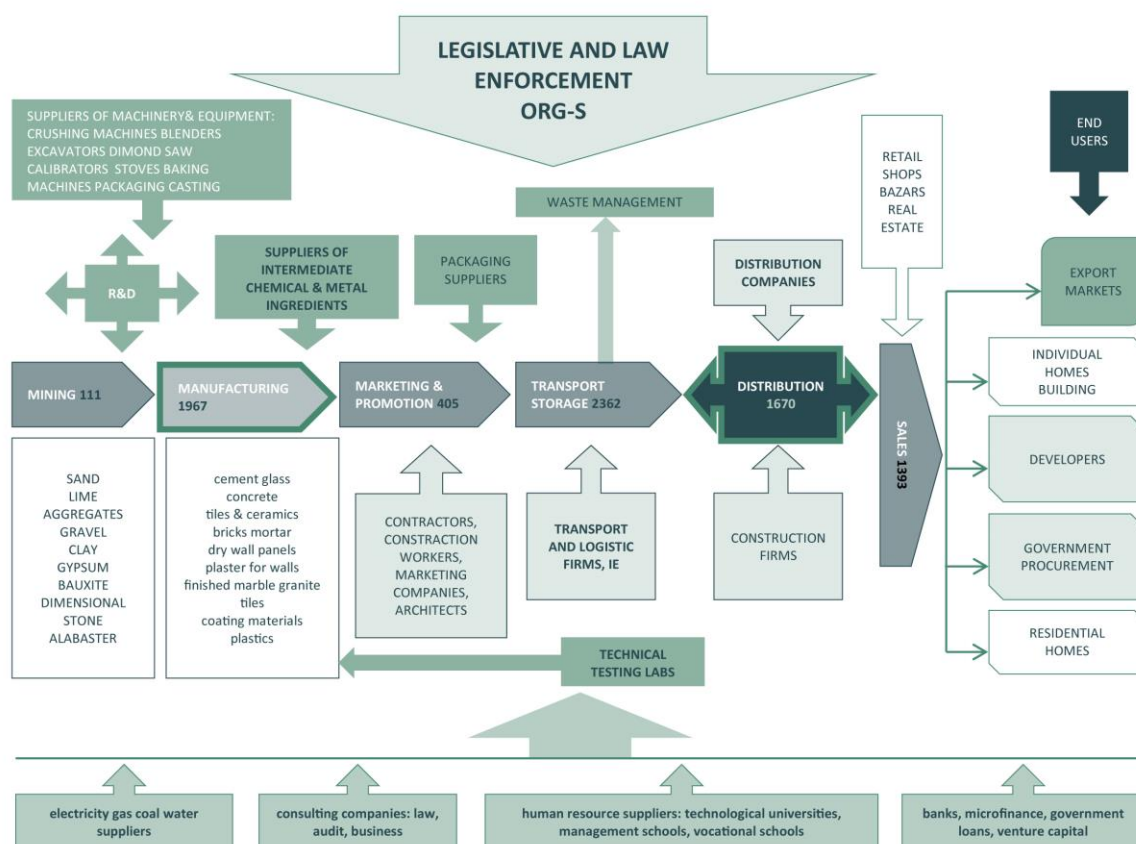
The level of a country's development defines the diversity, breadth, and width of the VC, which is illustrated on the map by the number of branches/boxes and links. Construction materials and products include the extractive industries providing raw materials, processing and manufacturing industries that turn raw materials into building products, and marketing firms, distribution channels, wholesale and retail chains that supply materials and products to the construction sector. Engineering, architectural and designer services are also important players as they participate in the marketing and promotion of certain types of construction products. The roles and relationships of the CMVC players may change depending on whether the economy is in a growth or contraction phase, and overall, roles evolve as the industry becomes more sophisticated. At each stage, some important missing links may be assumed by different players in the value chain.

In the current emerging stage of development, the CMVC is either dominated by fully integrated firms, where the entire chain is controlled by few firms, or has a governance structure directed by the large buyers, upon whom the small suppliers depend. Mature value chains have more market based relationships among players where the switching cost of buyer/suppliers is low and they have a developed network of business relationships, not only between suppliers and buyers, but also among suppliers and buyers as well.

The construction materials value chain is a branch of a much bigger construction value chain, which creates demand for other value chains such as construction equipment, furniture, home textiles, energy-saving equipment, electronics, computer systems and others. The growth of firms in these value chains does not depend on the growth of the construction sector to the same extent as it does for the construction materials VC.

Each box with arrows pointing to the central chain indicates input activities that are necessary for the functioning of one of the six main nodes. A larger number of boxes is an indication of a more developed value chain with the specialized companies producing products or services of higher sophistication. The interviews with stakeholders allowed the identification of the actors for the VC map in Tajikistan. Boxes with dark shading indicate that the input is not produced in the country (e.g. machinery) and it is imported, or the activity is at the initial stage of development or non-existent (e.g. exports, R&D). The limitations of the study and data do not allow us to go into a deep analysis of the linkages. The survey, conducted as part of this study, only explored the six central nodes of this value chain. The following is a description of each of these six nodes, as well as the overall governance of Tajikistan's CMVC (see Figure 6).

Figure 6: Construction materials value chain map



Source: Author's analysis; estimates of number of firms based on the survey.

• MINING

The CMVC starts from the extraction process. Tajikistan has deposits of important raw materials that are basic construction materials inputs. The MINT reports that there are 400 deposits representing 30 different groups of minerals that potentially can be used in manufacturing of construction products. The deposits are spread throughout the territory of the country, which could be conducive to the regional development of businesses. However, this is the least developed node of the value chain. The survey estimated only 112 mining companies throughout the country. Out of these, only 6 percent are medium and large size and 63 percent are micro¹⁹ or individual entrepreneurs. One of the interviewed companies had – instead of employees working on the quarry – individual entrepreneurs (IEs) supplying them with the decorative stones from the high regions where they cannot use equipment.

The consultations with extracting companies revealed that cumbersome access to quarries was a key impediment to business. The very small number of companies in the mining node could be the result of high administrative burden of operating. According to the interviewees, in order to get access, a firm must go through multiple time-consuming procedures. First, it must submit documents for the auction and get those documents accepted. The procedure to establish the eligibility of a firm is time consuming. After the documents are accepted and the winner of the tender is determined, the firm pays a small license fee to the Department of Geology.

¹⁹ In the survey registered individual entrepreneurs (IE) were counted as micro firms. IE are allowed to hire up to 4 persons.

However, getting a license still does not give the permission to start operation. The firm should sign a contract with the Ministry of Finance and pay a signature bonus in advance, in the amount of 40,000 somoni (approx. \$4,500²⁰), which is a significant amount for a small company. Only after the payment is made the company can sign an agreement with the government that will allow it to operate the quarry. The contract duration is 3 years only, which makes investors hesitant to invest not knowing what can be expected after the 3 years.

• PROCESSING/MANUFACTURING

Out of more than 75 types of construction materials, companies in Tajikistan produce only 15. The major products are cement and cement products, ceramics, aggregates, concrete, bricks, limestone, quartz sand, dimensional stones, glass, which mostly use local inputs. To manufacture paints, doors and windows, insulation materials, and metal products (construction nails, wires) inputs are imported. The main trade partners for inputs are Russia, China, and Turkey. In addition, it could be commercially viable to process several bulk or low value-added materials (e.g. aggregates, cement products and concrete, stone, and ceramic products) in Tajikistan instead of importing them, avoiding the high transport costs.

The MINT reports 450 companies in the manufacturing sector for the year 2015 with turnover of 1.2 billion somoni in total (approx. \$140,000). The table below shows 14 types of construction materials that are accounted for by the MINT. Except for the cement, the amounts are small and reflect the very small size of the sector with 450 small, medium and large companies.

Table 3. MINT data on construction materials production in 2014-2015

Material name	Unit of measure	2015	2014	%	+ -
Cement	'000 tons	1400,0	1145,0	122,2	255,0
Reinforced concrete products	'000 m ²	45,0	40,0	112,5	5,0
Sand and gravel	'000 m ²	1080,0	821,0	131,5	179,0
Concrete	'000 m ²	155,0	80,0	193,7	75,0
Brick	'000 pieces	170,0	162,0	104,9	8,0
Lime	'000 tons	13,0	8,0	150,0	5,0
Plaster	'000 tons	8,0	12,5	64,0	-4,5
Marble materials	'000 m ²	36,0	30,5	118,6	5,5
Granite materials	'000 m ²	3,7	2,5	128,6	1,2
Quartz sand	'000 tons	108,0	105,0	103,0	3,0
Painting materials	'000 tons	3,3	3,2	103,1	0,1
Slate	'000 pieces	10,0	0,0	0,0	10,0
Cement bricks	'000,000 pieces	42,0	26,0	158,1	16,0
Basalt fiber	'000 m ²	16,3	6,5	250,7	9,8

Source: MINT

On the other hand, the survey provides a far higher estimate of 1,966 firms in this node, 90 percent of which are of small and micro size (between 2 and 29 employees). The survey estimated the following distribution of companies by major products (Table 4Error! Reference source not found.).

²⁰ Throughout the report somoni are converted to USD at an exchange rate of 8.81 somoni/USD as of August 2017.

Table 4. Distribution of companies by size and main construction products

		PRODUCT					
		Bricks	Cement & cement products	Concrete	Doors& Windows	Others	Total
SIZE	Micro	140	344	15	377	570	1446
	Small	52	37	56	84	108	337
	Medium	58	20	66	2	23	168
	Large	2	4	0	0	10	15
	Total	252	404	136	463	711	1966

Note: The firm sizes are defined as follows: micro (1-4 employees); small (5-29 employees); medium (30-99 employees); large (100+ employees).

Source: Jobs in Value Chains Survey 2017.

In 2016, Tajikistan increased its cement production to 2 million tons, an increase of 500,000 tons from 2015. This is due to new cement plants opening in Vahdat, Bobojonghafourov and Yovon. The country has begun exporting its excess production to neighboring countries. In 2016, Tajikistan exported cement to Afghanistan, Kyrgyzstan, and Uzbekistan. Small volumes of cement were also exported to Russia²¹. Two large companies already supply 90 percent of the local market. One of these business holdings, Gayur Investment Company (a Tajik-Chinese joint venture) has invested in a modern glass manufacturing plant and the first plaster board manufacturing enterprise in the country. The competition is high among door and window importers and producers, which use imported PVC and aluminum profiles. The majority are small and micro size firms.

A few medium and large size companies are pursuing a diversification strategy into the products that are currently being imported to Tajikistan. There are more cases of backward integration from trade to manufacturing of insulation materials, or forward integration – from mining of basalt into manufacturing of basalt fiber. The next chapter provides a more detailed analysis of the manufacturing node.

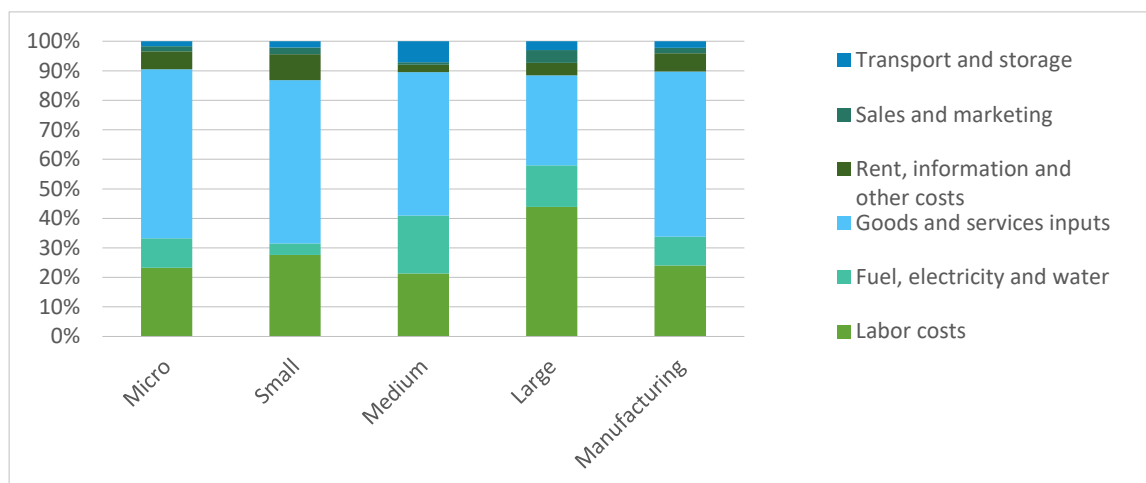
• MARKETING

The marketing node represents one of the smaller segments in the CMVC of Tajikistan accounting for about five percent of the firms and 6.5 percent of the employment in the value chain. Part of the explanation is that often marketing activities are implicitly assumed by designer or architecture firms in that they may indicate or even specify in their projects, which product produced by which company should be used. In this way, for example, home design companies often become main promoters of new construction products. This “side-effect” from their main activities is not directly a paid service. It does generate value, but it is not necessarily reflected in the value chain map as a transaction for which services are directly compensated. For this reason, for example, the value chain map depicts marketing services provided not just by marketing companies, but also by contractors or architects.

In terms of in-house marketing and sales function, the interviews with manufacturers revealed that most companies (except for the largest ones) do not conduct any marketing activities and do not employ trained marketing specialists in their enterprises. This observation is supported by the survey data (see Figure 7). The share of the marketing and sales costs in the cost structure of the manufacturing companies is insignificant.

Figure 7: Cost structure of the manufacturing node

21 Source: <http://www.asiaplus.tj/en/news/tajikistan/economic/20170330/238089>



Source: Jobs in Value Chains Survey 2017.

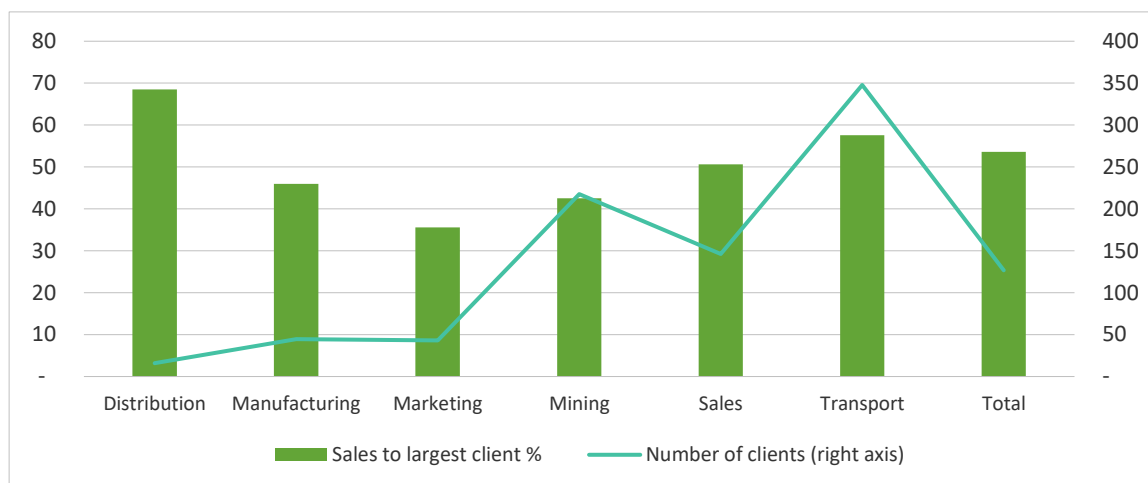
The interviews suggested that there are few highly qualified marketing specialists who command high compensation, which may not be affordable to the companies. The interviewees also reported a lack of information on the new products and the difficulty to follow the changes in market demand in a timely manner. The same is true for companies from the other nodes. Although they try to make estimates of the demand for the products they sell, they don't use professional services for that and the orders made for the next year are rather based on intuition and the previous year's sales.

The other explanation for low marketing costs is in existing selling practices, which are largely influenced by community ties and networks (mainly informal). The predominating practice among top management is to utilize their own personal contacts. The practice of developing a marketing plan and a product promotion plan using existing distribution channels likely exist only in large companies with modern management when they are looking for new business opportunities. Unable to access the supply chains of large companies, small and micro companies are limited to the market segment of individual home building and maintenance and their distribution channel is a specialized bazar (local informal market).

There is a perception among firms that contacts are more important and useful than having a marketing specialist, which may be true given the small size of the market in which they operate. The appreciation for marketing skills by the managers lie more in finding new markets, rather than operating on the existing market. In this context, respondents in medium size companies acknowledge their lack of marketing skills and see value in having access to a marketing training courses.

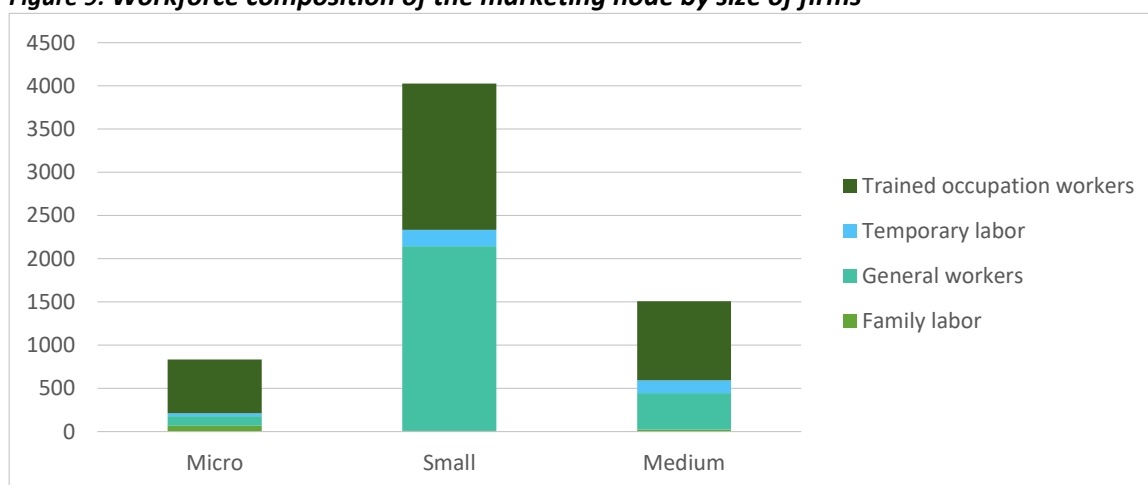
These perceptions, as well as firms' tendency to fulfill their marketing and sales needs in-house, leaves the marketing companies with little demand for their services. There are only 25 medium size companies which provide very wide range of services (market surveys, call centers, marketing campaigns, etc.) and the rest of 405 are of micro and small size. The survey estimates total annual revenues for an average marketing company at \$53,300 originating from 43 clients (see Figure 8). At the same time, the node has the largest number of qualified personnel, suggesting qualifications matter for marketing. Given the low sales figures, it is difficult to keep these qualified workers on salaries, therefore the majority of firms in this node are self-employed marketers (see Figure 9).

Figure 8: Number and composition of clients



Source: Jobs in Value Chains Survey 2017.

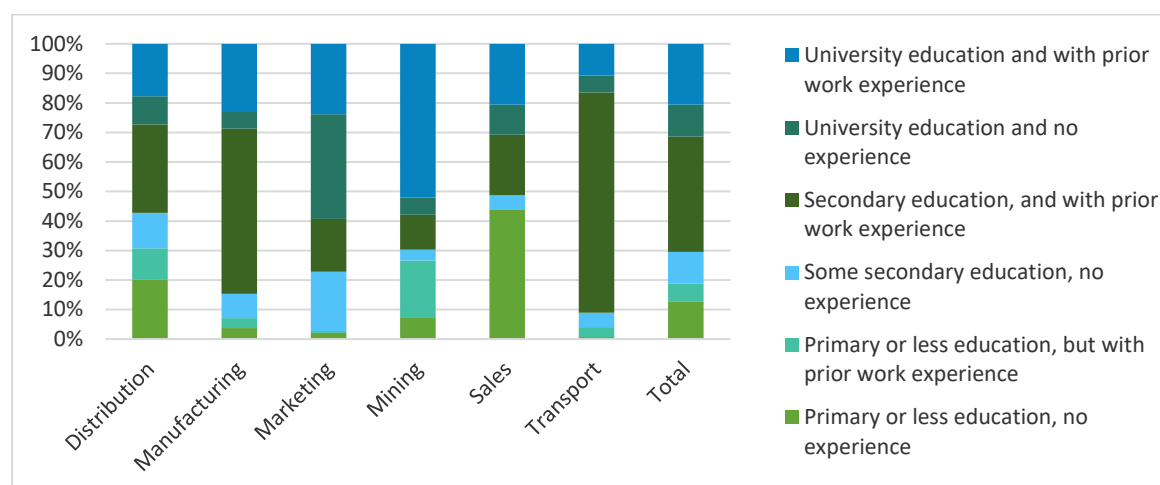
Figure 9: Workforce composition of the marketing node by size of firms



Source: Jobs in Value Chains Survey 2017.

• LOGISTICS AND TRANSPORTATION

Total turnover in the transportation node is estimated at \$135 million according to the survey data. The survey estimates 2,362 companies with one large and 56 medium companies. This node employs around 12,300 people and has the highest share of micro companies compared to other nodes of the CMVC. The reported average monthly wage in this node is around \$260, which is more than double the average in the other nodes in the value chain. This node also has the highest share of family employees accounting for almost two-thirds of labor, and values prior work experience more than other nodes in the value chain: respondents reported that on average 88 percent of the new hires over the last three years had prior relevant work experience while experienced hires accounted for 58 percent of hires in distribution, 42 percent in marketing and 41 percent in sales (see Figure 10).

Figure 10: Hires by education level and experience (past 3 years)

Source: Jobs in Value Chains Survey 2017.

Most construction materials manufacturers as well as construction companies have their own transport fleet, however these fleets account for a minority of the total capacity, which is dominated by individual entrepreneurs (“owner-operators”). The prices for domestic transportation, according to interviews, are negotiated in each individual case and depend on volume, distance, road quality to the destination, and weather. Statistics data for the transport sector are non-existent.

The industry is regulated by the State Body for Monitoring and Regulation in Transport. The individuals that want to operate in the industry need to register a company, get a license, open a bank account, and sign an agreement with the State Unitary Company “Automobile transport and logistics,” a company under the Ministry of Transportation, which is the main coordinator of domestic freight and passenger transportation. It is the largest domestic transportation company, with its own fleet of trucks and passenger vehicles. It also acts as an agent between producers and transport firms and earns agent’s fees. They regulate the tariff for the transportation, which is 1 somoni/ton/km. The company places the orders from manufacturers and others on the webpage, which can be picked up by the transportation firm that have an agreement signed with them. The company web page does not give any information regarding the turnover. The company director said that there are state training courses for dispatchers and operators. It is obligatory for them to complete 20 hours of training per year.

The interviewees complained that the poor quality of roads causes high maintenance cost of vehicles. Companies pay a vehicle tax in addition to the road tax. Still, the land transportation is preferable for cargo transportation compared to railway, especially for cross-border cargo trade.

Logistics and warehouse services is an emerging business among Tajik companies. To keep a warehouse space is costly for SMEs, especially after real estate taxes were increased. Its tax burden estimate is 2.02 percent of profit.²² Foreign companies are the main players in international logistics transportation, offering a full range of services - multi-modal freight forwarding, logistics, removals & relocations, customs brokerage, warehousing, and distribution.

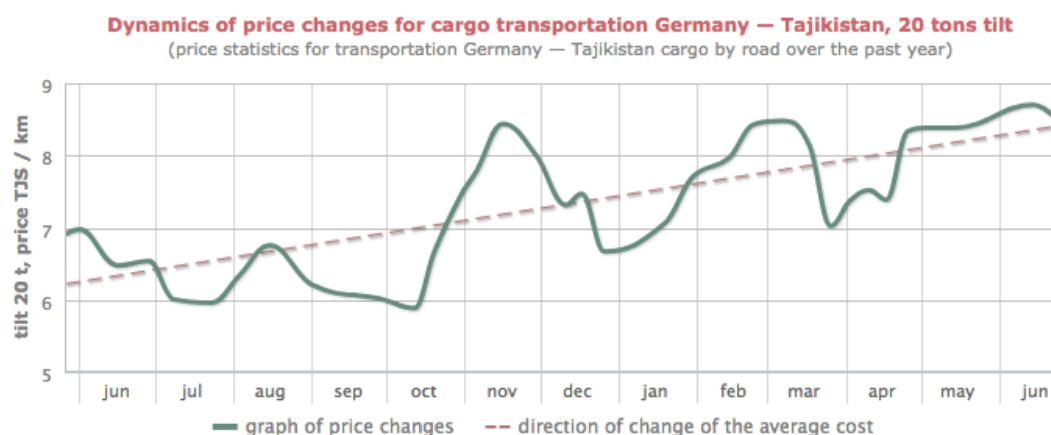
The railway network within the country is poorly developed and is less efficient than land transportation, although it is cheaper. International land freight transportation price volatility is high (see Figure 11).²³ Besides factors such as competing routes, volume, weather, road quality, etc., it also depends on whether the truck returns loaded or not. The price from Berlin to Dushanbe is 3 times higher than from Dushanbe to Berlin. The price per kilometer for a 20-ton car may vary from \$0.87/km to \$7/km. These rates are high even compared to

²² Estimates are made by the WB Doing Business 2017

²³ Source: <http://www.della-tj.com/price/local/>

transportation prices in neighboring Uzbekistan. Where the St. Petersburg – Tashkent freight rate is \$0.53/km, the St. Petersburg – Dushanbe rate is \$0.8/km.

Figure 11: Example of the volatility of the cargo transportation price to Tajikistan.



Source: Delta Smith

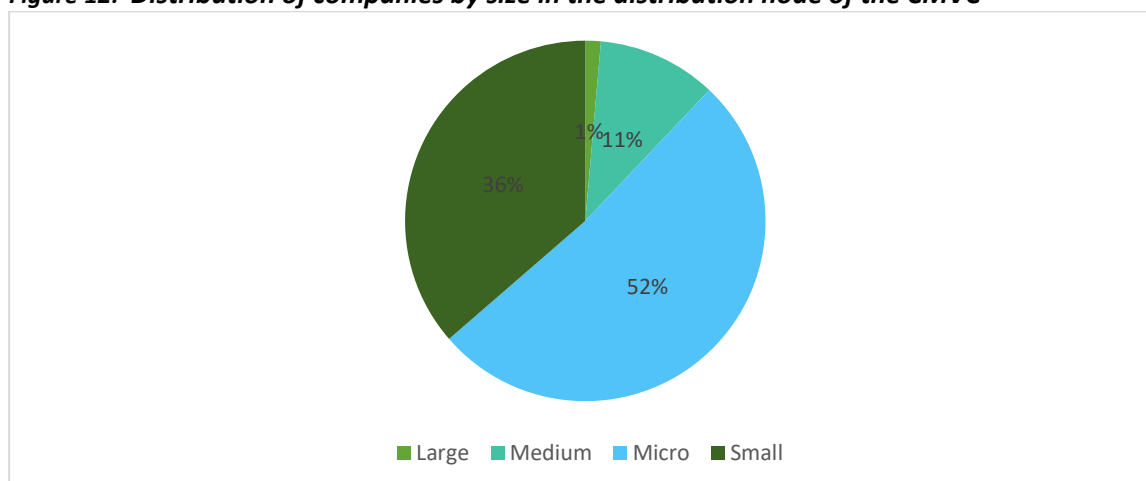
Prices and delays in shipment schedules increase if the truck crosses the border with Uzbekistan. The high cost of shipments increases the total cost of construction products for small companies that use imported inputs, for example, window manufacturing.

• DISTRIBUTION

Construction companies are the main customers and at the same time act as distribution channels for producers of construction materials. They contribute significantly to job creation by increasing their activities in some very promising areas such as the renovation of buildings and infrastructure. The competitiveness of construction companies is important not only for growth and employment, but also to ensure sustainability of the whole value chain.

There are other distribution channels for construction materials as well, including distribution companies that are mainly import oriented. The survey estimated 1,670 companies in the node with the highest number of large companies, and the highest share of sales to the government, of any node. Nevertheless, as with all nodes in the value chain, microenterprises dominate this node as well (see Figure 12)

Figure 12: Distribution of companies by size in the distribution node of the CMVC

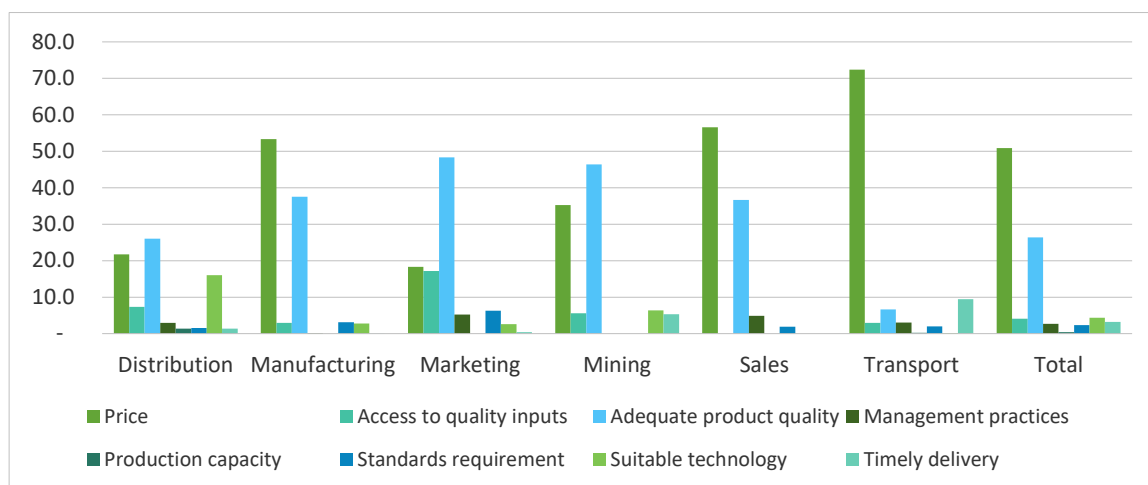


Source: Jobs in Value Chains Survey 2017.

Construction companies are typically involved in the manufacturing and importation of one or more types of construction materials and products. They have in-house architects, but for large projects, they usually outsource the architectural and engineering services. The large companies may give some construction work to small contractors. Different combinations of availability of finances and other resources, such as access to skills and know-how and personal contacts create many business models, horizontal and vertical integration of activities.

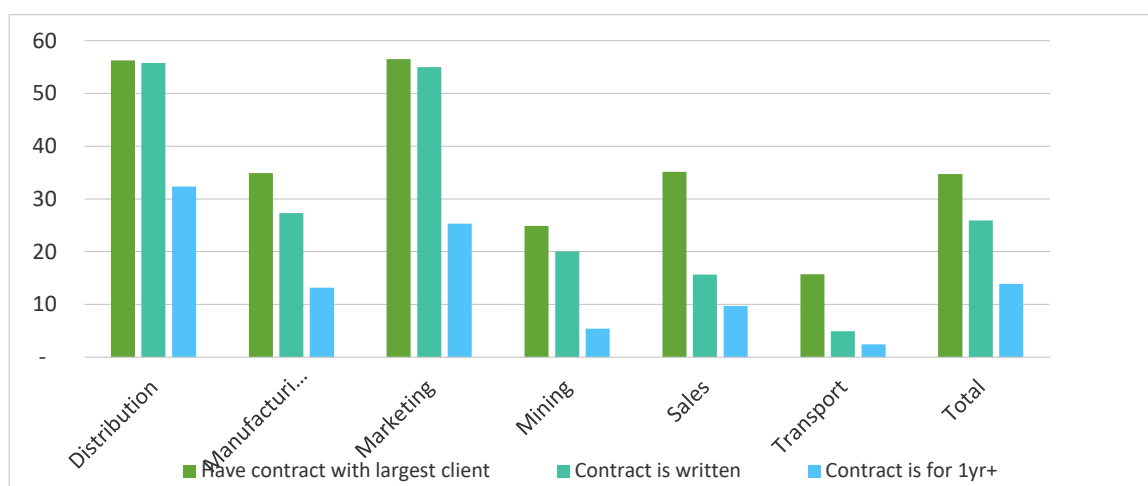
Price and adequate product quality are the main factors for supplier selection, yet distribution companies face higher pressure than firms in other nodes to maintain modern technology (see Figure 13). In the distribution node there are also the highest number of written contracts (see Figure 14). The State Support Program for Improvement of the Investment and Entrepreneurial Climate for Construction Organization of 2012-2014 states that the construction companies face several challenges, including corruption, lack of qualified workforce, inefficiencies in licensing of construction activities in state procurement for construction works, long state inspections, and more. Although the government program is trying to eliminate some inefficiencies, the sector remains heavily regulated. This increases the cost of doing business, construction cost and price of materials.

Figure 13: Factors for supplier selection contracts



Source: Jobs in Value Chains Survey 2017.

Figure 14: More than 55 percent of firms in distribution rely on written contracts

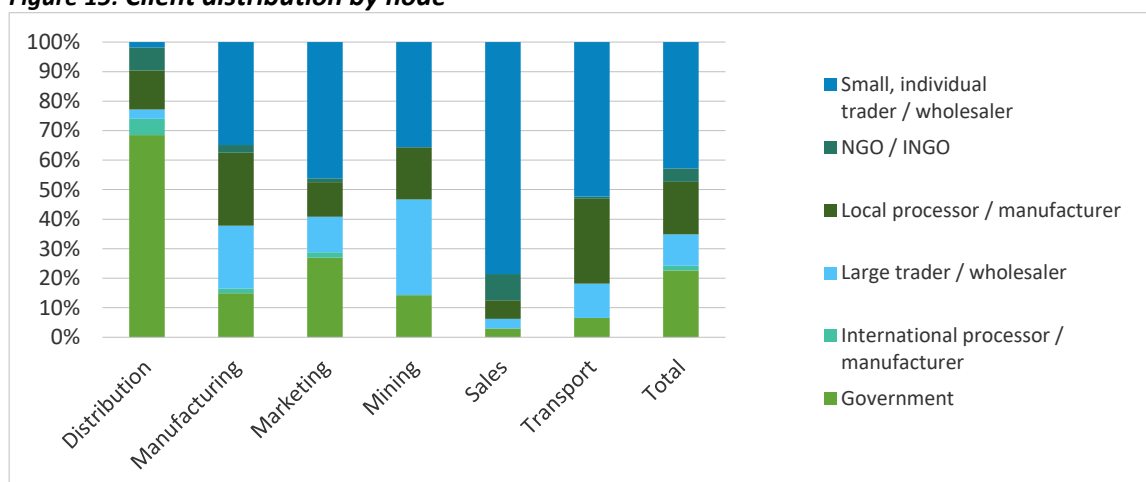


Source: Jobs in Value Chains Survey 2017.

• SALES

Sales companies support transaction activities through which end users interact with the construction materials distribution channels. This node is dominated by small shops and bazars that specialize in both wholesale and retail markets in CM, serving the individual home building and maintenance segment of the market. This low-volume segment accounts for 80 percent of sales for this node.

The sales node generates jobs primarily for self-employed workers: micro firms with less than 5 employees account for 99 percent of sales firms employing 85 percent out of estimated total 6,900 employees in the sales node. Approximately 40 percent of workers are family labor.

Figure 15: Client distribution by node

Source: Jobs in Value Chains Survey 2017.

Sales is the also the youngest node with 79 percent of firms less than 5 years old, a testament to the fact that thin margins and intense competition make it difficult to survive and grow. Most firms just re-sell construction materials: buy cheaper at the manufacturing enterprises or at the wholesaler and re-sell in bazars with a very small mark-up. The bazars differ by size and cost of rental payments. The photo below was taken at the construction materials bazar in Dushanbe where renting the space is the cheapest. However even after paying little rent (around 10 percent of costs by survey estimates), the salesmen are left with a very low surplus due to the low mark-up.



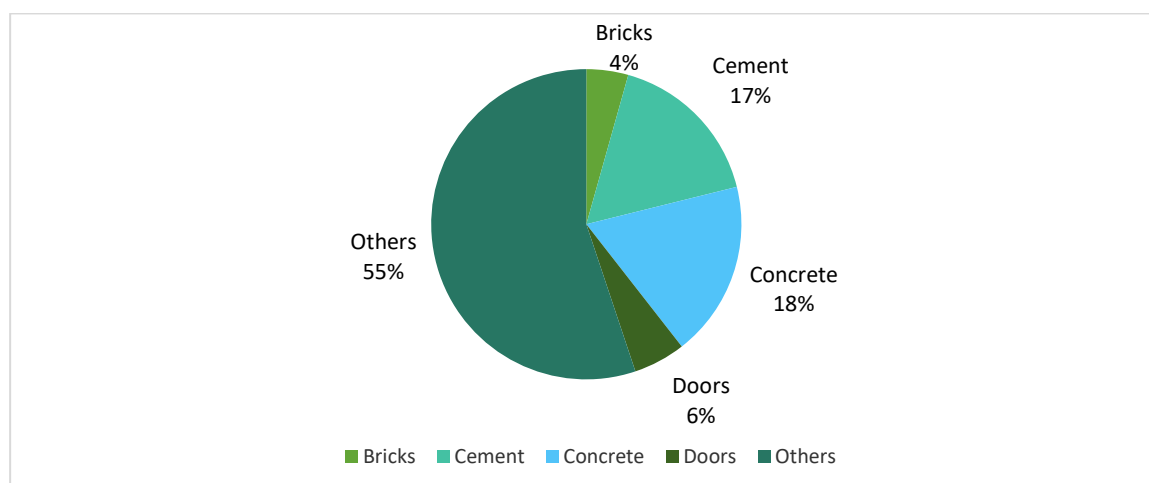
Chapter 4: Main Findings

4.1 Characteristics and Constraints to Value Chain Development

Key nodes are underdeveloped, or altogether missing, in the value chain map and product sophistication is low. There is good potential for growth, provided the enabling environment for businesses continues to improve and firms diversify production and move to higher value-added products and services.

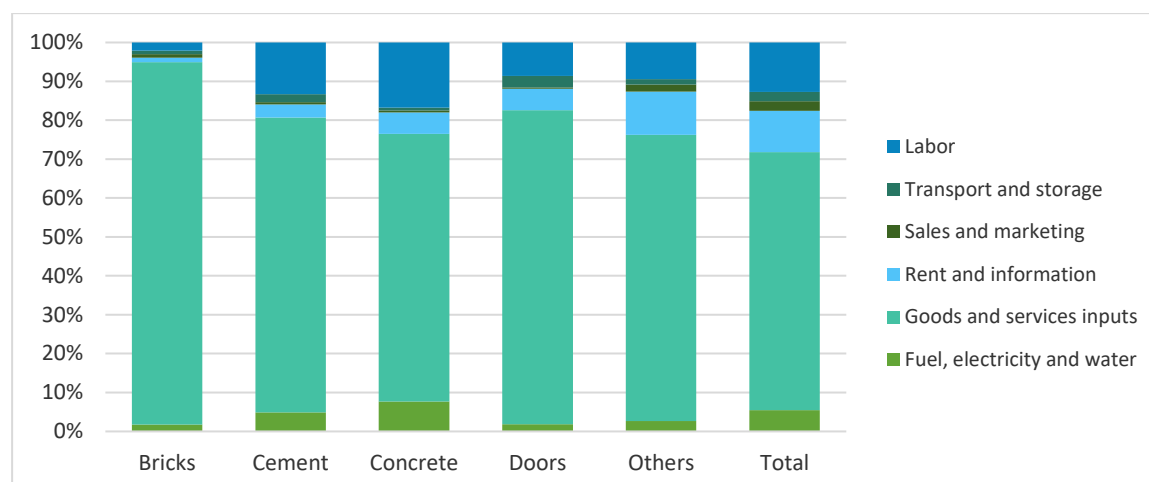
The narrowness of the value chain, the small number of links supplying the main nodes of the CMVC, and construction products with low levels of sophistication, are all features consistent with an early stage of value chain development. Most construction products manufactured and sold in Tajikistan are processed quarry products with a low level of sophistication. The value chain is concentrated on production of a few products: from the 75 varieties of construction product groups less than 20 are produced in Tajikistan. Survey estimates show that concrete and cement are the largest product segments in the construction materials market. They contribute 18 percent and 17 percent respectively (See Figure 16).

Figure 16: Construction materials market size by main product segments



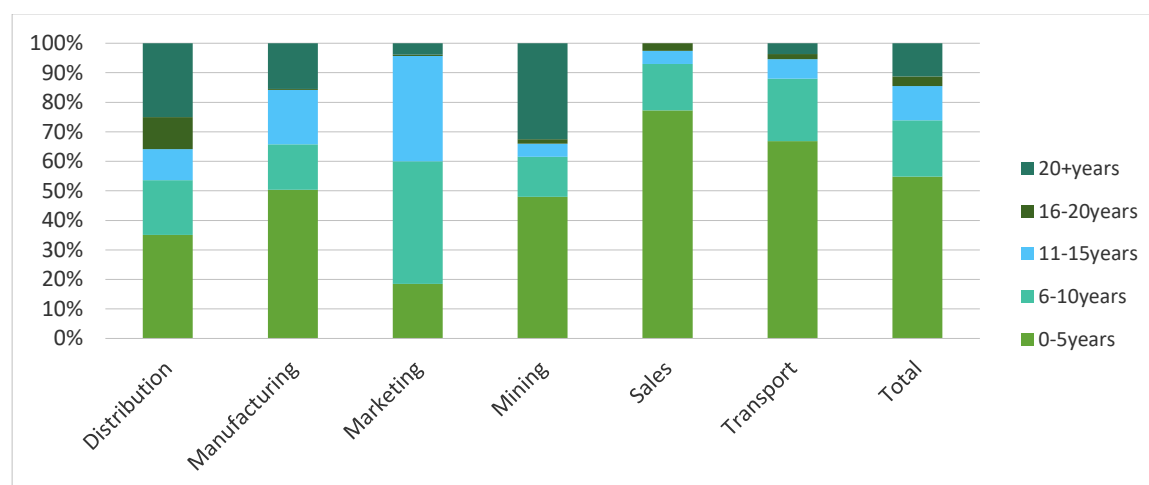
Source: Jobs in Value Chains Survey 2017.

A look at the cost structure of manufacturing firms provides another perspective on the relatively low level of sophistication in the sector. Firms report a low share of fuel and electricity costs (Figure 17) while the typical energy cost for products like bricks, concrete, and cement is as high as 30 percent of the cost of the product. Besides the relatively low cost of electricity in Tajikistan, this can be explained by the low use of technology in the manufacturing node. While for large and medium companies (which employ modern technologies) energy has a high cost share, most firms are small and micro, and they produce, for example, bricks using a traditional technology (sun drying). The same is true for downstream cement products.

Figure 17: Cost structure by product segment

Source: Jobs in Value Chains Survey 2017.

In addition, firms are young. The survey shows that 50 percent of the companies are less than 5 years old and 75 percent of the companies are younger than 10 years (see Figure 18). The creation of new companies can be explained by the increased demand for construction materials during the construction boom of 2011-2012. Entrepreneurship in the sector was also influenced by the relative improvement in the business environment, namely, the issuing of licenses for quarrying activities and new opportunities that came with the introduction of government investment support programs and the program targeting the construction materials sector.²⁴

Figure 18: Age distribution by node

Source: Jobs in Value Chains Survey 2017.

The value chain has an undeveloped, narrow shape (see Figure 6 on pg. 21). Many important nodes and links are absent. For example, there are no manufacturers of equipment and machines for mining and processing; these products are imported. There are no companies that can consult on equipment and supplier selection. The companies are not investing in R&D and do not have links to universities. Production of chemical and metal ingredients for construction is missing, as well as packaging materials which must be imported as well. Some of the existing nodes are only emerging: for example, there are very few companies that specialize in engineering, design, and marketing services. Access to banking services is low and banks could play a bigger role of a financial

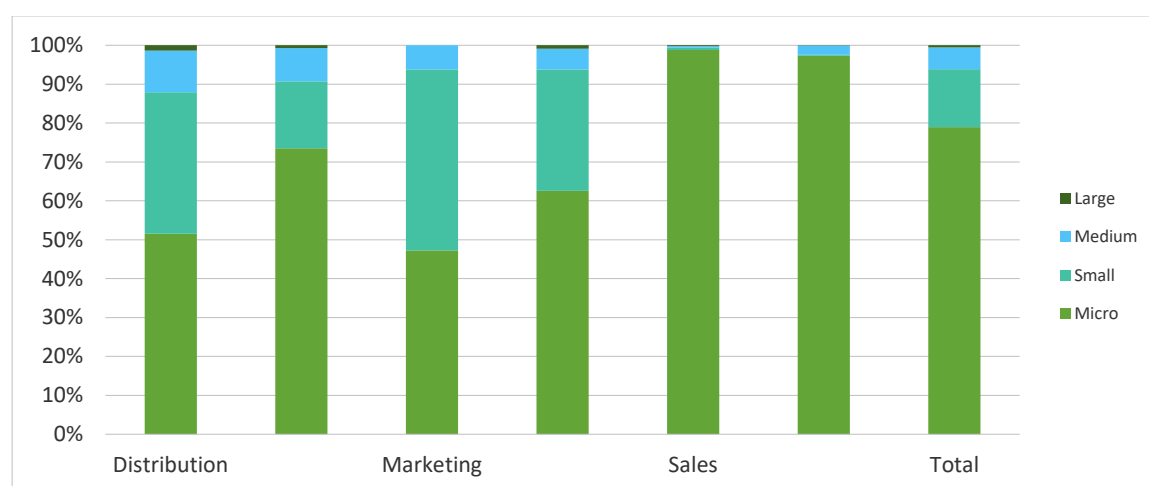
²⁴ Entrepreneurship State Support Program for the period of 2012-2020, State Support program of the construction materials sector for the period of 2012-2015.

intermediator in the VC. The map illustrates the absence of construction waste recycling companies and technical laboratories. Very few companies export to neighboring countries.

2. The estimated number of manufacturing companies in the CMVC is significantly higher than government records indicate. Many companies seem to prefer to stay small to “stay under the radar” of authorities.

In total, the estimated number of the companies in the CMVC is approximately 8,000, out of which 1,970 are in the manufacturing node, and this number is 4.8 times higher than MINT data. The discrepancy can be explained by the fact that 78 percent of them are micro companies, or individual entrepreneurs (IE) that are not included in MINT data (see Figure 19).

Figure 19: Size of firms for each node of the value chain



Source: *Jobs in Value Chains Survey 2017*.

The share of IE seems disproportionately high for the construction materials manufacturing node, which generally requires investments in machines and equipment and more than 5 employees (including a director and an accountant). The consultations with the private sector revealed that it is easier to do business as an IE than as an LLC because as the company grows, its visibility grows as well. The smaller a company is, the easier it is to stay “under the radar” of state inspections. This is possible because, in practice, a company with around 20 employees can operate as an IE with only 5 employees registered.

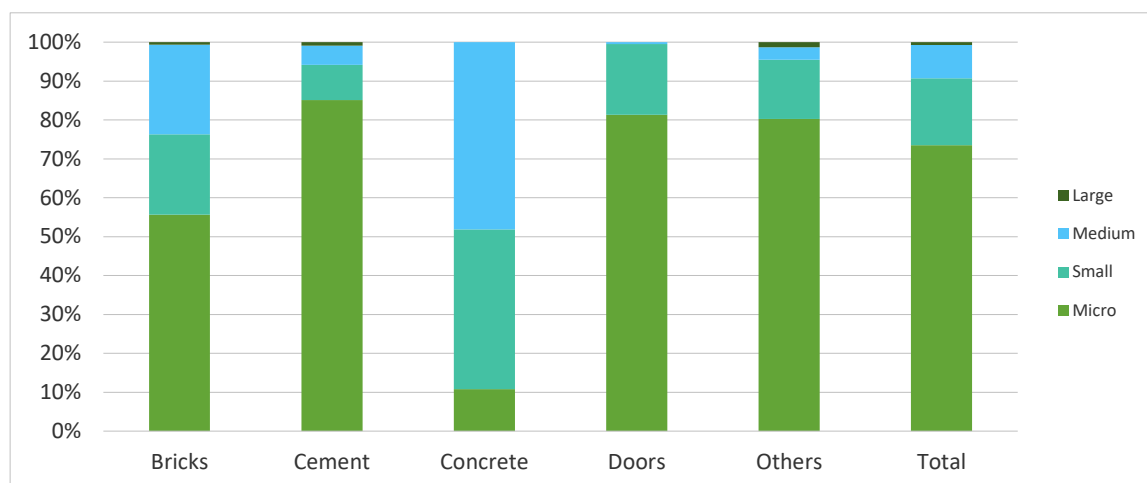
Why is it considered necessary to operate with lower visibility? There is anecdotal evidence that that phytosanitary inspection bodies sometimes “penalize” producers of construction materials and that the frequency of visits from a wide variety of state inspection bodies in such cases becomes bi-weekly. It is, of course, possible that the penalties in some cases are fully justified, due to genuine violations of important regulations. However, the anecdotal evidence points the other way, suggesting increased harassment for companies that have not made the necessary accommodations with authorities.

This situation in addition to the additional costs required to hire somebody formally²⁵ contributes to informal (unregistered) employment, and it is most likely that the share of micro companies (with less than 5 employees) is lower in reality than what is reported in the survey, and by authorities. The government estimates that the share of the unregistered employment remains higher than 50 percent in the construction and manufacturing

²⁵ Employer pays 25 percent of gross salaries to finance old age, disability, and survivor pensions. Employee pays 1 percent, which is meant to finance a notional defined contribution account introduced in 2013. The employer's contributions also finance sickness and maternity, unemployment benefits and family allowance. Self-employed persons pay 20 percent of declared income; certain categories of self-employed pay a flat-rate contribution of 15 somoni.

sectors.²⁶ The distribution of firms in manufacturing of concrete, where micro firms account for only 10 percent compared to 75 percent for manufacturing as a whole, probably gives a more realistic picture and can serve as a proxy to the real distribution of firms by size, since it is more difficult to keep a concrete agitator truck unregistered than a worker (see Figure 20).

Figure 20: Distribution of firms by size and manufacturing product

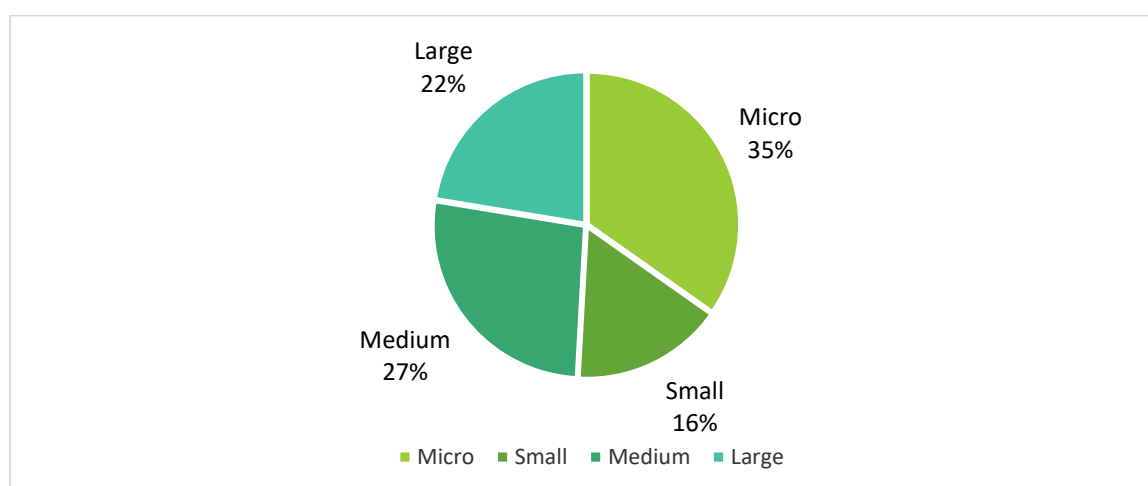


Source: Jobs in Value Chains Survey 2017.

3. More than 90 percent of companies that are micro and small size account for only 51 percent of total sales in the sector.

Large and medium companies lead in the CMVC in terms of output, exports, and productivity. Their share is estimated only as 6 percent of total number of firms, while their share in total sales accounts for 49 percent (see Figure 21).

Figure 21: Market size by firms

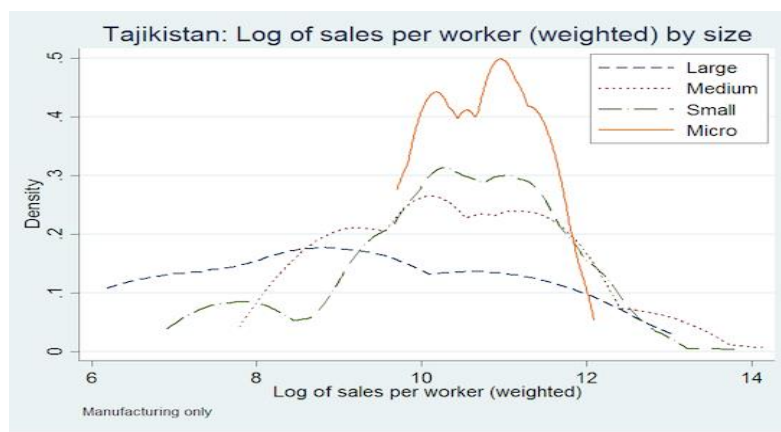


Source: Jobs in Value Chains Survey 2017.

²⁶ Comprehensive Program for Reduction of the Level of Unregistered (informal) Employment for the years 2015-2017.

The small size of the companies in manufacturing does not allow firms to take advantage of economies of scale, which leads to a higher cost per unit and lower labor productivity. However, the survey results (see Figure 22) indicate the opposite, showing micro enterprises with labor productivity approximately three times that of large companies, with the small and medium falling exactly in between. The best explanation for this discrepancy is that unregistered employees are more prevalent in the smaller companies, so that reported labor productivity becomes very high.

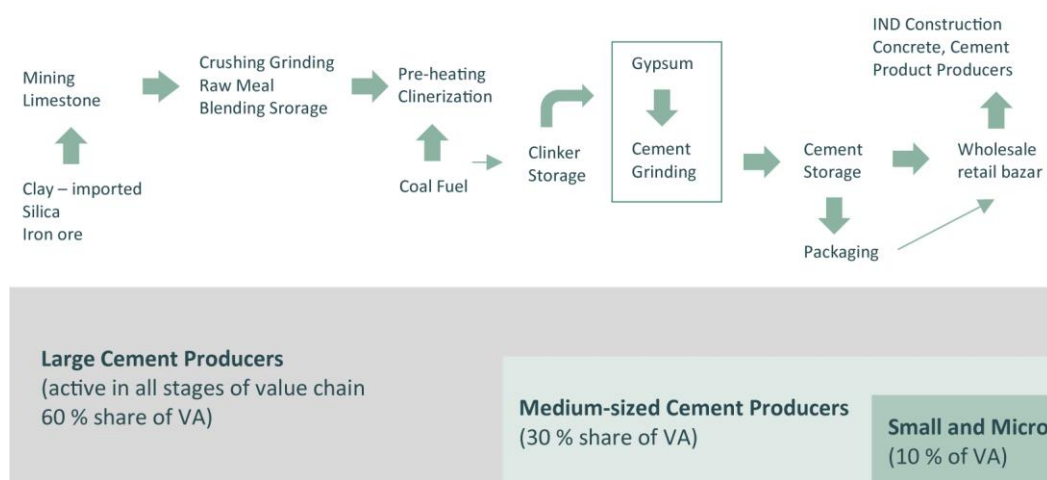
Figure 22: Productivity by size of firm



Source: Jobs in Value Chains Survey 2017.

In reality, small and micro companies are concentrated in the part of the value chain with very low value added. They do not have any bargaining power neither with their suppliers, nor with customers. Most of them produce and sell products with low level of sophistication. Entry cost to the business is high. Figure 23 illustrates the example of the value added distribution in one of the largest product segments - the cement value chain – where small and micro companies participate only in the final retail step which creates an estimated 10 percent of the value of the product. The large cement companies have the full cycle of cement production starting from mining of the limestone to selling packaged cement, capturing the full value added; medium companies purchase clinker and have cement grinding operations, therefore add less value to the product. Small cement companies buy cement and either produce cement products or re-sell it and therefore add the smallest value.

Figure 23: Share of Value Added by Size of Firm in Cement and Cement Products



Source: Authors.

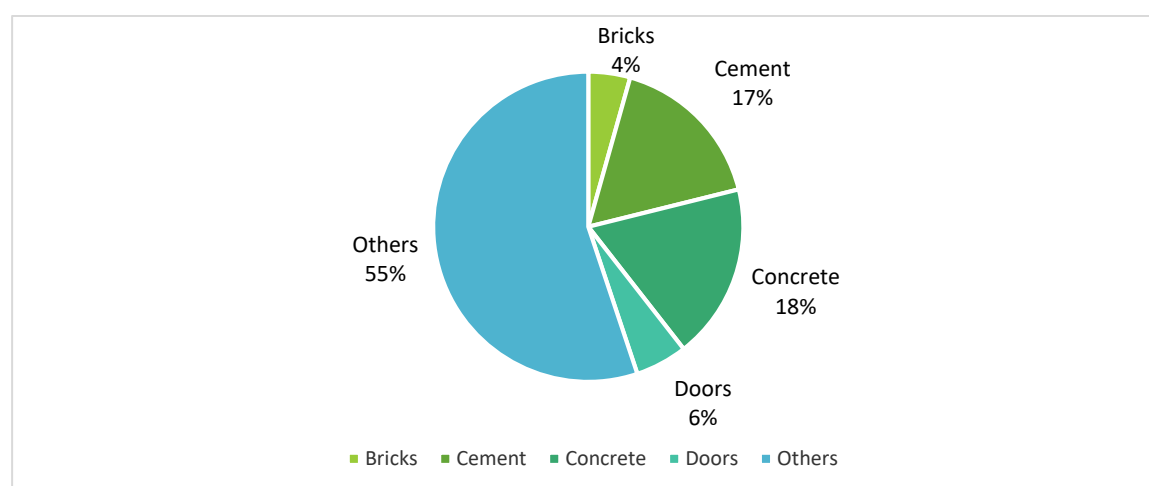
While two or three firms occupy 90 percent of the local cement market, half of the companies survive with annual sales of less than 153,000 somoni or \$17,400 (Table 5), which means selling maximum 15 bags of cement a day, on average. Small companies are very sensitive to the swings in the demand due to low working capital. To weather demand shocks, consultations suggest that some companies rely on business linkages with large firms, e.g. these companies most probably have the same owner.

Table 5. Sales estimates by product

Node	Mean (TJS)	Median (TJS)
Bricks	369,136	290,000
Cement	883,971	153,000
Concrete	2,860,245	2,000,000
Doors	249,464	72,000
Others	1,648,439	150,000

Source: Survey 2017

Figure 24: Sales structure in manufacturing by value-added

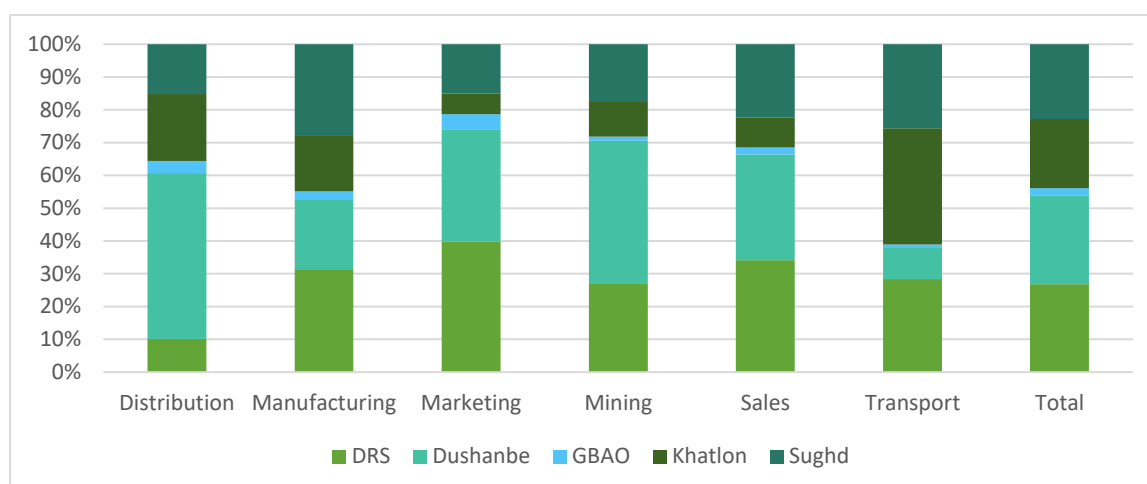


Source: Jobs in Value Chains Survey 2017.

4. Regions which are rich with mineral deposits have yet to contribute proportionately to the competitiveness of the CMVC.

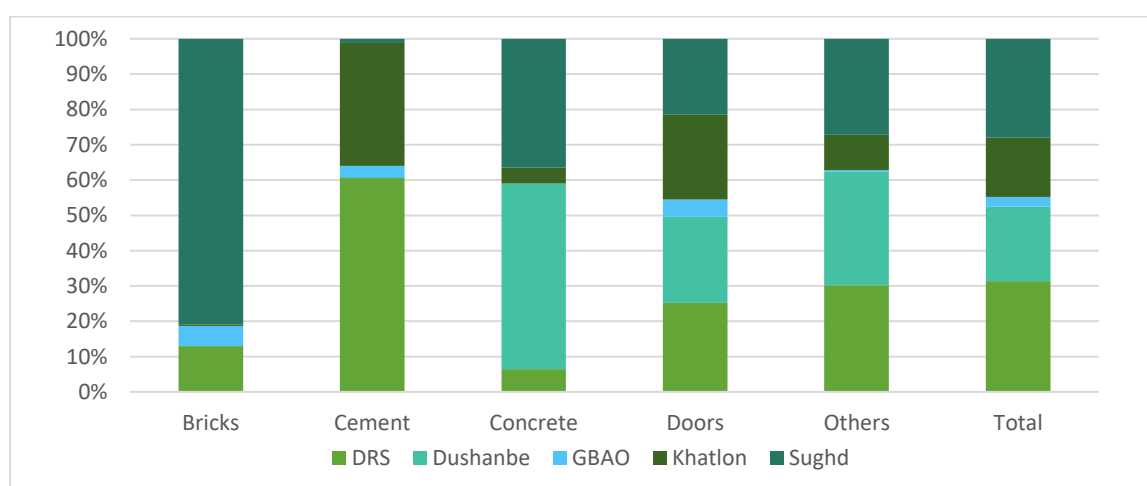
Overall, across all nodes, the regional distribution of companies is relatively even, with the exception of GBAO (see **Figure 25**). Some regions such as Sughd and Khatlon have fewer mining companies, but Sughd is strong in manufacturing and Khatlon is the largest in transport. GBAO has only 2.5 percent of companies across the all nodes of the CMVC. The region has some production of bricks, cement, doors, and windows, but absence of concrete manufacturing companies indicates that there are no large buildings being constructed in the region as the concrete production usually is located near construction sites (see Figure 26). On the other hand, the largest number of concrete and construction firms are in Dushanbe, corresponding to a high level of construction activity in the region. The consultations with firms suggest that many construction and concrete firms are vertically integrated even if they are registered under different legal entities.

Figure 25: Geographic distribution of firms by node



Source: Jobs in Value Chains Survey 2017.

Figure 26: Where construction materials are manufactured



Source: Jobs in Value Chains Survey 2017.

5. The limited demand for construction materials and the small size of the economy in Tajikistan force firms to integrate vertically to survive, especially in the construction industry, and to diversify outside of the core business to grow. Linkages between large companies and independent small suppliers are very weak.

The interviews showed that holding companies which comprise a range of very different businesses are widespread. For example, a holding company could combine three unrelated businesses like tourism, honey production, and manufacturing of ceramic tiles. Tajikistan's small and volatile market forces investors to diversify into other unrelated opportunities. Nevertheless, there are other examples like Huaxin Gayur Cement, which reached a market limit in cement on the domestic market, and invested in production of glass and plaster boards – both in the construction materials value chain. Most markets in Tajikistan are thin, with a few buyers and a few sellers. At the top, well capitalized contractors – typically construction companies – are oligopolistic and very few have the capacity to compete for large projects. The largest projects are government funded. When demand is small and state orders drive the firms' income, companies try to integrate vertically to have full control over the cost of inputs.

Although, most transactions are conducted through invoices, which can be issued electronically by a firm, the low share of written contracts and low share of value added of marketing and sales in the cost structure of firms

may reflect the fact that many companies are vertically integrated. Managers feel that this is not an efficient way to do business as it limits them to buying from the same supplier who does not have any incentives to improve quality or to bring costs down, knowing that they have a guaranteed customer.

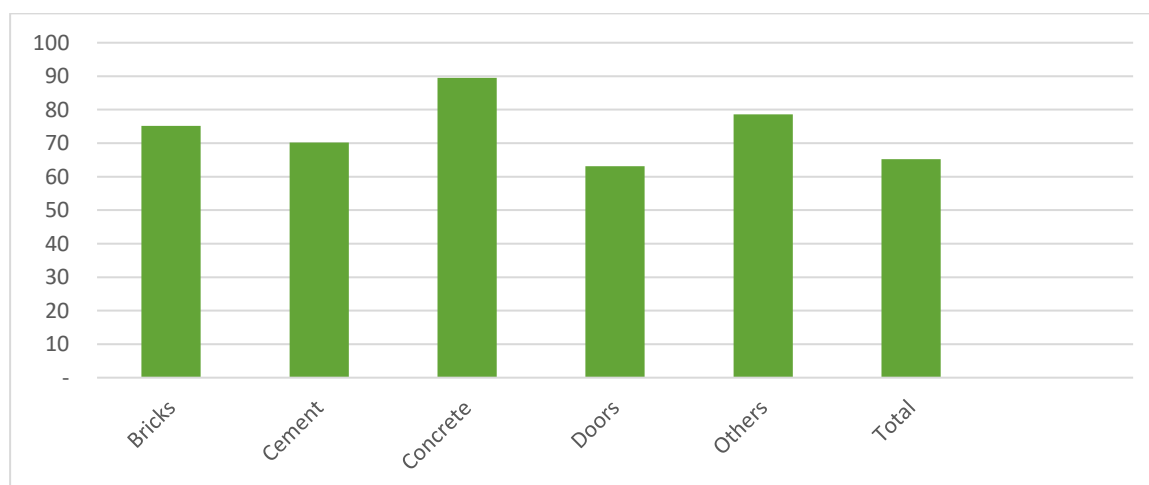
The semi-structured interviews revealed that the lack of a supply base for a wide variety of construction inputs creates problem for companies in all product segments and pushes them to diversify either into becoming an importer or a producer of those inputs. Small firms supply large ones with the basic products such as sand, gravel, concrete. However, when it comes to more sophisticated inputs, e.g. glass, plaster board, or features for windows, large companies have low trust that small local manufacturers will be able to meet schedules and quantity or quality requirements. Therefore, construction companies and large manufacturing firms are forced to import inputs for their own needs, as the market for the imported materials is undeveloped as well. For example, to keep costs down they are forced to import larger than needed quantities, and that pushes them to integrate forward as well and re-sell the imported items on the domestic market.

Small companies also try to diversify market risk by diversifying into the food or retail sectors. Some small companies expressed the desire to produce higher value-added products given that the financial and production know-how are accessible. For example, a small concrete manufacturing company was looking for business opportunities in retail clothing and food. However, at the same time they were looking to upgrade their core business by going into production of a higher value-added construction material – white cement. As the management lacked the information to execute this strategy on their own, they decided to form a joint venture with an Iranian company for production of white cement.

6. Access to finance and macro volatility emerge as the top obstacles. Companies lack access to finance, which is required to maintain or grow the businesses, especially in downturns. The high cost of doing business leaves companies without investment capital and pushes them into “shadow” operations.

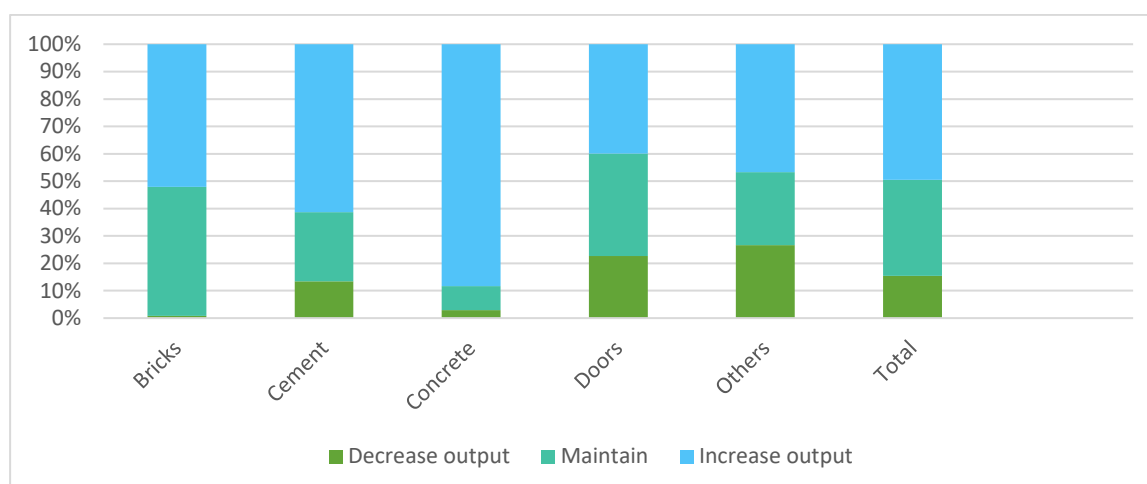
During the last two years, macro trends had an adverse impact on the demand for construction and for construction materials. There are no data on the number of companies that closed in this period. All the interviewed companies reported a 20 – 50 percent decrease of their sales in the years 2015-2016 due to the recession in Russia. The survey estimated that overall capacity utilization is 65 percent, an indication that the economy has not yet recovered fully (see Figure 27). On a more positive note, the semi-structured interviews and the survey observed a certain optimism in the sector due to the improving economic situation in Russia (see Figure 28).

Figure 27: Capacity Utilization in manufacturing (percent)



Source: Jobs in Value Chains Survey 2017.

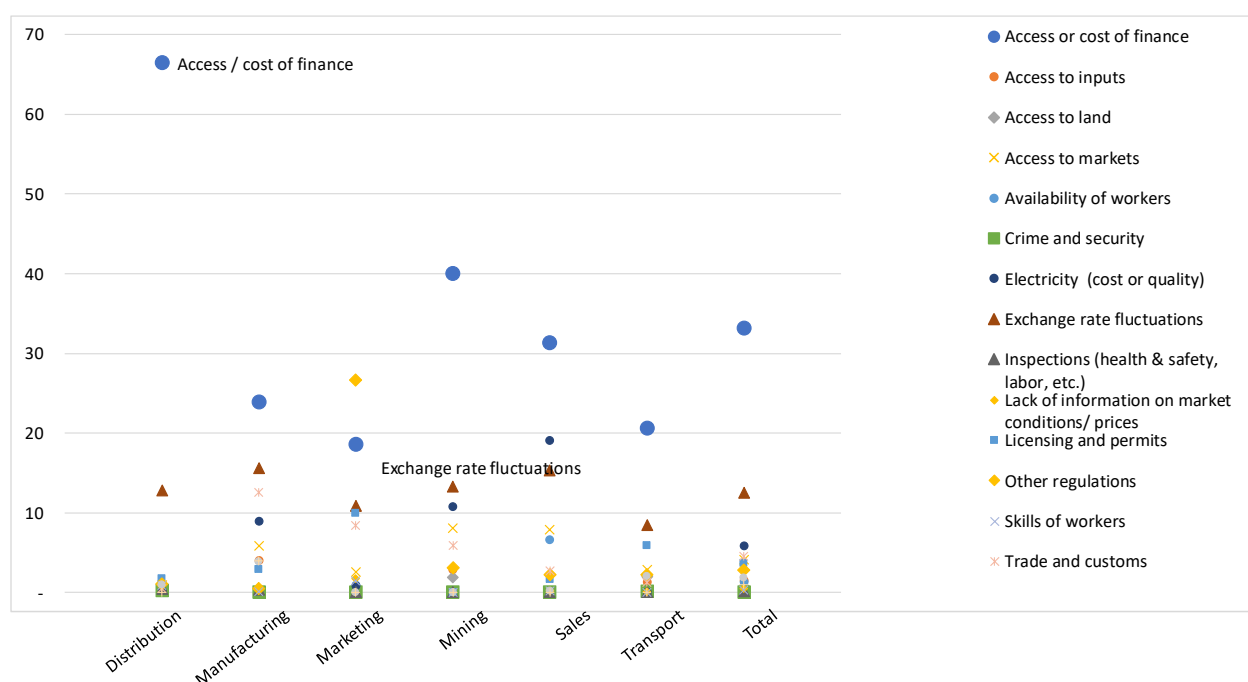
Figure 28: Expectations about the next year output



Source: Jobs in Value Chains Survey 2017.

However, to achieve this growth, companies need to surmount obstacles in the business environment. The survey reveals that companies consider exchange rate volatility and access to finance as the top constraints to doing business (see Figure 29), with firms in the distribution node feeling particularly capital constrained. Interviewed companies confirmed that they are looking for investment funds outside the country, and they do not consider a bank loan in Tajikistan as an option due to high interest rates (above 25 percent) and high collateral requirements (around 170 percent). Out of 19 interviewed companies only one confirmed that it benefited from government investment programs. For small and medium companies, some incentives are not applicable. The tax incentives cover only the import of new machines and equipment to produce construction materials. However, small and even medium companies can only afford second-hand equipment and therefore do not benefit directly from the import tax and VAT exemptions.

Figure 29: Top obstacles reported by firms in the CMVC



Source: Jobs in Value Chains Survey 2017.

The survey showed a high sensitivity to the questions on the top constraints. The results do not reflect those from the semi-structured interviews, where the most frequently mentioned constraints were red tape and the lack of qualified specialists. Arbitrary administrative procedures lead to lack of transparency where, for example, managers do not know what the effective tax rates will be, but they do have a strong perception of the overall tax/government burden for their business.

7. Few companies are export oriented. Even with sufficient resources, it will be difficult for them to diversify their business into higher value-added products and value-added jobs. FDI can play a major role in development of SMEs in the construction materials value chain.

The high cost of doing business and high transportation costs create disincentives for manufacturers of construction materials to export. However, the interviews identified some “soft” constraints specific to the CMVC, particularly in local SMEs’ limited export-related skills. All the companies interviewed highlighted a lack of knowledge of foreign markets and the inability to meet foreign requirements as strongly limiting factors or stressed that the foreign markets knowledge and the required skills are obtained through their foreign partner.

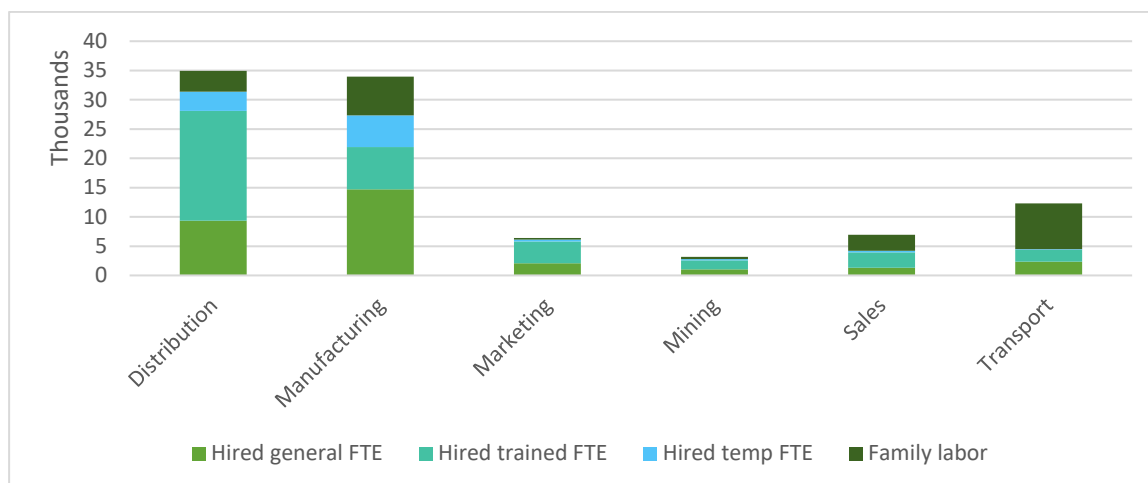
The comparative advantage of Tajikistan’s Construction Materials Value Chain lies in its low labor cost and the endowment of natural resources, overcoming the limits imposed by a small domestic market. To unlock the potential and develop the value chain’s competitive advantage, large investments are needed to provide capital and equipment, and the associated know-how. Recent investments made by Chinese investors in Tajikistan help to address the issues that the domestic firms cannot address alone, as they can provide the machinery and technology required to develop large quantities of high-value products. However, FDI can do more in helping to boost SME development in the value chain by providing specific technical assistance and training to improve the quality of suppliers’ production.

4.2 Jobs in the Construction Materials Value Chain

1.. The CMVC has almost 100,000 estimated jobs concentrated in the manufacturing and distribution nodes.

The survey estimate for total number of jobs in the CMVC is 98,000. Together, the distribution and manufacturing nodes in the CMVC generate an estimated 70 percent of all employment, approximately 35,000 and 34,000 respectively extrapolating survey data to the population (see Figure 30). The transportation and sales nodes consist primarily of self-employed individuals, and together they account for an estimated 20 percent of jobs in the construction materials value chain. While large companies provide a third of all employment, they are responsible for most of the higher valued added jobs. Chapter 5 discusses the potential job creating potential of the CMVC under certain conditions.

Figure 30: Employment and workforce composition by node



Source: Jobs in Value Chains Survey 2017.

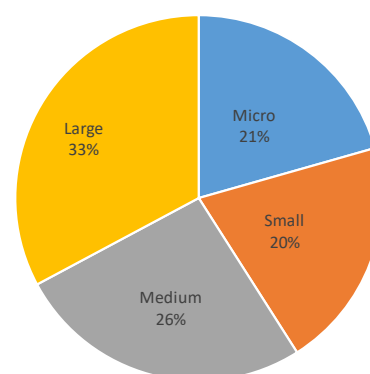
2. Microenterprises and self-employment are important job generators in the value chain. These firms maintain flexible workforces, using family and temporary workers, to stay nimble and survive, but also possibly to stay under the “tax radar”.

Micro firms and small firms each account for about a fifth of employment even though they make up an estimated 94 percent of all firms in the sector (see Figure 31). Medium-sized firms account for another 26 percent of total employment

In terms of workforce, micro firms rely heavily on family labor which makes up 42 percent of their FTEs. In comparison, family labor accounts for less than 2 percent of workers in small, medium, and large firms.

Medium firms on the other hand are much more likely to rely on temporary labor than other firms. Temporary workers account for 18 percent of the labor force in medium firms compared to 10 percent of the total employment in the sector. They are also important in small businesses such

Figure 31. Employment by size of firm



as small manufacturers of windows, cement products and unbaked bricks. These manufacturers use unsophisticated technologies that utilize a high proportion of manual labor. The interviews confirmed that temporary labor allows them to keep capacity flexible and be able to respond to orders without increasing permanent labor costs. When an order exceeds their production capacity, they hire temporary workers.

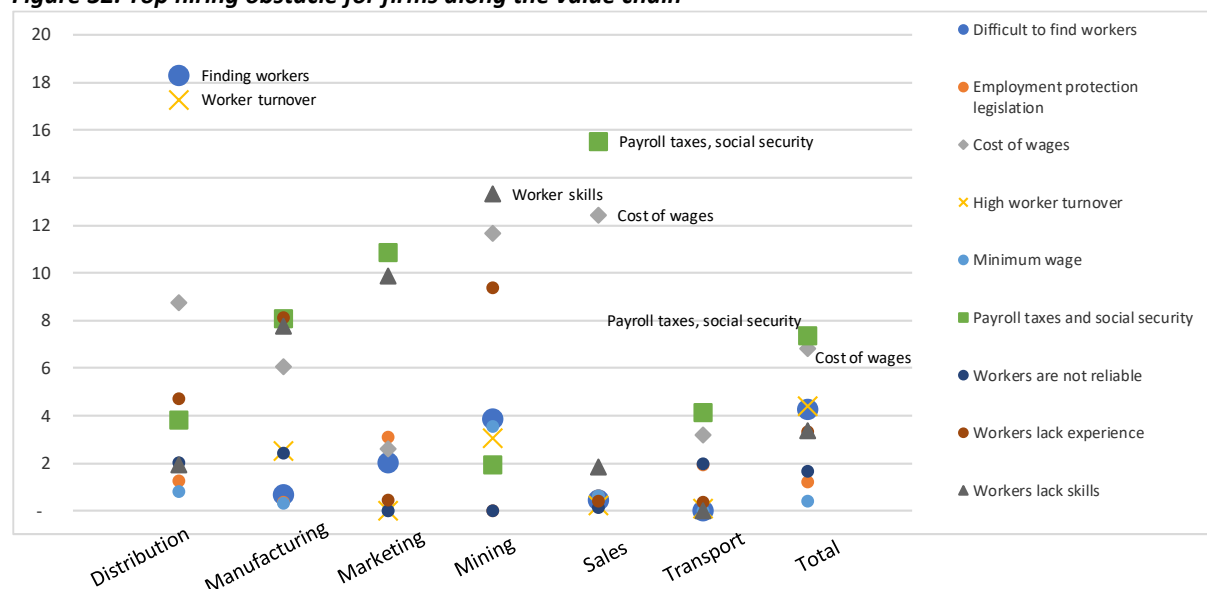
On the regulatory front, micro companies or individual entrepreneurs may hire up to 4 people and take advantage of a simplified tax system.²⁷ Many micro businesses are spun out from large firms to take advantage of this regime and remain as their “satellites”, mainly working for them. The social security and payroll taxes as well as the cost of wages are named as a top hiring obstacle in the survey and there is some evidence that smaller firms underreport employment and wage data.

3. The high level of unregistered employment and underreporting of wages could impede firms transition to higher value-added products and services. Family labor accounts for 42 percent of employment in micro firms. Overall, social security and payroll taxes as well as the cost of wages are named as a top hiring obstacle in the survey (see Figure 32). Anecdotal evidence from semi-structured interviews as well as the discrepancy between the number of firms and industry employment as reported by MINT and the estimates based on the survey suggest that firms underreport employment and wage data. Respondents in the semi-structured interviews

²⁷ The simplified tax system, which is 6 percent (5% in manufacturing) applies to companies with sales less than 1 million somoni (approx. \$114,000).

pointed out that firms continue operating as IEs even after they grow beyond four employees to take advantage of the simplified tax regime that IEs enjoy. This tendency to avoid wages and payroll taxes pushes firms in a low equilibrium settling for low value-added activities that can be carried out by unregistered workers. Upgrading to higher value-added activities is already technically challenging, and the difficulty of hiring qualified workers without paying their social taxes creates further barriers to upgrading.

Figure 32. Top hiring obstacle for firms along the value chain

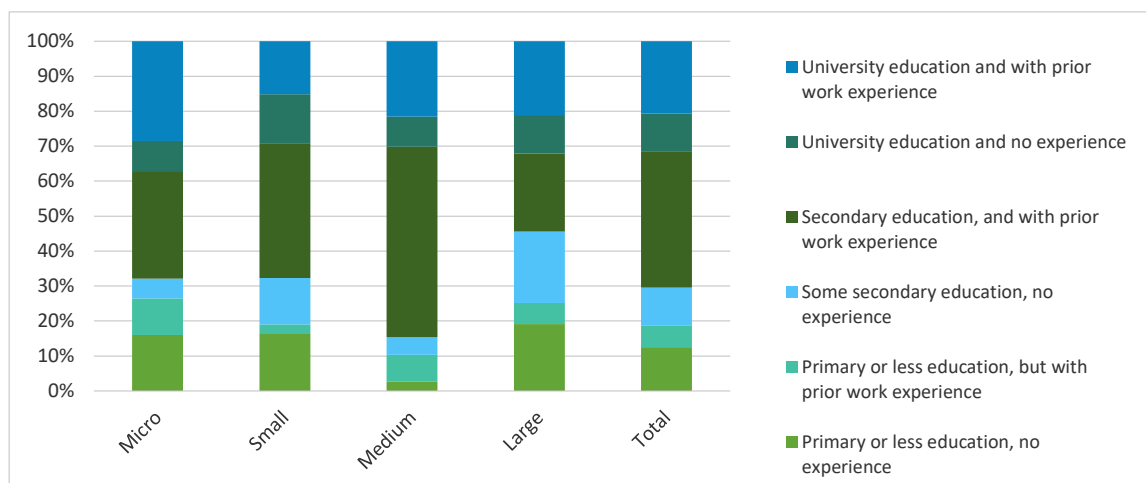


4. The lack of market information and managerial capabilities, coupled with the scarcity of highly qualified specialists, emerge as binding constraints for moving to higher value-added products and jobs in the CMVC.

Despite the fact that managers emphasized the importance of skills and experience both in the interviews and in the survey, only 20 percent of trained workers have prior experience, illustrating a shortage of qualified labor (Figure 34). There are two main reasons. First is the high level of migration of qualified labor to Russia. The second reason is inadequate supply of qualified labor by educational institutions to meet private sector requirements. Education institutions are experiencing declining standards, funding difficulties and unequal access to education across regions and among gender categories.²⁸ A university degree in engineering is important for working with new technologies. General low skilled labor and family members account for more than 60 percent of the workforce. Around 30 percent of hires have a university degree. Prior experience is an important prerequisite for hiring. Sixty-five percent of workers have prior experience.

Figure 33: Educational levels of hires for last 3 years

²⁸ Tajikistan. Promoting export diversification and growth. Country Diagnostics Study, ADB, 2016.



Source: Jobs in Value Chains Survey 2017.

The interviews and the focus group discussion revealed an acute shortage of middle management with the knowledge and skills for technology-based production processes. These include design engineers in precast concrete companies with “know-how” that is critical for areas such as ready-mix concrete production. Other specialty areas include asphalt production and laying. The way the product has been laid, the weather conditions and how the material has been stored, can all affect the product’s performance. Qualified operators of construction cranes and other construction equipment are also in demand. The large cement companies resorted to hiring Chinese engineers on managerial positions and had a high number of Chinese workers during the first two years of operation.

Among smaller firms an alarming reality is that management lacks an appreciation of the skills gap that needs to be closed in order to grow the business towards higher value-added products and services. The lack of access to a labor pool with managerial skills was not cited as a binding constraint. Firms lack capacity or awareness in managerial accounting, financial management, defining the strategy, development of the sales forecast or sales plans. The management style is largely based on intuition and nepotism is common.

These capacity constraints impede the attraction of FDI in the sector as well as the transfer of technology and knowledge through foreign investment or through linkages between firms in the sector. Participants in the focus group highlighted the limited new technology absorption skills of firms as a top obstacle to transitioning towards more sophisticated products and services, particularly among SMEs in the manufacturing node. This limits the possibility of creating successful links with the local industrial base, for instance to source the inputs needed or outsource specific steps of the production process. Large companies emphasized a lack of specialized technical labor and outdated/insufficient equipment as barriers to integrating small local manufacturers into the supply chain as they fail to meet quality requirements. The specific technical skills that need to be developed will require a sector-specific skills assessment.

Chapter 5: Scenarios for growth and job creation in the construction materials value chain

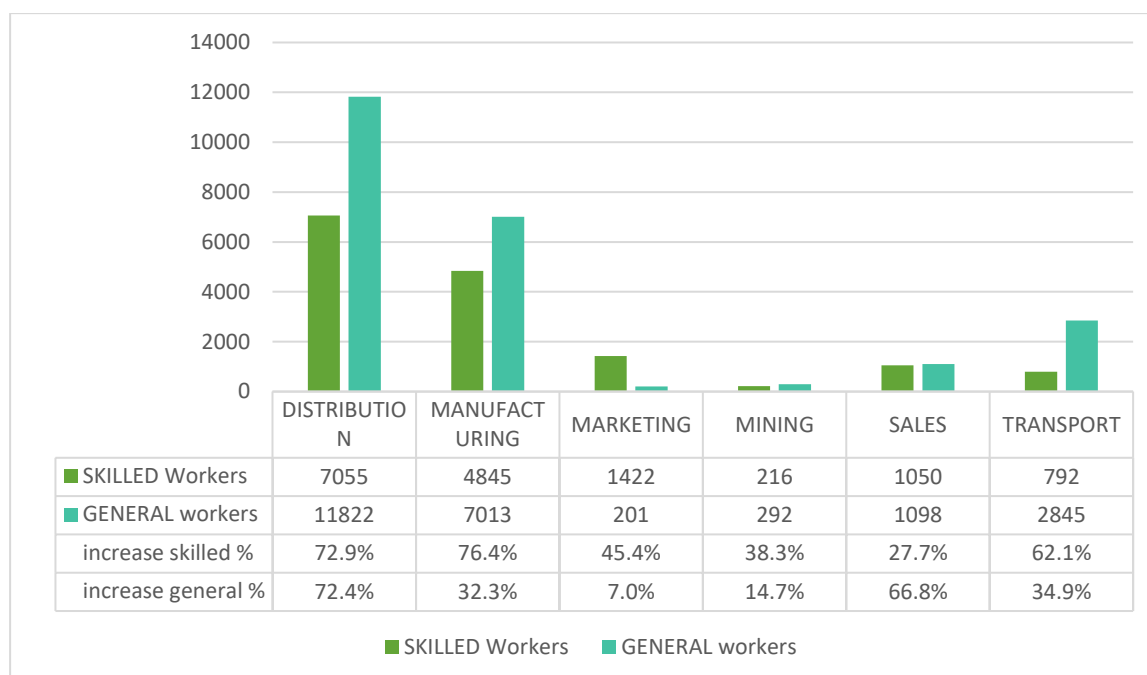
What might be the jobs potential for the construction materials value chain in Tajikistan? Having a perspective on the job creation potential of various scenarios may be valuable to policy makers to a priori gauge the impact of interventions and policies to support the sector in order to enable more job creation. However, assessing the potential jobs growth in the construction materials value chains is somewhat complicated due to the complex and often nonlinear relationship between the nodes that makes estimating the value added and related new job creation more challenging. Nevertheless, despite these difficulties, two scenarios of jobs growth potential of the value chain are possible to estimate: establishing a new manufacturing plant and doubling of sales across all nodes of the value chain.

The first scenario estimates the potential effects of introducing a new plant (concrete, asphalt, cement, and masonry) to address Tajikistan's growing needs of development of materials for home and road infrastructure. Under this scenario, we estimate that a new plant with average annual sales of 800 million Somoni (approximately \$90 million) would generate 179 skilled jobs and 465 general direct jobs.

A second scenario estimates the potential new jobs resulting from theoretical new 3-year contract that would effectively double the sales of the construction materials firms. The respondents were asked to estimate the job growth potential from the sales increase. Under this scenario, we assume that all demand is met by adjustments of the production factors including labor. Given the large scale of such a hypothetical scenario (it involves the entire value chain) the employment impact would be much higher than in the first scenario. This essentially represents a best-case scenario that shows the potential for jobs increase if the overall business environment conditions improve for the entire construction materials sector.

Figure 34 shows that the total sales increase (sales doubling) could create a substantial number of jobs across all parts of the chain. Overall, the initial analysis indicates this scenario could result in over 35,000 new jobs including over 15,000 permanent skilled jobs and over 23,000 general jobs. Two nodes – distribution and manufacturing – would account for the bulk of the increase, i.e. about 80 percent of the overall increase and about 81 percent of the general jobs. Only marketing and sales nodes would generate mostly skilled jobs while all other nodes predict hiring more general workers vs. skilled workers under this scenario. Distribution node has the highest jobs to total sales elasticity (73 percent average increase) and the marketing node has the lowest elasticity for general workers of just 7 percent.

Figure 34: Breakdown of job creation potential related to doubling of output - by job type and node

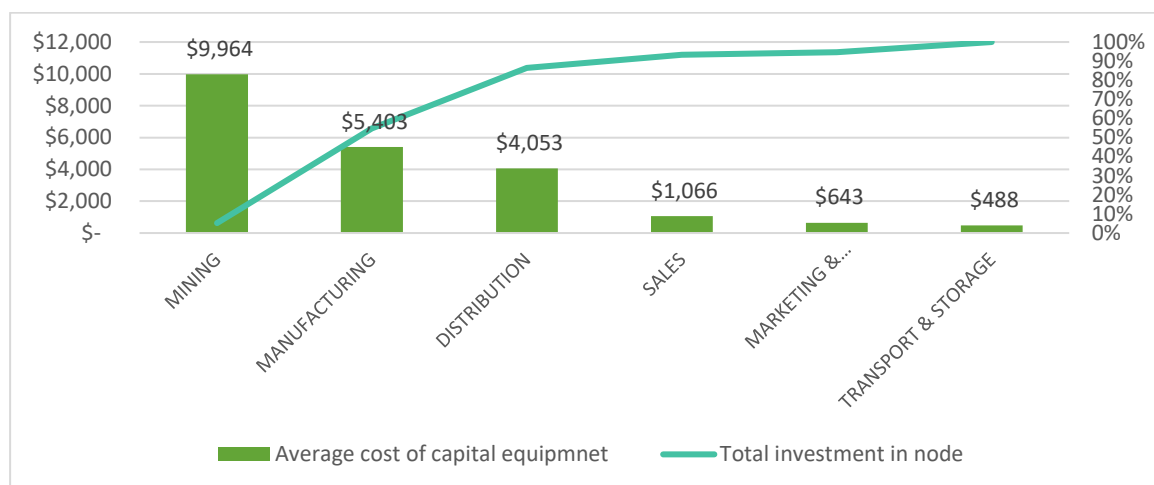


Source: World Bank staff estimates based on the results of the Tajikistan Jobs in Value Chains Survey.

Looking at alternative but complimentary angle to the job scenario above is to estimate the need for new capital equipment (see Figure 35 below).²⁹ The mining node, as expected, would need the highest investment in capital (\$9,964, on average) while sales (\$1,066), marketing and promotion (\$643) and transport and storage (\$488) have relatively lower capital requirements. Manufacturing (\$5,403) and distribution of construction materials and related products (\$4,053) are in the middle, however those nodes would require 80 percent of the overall investment in the value chain to double output in the construction materials space.

²⁹ The estimated capital increase, per node, excludes outliers defined as respondents assuming they will need 20 times the size of the current capital equipment to meet the scenario.

Figure 35: Average cost of the new capital equipment required to meet the labor increase for doubling of output



Source: World Bank staff estimates based on the results of the Tajikistan Jobs in Value Chains Survey.

Chapter 6: POLICY RECOMMENDATIONS

This final section identifies the key improvement needs for enhancing job creation while stimulating CMVC competitiveness. Based on the findings of the survey, recommendations have been formulated with concrete actions for stimulating development for the next 12 months.

6.1 Priority areas for improvement

There are several positive trends in the recent development of the CM VC. The sector has benefited from the recent inflow of FDI in terms of technological upgrading and the increase of exports in the region. While Tajikistan ranks low in the World Bank's ease of doing business rankings (128th out of 190 in 2017, up from 130 the year before), the government has been taking measures to streamline the procedures to get construction permits, access to land and quarries. There is ongoing work to make the application process for construction permits electronic.³⁰ It has become easier to register property, get electricity, and pay taxes (tax declarations can now be done electronically). In 2013 Tajikistan assumed full membership in the World Trade Organization (WTO). The construction materials sector is high on the government's agenda, but more importantly in the medium-term program "on Export Promotion and Import Substitution for 2016-2020" the government developed a comprehensive set of measures that target all areas that are impeding the competitiveness of the private sector in the country.³¹

Recommendations are organized in three areas:

- (1) **Access to information:** Create a business-friendly enabling environment for companies engaging in the construction materials value chain by developing a one-stop shop web portal with all the necessary information for doing business;
- (2) **Supplier development program:** The CMVC in Tajikistan is currently natural-resource driven, and will continue to be for the near future. Managing the mining segment of the CMVC successfully is critical for the value chain's development, but even more important in the long run it so enable the evolution of a vibrant SME sector upstream and stimulating supply linkages and technological exchange with downstream companies.
- (3) **Business development services (BDS):** Strengthen the management skills and build capacity to encourage deepening linkages within the value chain and upgrading to higher value-added activities.

Details of each of the three recommendations:

(1) Access to information on business regulations relevant for the sector:

One of the ideas discussed in the focus group with the participation of the CMVC companies and State Investment Committee was to create a web based portal, which would at the same time become the PPD platform and one-stop-shop for companies to get all relevant information for doing business. Information could be provided on:³²

- opening and closing a company in mining, production, construction, services, etc. How to get all necessary permits, licenses, certificates, and their cost;
- tax regulations and company inspections;

³⁰ Interview with the Committee of Architecture and Construction of Tajikistan

³¹ State program on "The Support of the Export Promotion and Import Substitution for the period of 2016 – 2020".

³² Development of the web portal is already envisaged in the Entrepreneurship Support State Program.

- potential export markets for construction materials;
- imported construction products to Tajikistan;
- new and innovative construction products for the Tajik market, which could be imported or produced locally;
- international exhibitions in the field of construction, architecture, and construction materials;
- government and donor programs in the field of private sector development; and
- access to finance information.

In addition to accessing the above information companies would be able to:

- advertise their job vacancies on the website;
- receive online training in the field of construction materials available in the Tajik language; and
- Participate in an anonymous forum on selected topics for discussion.

As feedback is received from the government and the private sector, new services will be added to the web portal. There are two important features that would potentially bring more users to this portal:

- it should be updated weekly and,
- information about tax regulations, inspections, regulations about opening or closing businesses, licenses, permits, etc. should be comprehensive and bear the approval signature from the relevant governmental authorities.

While initially development of such web portal can be financed by a government or donors, over time the ownership can be transferred to a sectoral association and be financed by member dues.

2. Enable the evolution of a vibrant SME sector upstream and stimulating supply linkages and technological exchange with downstream companies. The Construction Materials Value Chain (CMVC) in Tajikistan is currently natural-resource driven, and will continue to be for the near future. Managing the mining segment of the CMVC successfully is critical for the value chain's development.

The first priority is the creation of a world-class regulatory environment for the companies in the CMVC which are involved in mining activities. Such a regulatory environment must be based on the principles of open and fair competition which enables access to quarries, licensing activities, development of fair fees, elimination of unnecessary and burdensome procedures and inspections, and at the same time introduces global standards for mining, including environmental, health and safety regulations. Regulations need to encourage the upgrading of activities in the value chain. As these topics are outside the scope of this study, further work is needed to explore the needs and formulate recommendations.

The second priority is the transition of small and micro companies from primary or low value-added processing to manufacturing of higher value-added products, thus enabling them to grow and increase their sustainability in the market. Investment in simple equipment, tools and parts for mining and processing is an important, positive step in this direction. Being located near China, firms need to be encouraged to exploit the opportunities of integration in regional industrial value chains, just as the Central European countries were successfully integrated into the value chains around the German industry ('Factory Europe').

Linkages between local companies and foreign construction companies, multinational producers of construction machines and products, can take many forms. Foreign producers are already establishing forward linkages with local companies (in distribution of machines and equipment) that represent them on a local market, sometimes outsourcing the distribution of their brand name and provide after sales services.

However, the economic spillover effect is bigger, especially in terms of jobs development, when multinationals establish backward linkages with local suppliers. These linkages increase the demand for the locally produced construction materials and provide technology transfer in the industry. There are several reasons why a foreign investor avoids working with local suppliers. The most important are SMEs' capabilities to deliver required quality

and quantity, and to meet schedules. One successful example is the Singapore Local Industry Upgrading Program (see Box 1).

Box 1: Singapore's business linkage program

Singapore's growth history is marked by foreign enterprises expanding their operations in the city state. MNEs now account for more than two-thirds of manufacturing output, and FDI has contributed more than 50 percent of total domestic investment in the last 25 years.

As early as 1961, the Economic Development Board was established as a platform for different ministries to increase FDI inflows in strategic industries. The initial focus was on labor-intensive manufacturing, which then moved to higher value-added industries such as chemicals and electronics and more recently to product development, biomedical and R&D.

The early and large presence of foreign investment in Singapore generated strong demand for local partners. An investment-friendly environment, coupled with an educated workforce and the will to develop a strong SME sector through financial assistance and development program allowed multinational enterprises to naturally establish strong relationships with local SMEs.

Nonetheless, further promotion was put in place through government policies that actively targeted FDI-SME linkages. The flagship initiative in this area has been the Local Industry Upgrading Program (LIUP). The program was established in 1986 to strengthen and expand the pool of local suppliers to foreign affiliates by enhancing their efficiency, reliability, and competitiveness.

LIUP supports the transfer of technology, marketing, and business knowledge from MNEs to local SMEs. Its activities are implemented through organizational and financial support, for instance by contributing to the salary of MNE experts seconded to local suppliers or by organizing workshops to the direct benefit of SMEs.

MNEs are encouraged to adopt SMEs in their value chain through a three-stage approach:

Stage 1: improvement of operational efficiency of SMEs, making them capable partners for MNEs.

Stage 2: introduction and transfer of new products and processes from MNEs to SMEs.

Stage 3: joint product or process research and development between MNEs and SMEs

The scheme has borne recognized success, involving important foreign enterprises including Hewlett Packard, Matsushita, and Honeywell. By 1999, 30 MNEs and 670 local suppliers were taking part in the program. Studies conducted in participating companies found that, in the early years of partnership with large firms, suppliers improved average productivity by 17 percent.

Source: Linking multinational enterprises and Armenian SMEs, The case of the construction materials sector, OECD March 2015

Thirdly, it would be important to enhance the private sector's absorption capabilities of global technologies through licensing or trade, while in parallel constantly upgrading the quality of the qualified workforce and engineers. Due to the lack of access to information and finance, SMEs typically buy second-hand, outdated or even fully depreciated equipment which impedes their ability to leverage the latest technology on the market. Large companies purchase new machinery, equipment or software, but they should be encouraged to cooperate with the universities and R&D institutes to develop their own solutions.

The fourth and important priority is to enable SMEs to grow through business linkages along the value chain by increasing the involvement of local suppliers in the purchasing and procurement process of construction companies.

To achieve this objective a **Supplier Development Program** could be developed for the construction sector (among others) which would aim to improve the technical capabilities of SMEs. The program would assess and select high-potential firms for intensive technical assistance and training. It would also facilitate partnerships with buyers to allow suppliers to gain new business. The firms that complete the program would become approved suppliers to large construction companies. The incentive for the construction company to participate in this program is a combination of cost savings, mainly from logistics, as well as the reliability and flexibility that comes from using local suppliers.

Studies on the construction industry suggest that moving to collaborative procurement practices, meaning better integration among homeowners, designers, builders, suppliers, and sub-contractors in procurement, should be encouraged. Therefore, effective communication and increased collaboration across the supply chain is strongly needed. This will result in achieving better quality and value for money, as opposed to securing lowest cost. Consequently, educating the industry on the benefits of collaborative procurement methods is a prerequisite.

The key to achieve better collaboration in the CMVC is good communication. Good communication between the various supply chain parties can provide efficient and effective information sharing, which could result in the provision of the correct construction materials from raw materials to the downstream end of the supply chain. Overall, improved collaboration can increase the efficiency and effectiveness of the entire supply chain.³³

An increased information flow due to greater collaboration would improve the understanding of construction materials in terms of warranties, prices, on-time delivery, pre-ordering requirements and the like. Moreover, the use of modern technologies (smartphones, computers, the Internet) could substantially help to improve information flow across the supply chain.

The Slovenian example (

³³ Don Amila Sajeevan Samarasinghe. Building Materials Supply Chain: An Evaluating Study of the New Zealand Residential Construction

Box 2) can serve as a model for a supply value chain development program. Matching grants would be useful instruments for engaging firms of different size into the joint projects along value chains and end markets.

Box 2: Slovenian Program to Strengthen Enterprise Networking and Cooperation

The “Strengthen Enterprise Networking and Cooperation” program was a key component of Slovenia's industrial policy. The aim was to upgrade the region's competitive advantage by stimulating manufacturing and continuous technology change through intra and inter-firm dynamics. The design of the program was based on the identification of factors responsible for the relatively low competitive advantage of the Slovenian economy in the late 1990s. Slovenia's growth rate was on average 2 percentage points below the EU-15, manufacturing gross value added per employee was one-third the level of the EU-15, and the value added per employee of SMEs in Slovenia was €17,000 compared with €65,000 for the EU-15.

The mapping study assessed the relationships and linkages between companies in selected Slovenian industries. The research was conducted through an examination of statistical data and through a number of interviews within enterprises. The principal findings were that the relationship and linkages between firms along the value chains were weak, and that the networking and cooperation necessary to promote innovation, diversification, and creation of products with higher value added did not exist. The study pinpointed the types of business development services that could support and stimulate linkages and supply chain development.

The Slovenian government launched a supply chain development program to overcome the problem of very weak linkages that existed between enterprises. The government co-financed projects involving a minimum of five companies (and institutions like universities), along value chains in the fields of marketing, product development, technology improvements, and the specialization in supply chains. About 330 projects involving integration of companies and specialization in value chains were conducted in 2001-2004.

Subsequent evaluations demonstrated that the program was especially important in developing links between large companies and SMEs. SMEs and large firms had a positive experience, learned to appreciate the need to work together, and thereby improved their individual and combined longer run competitiveness through the deeper interchange of knowledge, market understanding, skills, and technologies. Almost two thirds of the supply chains and networks created are continuing with joint development activities and undertaking important investments which further support cluster development.

Source: CLUSTER development in the Czech Republic and Slovenia / editors Tea Petrin, Pavla B uskov , Magdalena Bialic-Davendra. - 1st ed. - Ljubljana: Faculty of Economics, 2014, OECD, Business Clusters: Promoting Enterprise in Central and Eastern Europe, OECD 2005. Promoting enterprise interactions, specialization in value chains and the joint development of international markets: final report on the study, Mateja Dermastia, Ministry of Industry and SMEs, Ljubljana, 2000

3. Business development services (BDS): Strengthening management skills and capacity building to encourage deepening linkages within the value chain and upgrading to higher value-added activities.

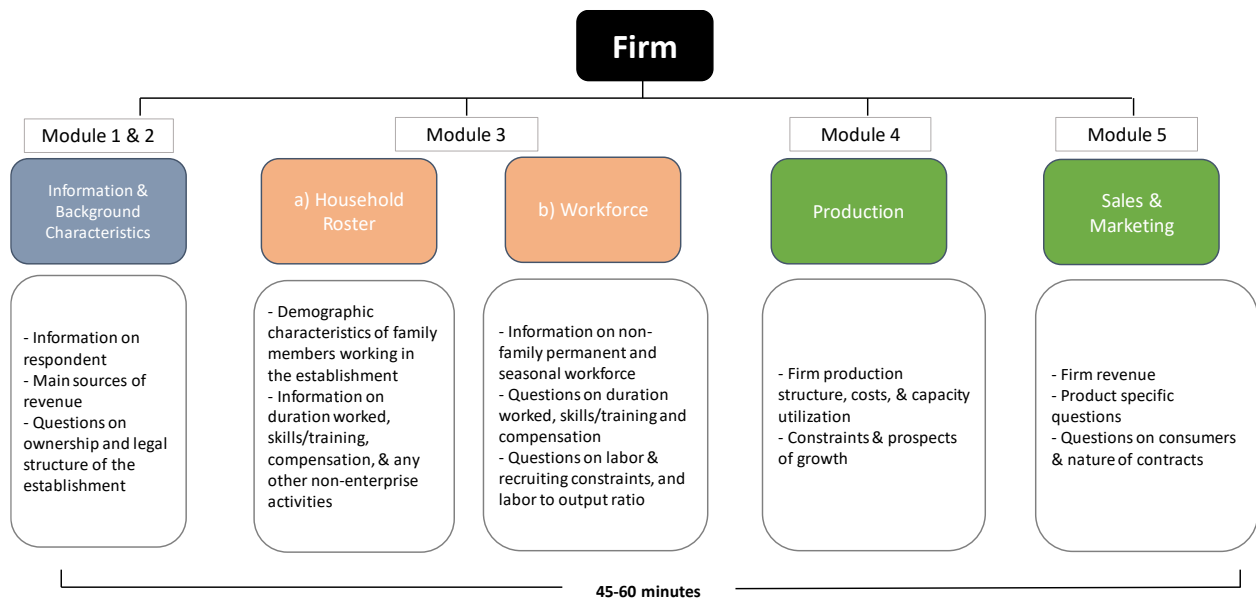
For the supply development model to work it is critical to have a coherent and professional management with knowledge of value chain issues, proper delineation of public and private sector roles, and a thoughtful combination of international and local skills in building the institutional capacity. An independent, non-partisan agency with strong business skills and subject matter expertise will need to manage this work and facilitate Public-Private Dialogue between the government, private sector firms and other key stakeholders.

Such an Agency must have experience in the best business management practices and the ability to apply these to Tajik realities. These skills are currently weak or lacking in Tajikistan. Therefore, in the initial stage of Project implementation there is a need to develop skills through intensive on-the-job experience (working in specific enterprises) and classroom training of selected local consultants. At the beginning of the Project, an international consulting firm will be hired to work with the Agency. The local consultants will be selected on a competitive basis by the international firm and trained in enterprises for one year. The international firm will also select, from a long list, the enterprises that it will be working with individually or in groups during the first phase of the Project. The first phase of the Project will both build local consultant skills and identify promising areas for developing the supplier development approach. In the second and subsequent phases of implementation, emphasis will shift to working with specific groups of companies from the CMVC.

Best practices from Moldova, Georgia, and Ukraine used a secondment model that proved to be effective in post-Soviet countries could be also considered. The following activities were common across the centers and agencies in those regions:

- On-the-job training of local consultants with the elements of the interim management in companies that will become the beneficiaries of the project and their participation in study tours abroad;
- Foreign internships exposing managers of non-participating companies to modern concepts of management through practical internships in leading firms abroad, and for participating companies, through organization of short-term study tours abroad; the Agency designed, subcontracted, and monitored a 6-month in-house foreign language course for managers and training in business essentials that was given prior to a 2-month secondment to foreign companies. The cost of language and business courses was covered by the companies.

Annex I: Overview of survey instrument: construction materials



Annex II: Sample Design and Weighting Procedures for the Tajikistan Jobs in Value Chains for Construction Materials

1. Sample Design for Tajikistan Jobs in Value Chains Survey

The Tajikistan Jobs and Value Chain Survey was designed to cover two separate value chains (Construction Materials and Tourism), in selected regions of Tajikistan. The overall sampling strategy is described in the report on “Sampling Strategy - Value Chain Analysis of Construction Materials and Tourism Sectors in Tajikistan” (Anteja ECG, Ljubljana, Slovenia, November 2016). A stratified one-stage sample design was used for each Value Chain (VC) Survey. A summary of the sample design for each VC Survey is provided here as a background for describing the weighting procedures.

1.1. Sample Design for Construction Materials VC Survey

The sampling frame of firms for the Construction Materials VC Survey was developed from a business register and other sources to cover the following 6 nodes of the VC:

Nodes for Construction Materials VC

1. Distribution
2. Manufacturing
3. Marketing and promotion
4. Mining
5. Sales
6. Transport and storage

The sampling frame of firms for each node of the Construction Materials VC was further stratified by 5 regions and 4 firm size categories, as follows:

Regions

1. DRS
2. Dushanbe
3. GBAO
4. Khatlon
5. Sughd

Firm Size Categories

1. Large
2. Medium
3. Small
4. Micro

The original sample of 500 firms for the Construction Materials VC was allocated to the node by region by size strata based on the distribution of the frame in such a way as to have a representative sample across each dimension. Some of the stratification cells had few firms, so they were combined with the next size category within the same node and region. Within each stratum the sample firms were selected with equal probability. During the data collection, it was found that some of the selected firms were no longer functioning or not operating in the target sector (that is, out-of-scope), and there were also non-interviews due to refusals or the address could not be found. All of the sample firms that could not be interviewed were replaced with other firms in the frame from the same stratum as much as possible.

2. Weighting Procedures for Tajikistan Jobs in Value Chains Survey

In order for the sample estimates from the Tajikistan Jobs and Value Chain Survey data to be representative of the population of firms, it is necessary to multiply the data by a sampling weight, or expansion factor. The basic weight for each sample firm is equal to the inverse of its probability of selection.

As described above, a stratified one-stage sample design was used for each VC Survey. The sample firms in each node by region by firm size stratum were selected with equal probability. The probability of selection for the sample firms in each stratum of the Construction Materials and Tourism VC Surveys was calculated as follows:

$$p_h = \frac{n_h}{N_h},$$

where:

p_h = probability of selection for the sample firms in stratum h

n_h = number of sample firms with completed interviews in stratum h

N_h = number of firms in the frame for stratum h

The values of n_h and N_h for each stratum are shown in Annex A for the Construction Materials VC Survey and in Annex B for the Tourism VC Survey. The basic weight for the sample firms in each stratum is the inverse of this probability of selection, and can be expressed as follows:

$$W_h = \frac{N_h}{n_h},$$

where:

W_h = basic weight for the sample firms in stratum h

Given that some of the firms in the frame for each VC Survey were found to be ineligible because they were no longer functioning or not operating in the target sector, it was necessary to adjust the weights to take this into account. The information on the interview status of all of the sample firms that were contacted during the survey, including both the original sample and reserves for replacement, was used to estimate the proportion of the firms in the frame for each stratum that were eligible.

In order to adjust the basic weights, the estimated proportion of the firms in the frame for each stratum that were eligible was estimated as follows:

$$p_{Eh} = \frac{n_{Eh}}{n_{Eh} + n_{NEh}},$$

where:

p_{Eh} = estimated proportion of firms in the frame for stratum h that were eligible

n_{Eh} = total number of contacted sample firms in stratum h that were considered eligible, including the firms with completed interviews

n_{NEh} = total number of contacted sample firms in stratum h that were considered not eligible (no longer functioning or not operating in the target sector)

The final weight for the sample firms in each node by region by firm size stratum was calculated by multiplying the basic weight for the stratum by the estimated proportion of eligible firms in the frame for the stratum, as follows:

$$W'_h = W_h \times p_{Eh},$$

where:

W'_h = final (adjusted) weight for the sample firms in stratum h

3. Outlier adjustment

For the purposes of the analysis a number of outlier responses were excluded from the analysis at the indicator level. Outlier responses were identified manually based on logical inconsistency with the rest of the responses of the firm and were only excluded from the analysis after a follow up call to the respondent failed to provide a satisfactory response.