

**Final report**

# Does management training and consulting services improve working conditions, worker skills and productivity, and firm performance in SMEs?

Evidence from the construction industry in Mozambique

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## **IGC Project 36204**

# **"Does management training and consulting services improve working conditions, worker skills and productivity, and firm performance in SMEs? Evidence from the construction industry in Mozambique"**

## **Scoping Project**

**Renata Lemos**

### **1. Objective**

In this scoping project, we assess the feasibility of a management training and consulting experiment in the construction industry by (1) identifying the potential sample of firms which would take part in a management training and consulting experiment and (2) engaging with potential partners to discuss in more detail the provision of consultancy services to these firms and performance data collection.

### **2. Introduction**

In recent years, economists have started to pay attention to management practices and have found that certain practices are also strongly associated with differences in performance (Bertrand and Schoar, 2003; Black and Lynch, 2001; Bloom and Van Reenen, 2007; Bloom et al., 2014; Ichniowski et al., 1997).

Searching for a causal link between management and performance, Bloom et al., (2012) provide estimates of the impact of management practices on firm performance through randomized field experiments with multi-plant Indian textile firms. The treatment intervention introduced basic modern management practices for factory operations, inventory control, quality control, human resources and planning and sales. They find that even in the short term the intervention led to significant improvements in quality and lower inventory levels, which they estimate to have increased productivity by over 10% and profitability by \$330,000 per year.

The next step in this research agenda is to understand the causal link between management and several other firm-related outcomes such as working conditions, worker skills, worker productivity as well as firm performance.

Lemos and Scur (2015) study management practices in Medium and Large firms in Mozambique and report that overall Mozambique is at the bottom of World Management Survey country ranking (of 35 countries) but that there are large gaps between the best and the worst managed

firms within Mozambique. The authors suggest that its position and overall productivity could be significantly increased by raising the management quality of Mozambican firms especially in the lower tail of the management distribution. This could be done by:

- **Improving Workforce Education and Skills:** Adapting existing successful initiatives within the Technical and Vocational Education and Training (TVET) reform framework to add a management practices training component such as (a) offering technical training and workshops to current managers and employees, (b) taking into account and incorporating the types of managerial skills needed and previously identified in each sector, (c) offering government-supported apprenticeships programs in partnership with private organizations and industry in order to train and develop the youth workforce and to provide an avenue for matching workforce skills and firm-specific management practices.
- **Closing the Information Gap:** (i) Creating management demonstration projects, showcasing modern management techniques with the aim of enabling managers to envision ways to incorporate best practices in their own firms. (ii) Helping managers critically evaluate their own management practices by using a diagnostic measurement tool which would allow managers to identify management performance strengths and areas for improvement. (iii) Holding workshops about best practices, create easy-to-read publications to disseminate latest best practices developments.

Building on Lemos and Scur (2015), and in a similar fashion to the experiments in Bloom et al. (2012), we proposed to address the following questions: What are the short- and medium-run effects of a management intervention on working conditions, worker skills and productivity and firm performance? Which management practices have the highest and longest lasting impact on working conditions, worker skills and productivity and firm performance? What makes these management practices stick?

As part of the research design, we proposed to utilize a randomized experiment using 100 to 150 mid-sized firms in the construction materials industry located in Maputo, Mozambique using the framework provided by the ILO SCORE training programme.

The management consulting and training intervention would be delivered on-site over one year and customized to each participating treatment group firm.<sup>1</sup> At a high level, the treatment consists of (1) Diagnostic Phase (3 months), an Implementation Phase (1 year), and Monitoring Phase (1 year). Control group firms proceed directly from the Diagnostic Phase to the Monitoring Phase without the Implementation Phase.

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<sup>1</sup> The intervention is focused on improving five distinct aspects of management practices delineated in the SCORE methodology: Workplace Cooperation, Quality Control/Continuous Improvement, Productivity through Cleaner Production, Human Resources/Workforce Management, Health and Safety.

The randomized phased intervention would allow estimation of the causal impact of management practices on working conditions, worker productivity and firm performance. In particular, with detailed weekly data on a large number of operational performance metrics for each firm, we could estimate multi-firm time-series models which test for trend breaks between treatment and control group firms. While the number of firms is small, the number of relevant metrics is large (including output, productivity, efficiency, quality, inventory, lead time, due date performance, etc.) and the data series are long and high frequency, enabling the use of modern multi-outcome estimators.

The proposed project is linked to previous studies by the National Directorate of Studies and Policy Analysis (Nhabinde et al, "The Challenges and the Way Forward for the Construction Industry in Mozambique") and current efforts by other researchers such as Martins and Regolo who are focusing on training the workforce in the construction sector, and Quintella, Nhabinde and Maueri who are focusing on the factors behind the limited participation of Mozambican construction firms in the market for civil and heavy construction, and the overall limitations of the construction materials industry.

Before rolling out such a project we assessed the feasibility of this study, as described below.

### **3. Methodology**

#### **i. Identifying sample of firms which would take part in a management training and consulting experiment**

In order to identify the potential sample of firms which would take part in this experiment, we received an outdated list of firms in the construction industry from the Ministry of Public Works. This list contained 2,490 firms which provided services to the construction industry and 185 firms which manufactured construction materials. In order to remove any variation in firm performance due to location or geographical characteristics, we chose to focus solely on firms in Maputo. Out of the 2,490 firms, 1,329 firm were located in Maputo (1,299 in Maputo City and 30 in the larger Maputo area).

We hired two research analysts to complete the following work:

- Stage 1: Establishing contacts with approximately 1300 companies in the construction industry sector to confirm the company's contact details.
- Stage 2: Conducting approximately 400 phone interviews with directors of establishments in the construction materials industry to collected more detailed information about their business.

Research analysts called each company by phone and asked to speak to the owner or general manager of the company (usually the person answering the phone). Research analysts were instructed to explain that we were conducting an industry and product mapping exercise of the construction sector in Maputo and ask if the owner or general manager was willing to spend 10-15 minutes of the phone answer a few questions about their firm. We were able to successfully survey 365 firms.

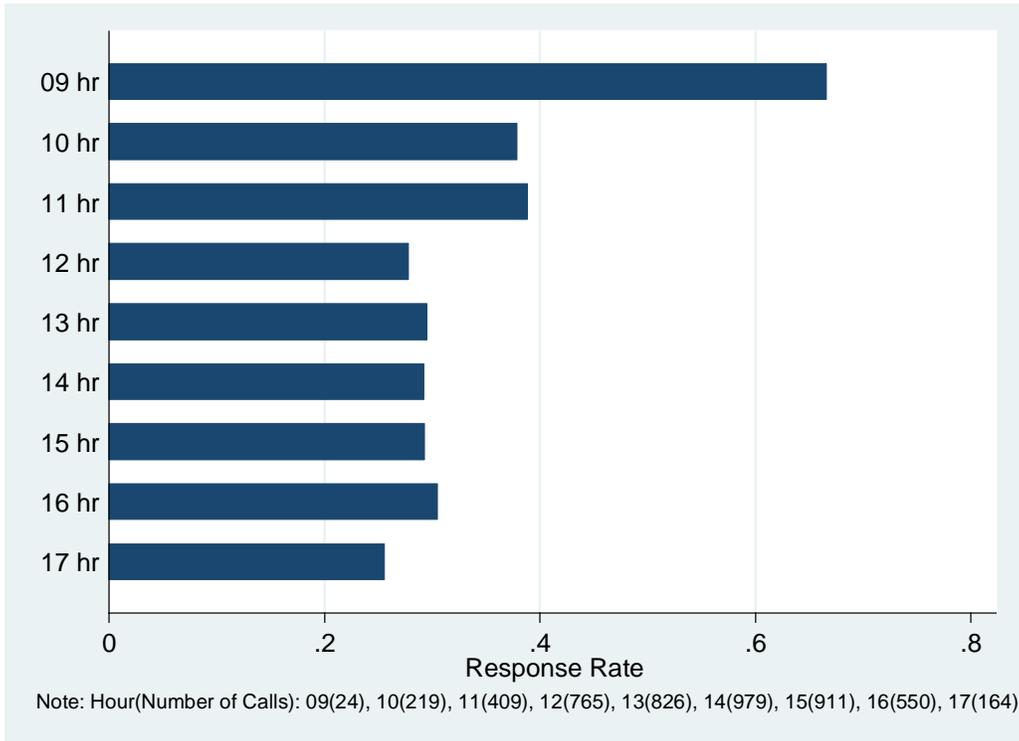
**ii. Understanding when best to approach SMEs by phone in Mozambique**

We used Skype for all calls and thus were able to keep call records throughout this exercise. using the call records, we've learned the following: First, our analysts were place to make 4847 calls. The initial list provided by the Ministry of Public works contained a much higher number of mobiles than landlines and as such 88% of the calls made were to mobile phones. Second, Table 1 shows that 16% of the calls made to a landline were answered while 32% of the calls made to mobiles were answered, suggesting (not surprisingly) that there is a higher chance of having a successful call if mobile numbers are used. Third, Figure 1 shows that calls made in the morning (from 9AM to 12PM) are more likely to be answered. Fourth, Figure 2 shows that calls made on Wednesday and Thursday are more likely to be answered, followed by calls made on Monday and Tuesday. Friday has the lowest response rate. Fifth, Figure 3 shows that analysts made short calls. The average duration was 2.06 minutes (median at 1 minute), and calls at the 90th percentile were of 6 minutes. Anecdotally, analysts reported having to split interviews in multiple calls in order to collect all information, despite the short survey instrument.

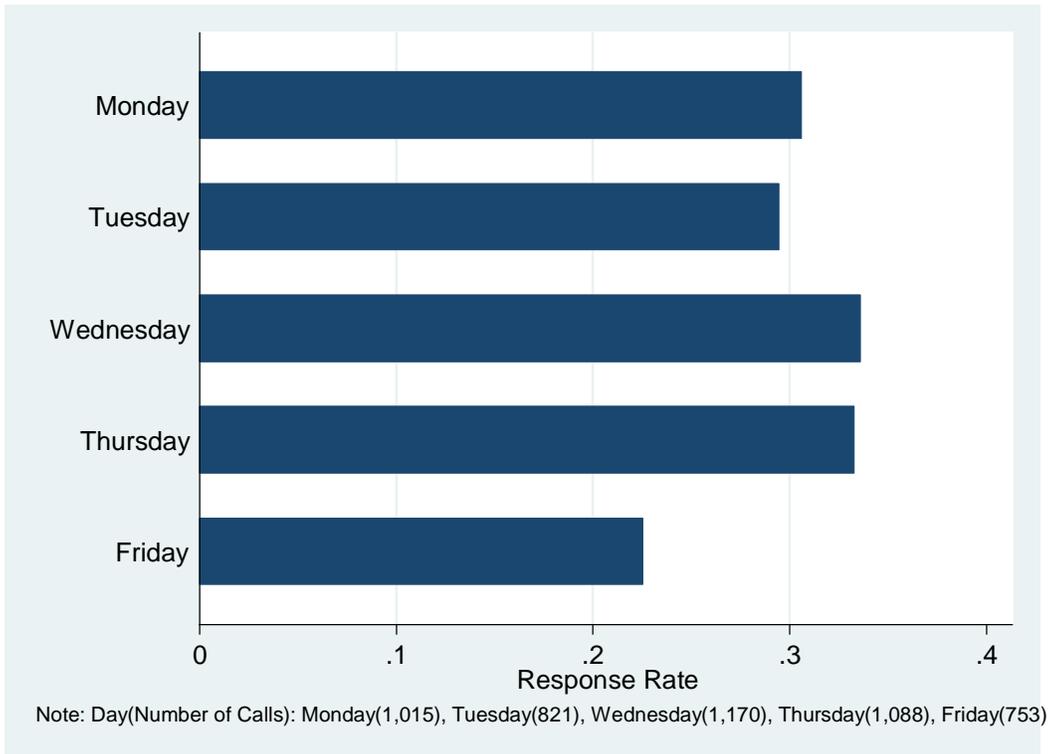
**Table 1: Number of successful calls, by call type**

Call Type	Call answered	Total Number of Calls
Landline	.1636364	550
Mobile	.323016	4297

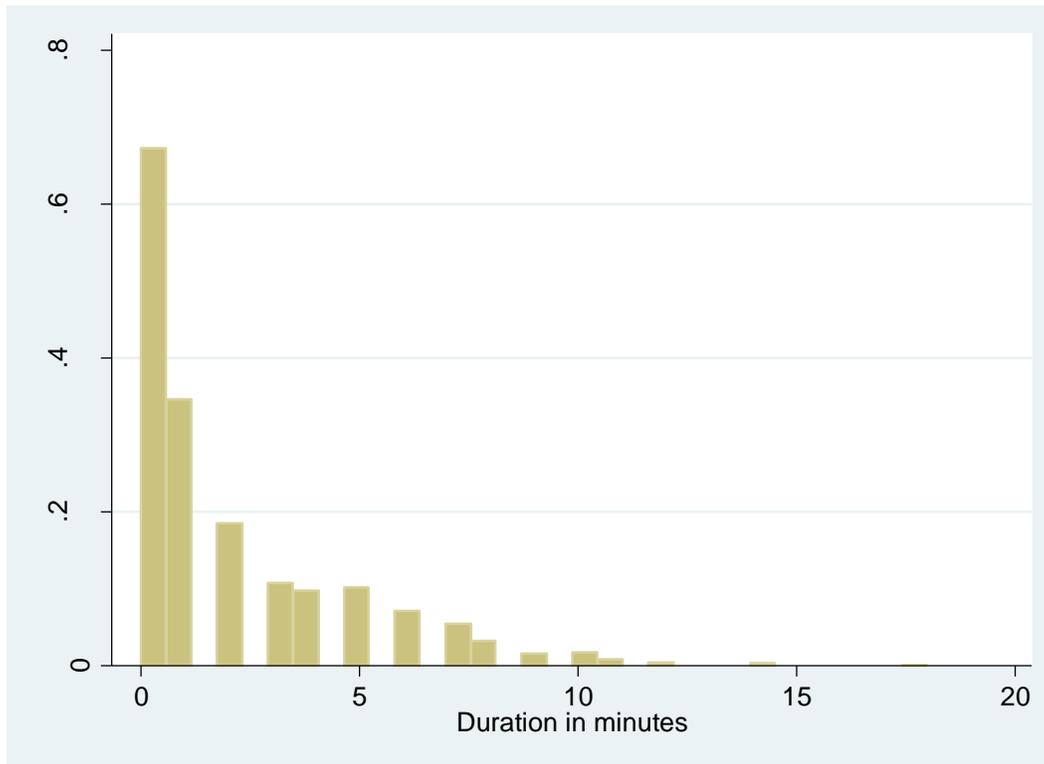
**Figure 1: Response rate as measured by calls answered, by hour**



**Figure 2: Response rate as measured by calls answered, by day of the week**



**Figure 3: Duration of Call, in minutes**



**iii. Understanding the SME sample in the Construction Industry in Mozambique**

As a result of the sampling frame exercise we conducted, we learned the following:

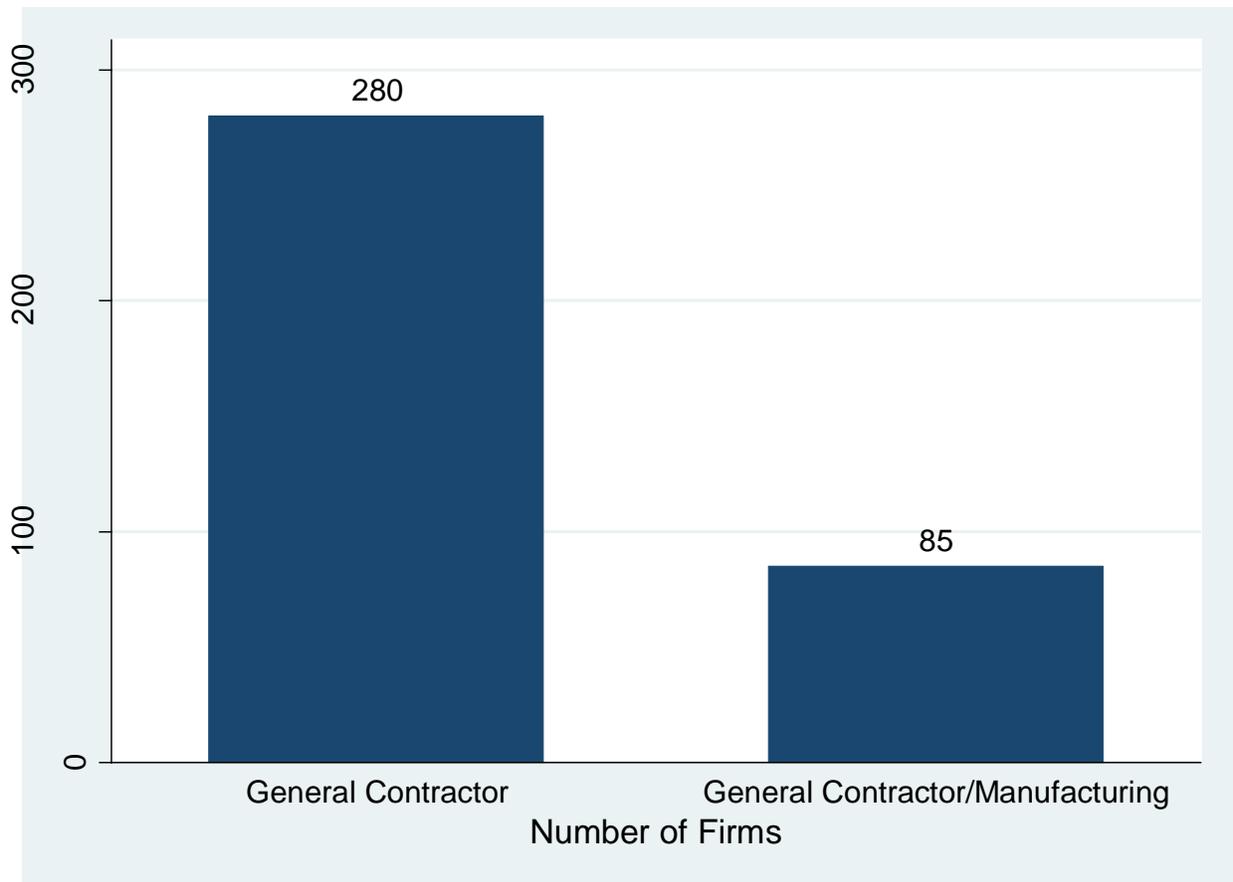
First, Table 2 shows that the average firm has approximately 84 employees (median = 28 employees) while firms in the 25th and 75th percentile have 12 and 60 employees, respectively. Out of these employees, the average firm has over half of their employees on the field: 57 employees working directly on construction sites (median = 17 employees) while firms in the 25th and 75th percentile have 7 and 40 employees, respectively. The average firm is currently working on 3 sites (median = 2 sites) and is 9 years old (median = 7 years old).

**Table 2: Firm characteristics**

<i>Variable</i>	Mean	S.D.	p(10)	p(25)	p(50)	p(75)	p(90)	Obs
<b>Firm Employees</b>	<b>83.57</b>	<b>241.3</b>	<b>6.0</b>	<b>12.5</b>	<b>28.0</b>	<b>61.0</b>	<b>150.0</b>	<b>365</b>
<b>Site Employees</b>	<b>57.01</b>	<b>191.2</b>	<b>3.0</b>	<b>7.5</b>	<b>17.5</b>	<b>40.0</b>	<b>95.0</b>	<b>331</b>
<b>No of Sites</b>	<b>3.29</b>	<b>4.6</b>	<b>0.0</b>	<b>1.0</b>	<b>2.0</b>	<b>4.0</b>	<b>6.0</b>	<b>336</b>
<b>Firm Age</b>	<b>9.53</b>	<b>9.4</b>	<b>3.0</b>	<b>4.0</b>	<b>7.0</b>	<b>12.0</b>	<b>18.0</b>	<b>354</b>

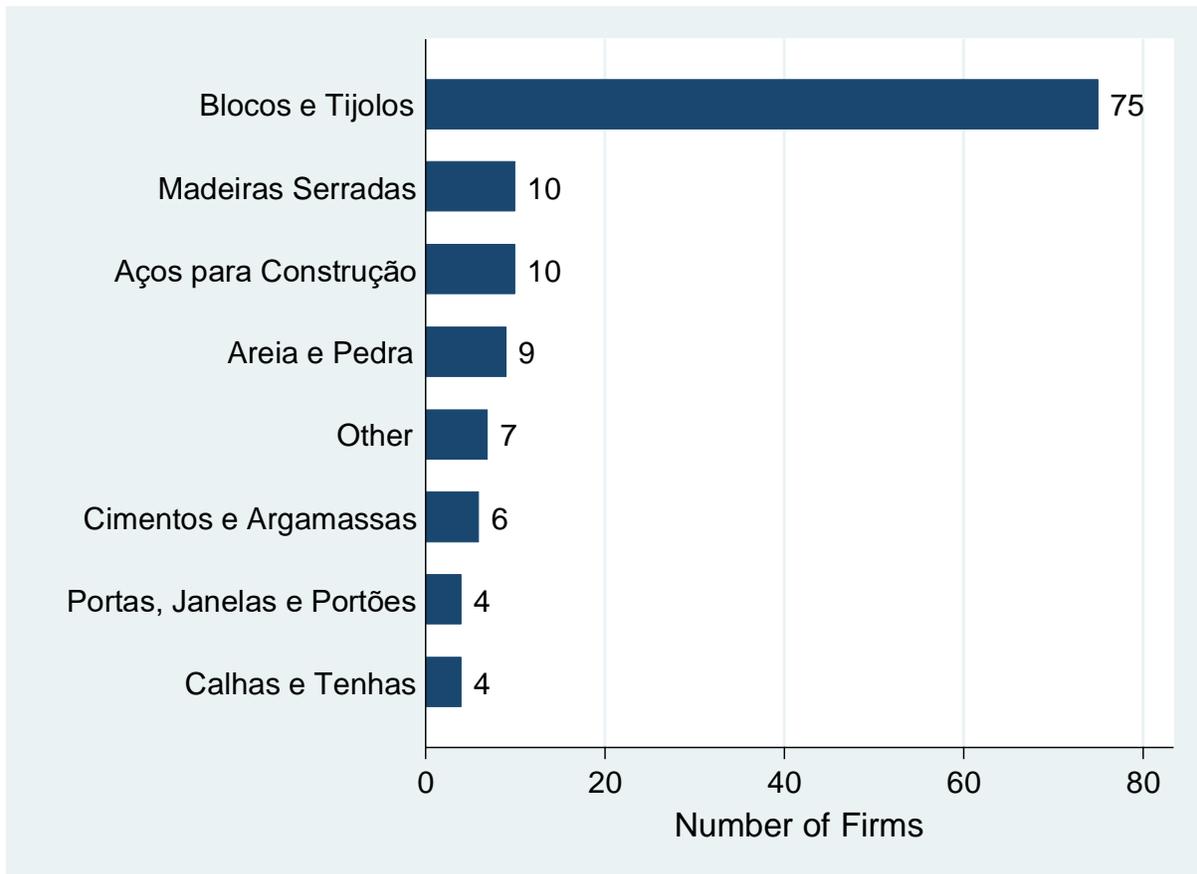
Second, there is a number of general contractors also manufacturing construction materials. As Figure 4 shows, out of 365 firms surveyed, 280 (77%) firms are general contractors providing services in the construction industry including building as well as heavy construction (highways, roadways, etc), while 85 (23%) firms are both general contractors which also manufacture of construction materials.

**Figure 4: Establishment in the Construction Industry in Maputo, by type of activity**



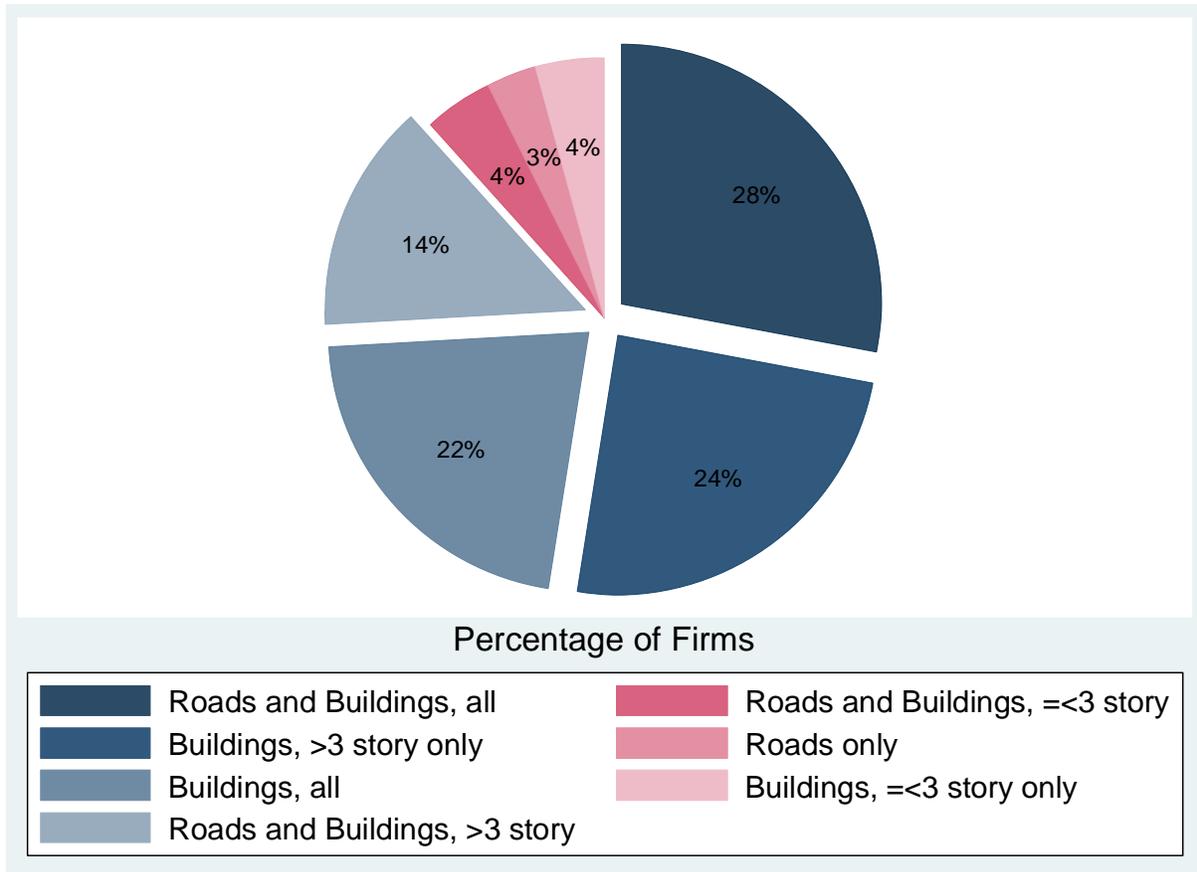
Third, Figure 5 shows that these 85 firms manufacture a range of construction materials: 75 firms manufacture block and bricks, the predominant type of construction material. Lumber and steel for construction are produced by 10 firms each. 9 firms produce sand and stone for construction, 6 firms produce cement. Doors, windows, and gates as well as gutter and shingles are produced by 4 firms each.

**Figure 5: Establishment in the Construction Industry in Maputo, by type of construction material**



Fourth, in Figure 6 we differentiate firms by the type of activity, asking what type of construction their firm specializes in: building construction ( $>$  or  $\leq$  3 stories) or heavy construction (highways, roadways, streets, etc). We observe that 28% of the firms surveyed report working on all types of construction, while 22% of the firms work on buildings only, and 24% of the firms only work on buildings with more than 3 stories. A further 14% works on heavy construction as well as buildings that are more than 3 stories high. This shows that 88% of the firms surveyed work on buildings that are more than 3 stories high.

**Figure 6: Establishment in the Construction Industry in Maputo, by type of construction material**



Fifth, we run a difference-in-means test in Table 3 to investigate whether general contractors are statistically different from general contractors who also manufacture construction materials on a range of basic characteristics. We find that in terms of firm employees, site employees and number of sites, these firms are not statistically different while in terms of firm age, general contractors that manufacture are on average 2.6 years older than other general contractors but this difference is only weakly statistically significant.

**Table 3: Difference-in-means, by type of activity**

<i>Variable</i>	<b>General Contract or Mean</b>	<b>General Contract or /Manuf Mean</b>	<b>Diff in means</b>	<b>T Stat</b>	<b>General Contract or Obs</b>	<b>General Contract or /Manuf Obs</b>
<b>Firm Employees</b>	<b>70.11</b>	<b>69.44</b>	<b>0.68</b>	<b>0.03</b>	<b>280</b>	<b>85</b>
<b>Site Employees</b>	<b>73.79</b>	<b>65.92</b>	<b>7.87</b>	<b>0.26</b>	<b>257</b>	<b>74</b>
<b>No of Sites</b>	<b>3.19</b>	<b>3.62</b>	<b>-0.43</b>	<b>-0.71</b>	<b>260</b>	<b>76</b>
<b>Firm Age</b>	<b>8.93</b>	<b>11.57</b>	<b>-2.64*</b>	<b>-2.23</b>	<b>274</b>	<b>80</b>
<b>N</b>	<b>365</b>					

Sixth, after the survey, we asked the research analyst to rate on a scale of 1 to 3, with 3 being the highest score: (1) how receptive interviewees were towards the call and whether they expressed interest, (2) how willing they were to spend the time to provide answers, (3) whether they were knowledgeable enough about the firm, (4) whether the research analyst believed that they provided accurate information. The large majority of firms scored 3 in all 4 categories for a total of 12 points (283 firms), while 37 firms scored 11 or 12 points. The remaining 32 firms scored 9 and below. Table 4 shows the average across these four dimensions and the number of firms in each score category. This suggests that firms in the construction sector in Mozambique might be willing to provide more information; the impression of our research analysts was that firms were generally interested in hearing about the project. Towards the end of the survey we asked research analysts to signal whether, based on their conversations with the interviewee and explanation of the larger project, they would recommend the firm to the next phase of the project (management training and consultancy services). Out of a sample of 149 firms, 85% were recommended by our research analysts.

**Table 4: Perception of Interviewee's receptiveness and reliability**

<b>The interviewee...</b>	<b>Mean</b>	<b>S.D.</b>	<b>Score 1</b>	<b>Score 2</b>	<b>Score 3</b>	<b>Obs</b>
<b>was receptive and interested</b>	<b>2.86</b>	<b>0.4</b>	<b>10</b>	<b>31</b>	<b>316</b>	<b>357.0</b>
<b>was willing to spend time</b>	<b>2.82</b>	<b>0.5</b>	<b>13</b>	<b>38</b>	<b>305</b>	<b>356.0</b>
<b>was knowledgeable about the firm</b>	<b>2.90</b>	<b>0.3</b>	<b>5</b>	<b>25</b>	<b>326</b>	<b>356.0</b>
<b>provided accurate information</b>	<b>2.86</b>	<b>0.4</b>	<b>5</b>	<b>40</b>	<b>310</b>	<b>354.0</b>

**iv. Engaging with potential partners to discuss in more detail the provision of consultancy services to these firms and performance data collection**

We met a consultancy company - InSite,Ltd - to discuss the provision of consultancy services to treatment firms. InSite, Ltd is a Mozambican Company launched in 2010, specializing in the consulting, training, and auditing of management systems. We had also discussed the possibility of using the SCORE methodology previously in an experimental setting with the ILO. We were also recently in contact with a Japanese academic who has successfully run KAISEN (continuous improvement) management training in Tanzania at the cost of approximately 2,000 per firm. All parties showed interested in being involved in providing tools and/or carrying out the intervention of this project.

We also submitted requests for quotes to local consultancy firms for data collection. The work included the two sampling frame stages described above as well as baseline data collection: 150 30-minute face-to-face interviews with directors of establishments in the construction materials industry (Maputo City and Maputo Province only) to collected more detailed and sensitive information about their business. Unfortunately, the quote we received was much higher than the budget provided for this scoping exercise (approximately 30,000 pounds).

## **Conclusion**

This project is directly linked to IGC's goal of promoting sustainable economic development in the developing world and well aligned with the firm capabilities research programme. Learning how to improve firm outcomes is of critical importance for development economics given the massive differences in total factor productivity across countries. Any changes that can generate even small and sustainable improvements in working conditions, worker skills and productivity, and firm performance will lead to large improvements in welfare for people in the developing world.

As mentioned, the Ministry of Public Works and the Ministry of Planning and Development are re-formulating government policies to focus on the development of a competitive construction sector. This project which proposes to look at managerial constraints and opportunities for improvement in the construction sector is therefore very well-timed. To the extent that we can identify opportunities for improvement in the next two years, this project can provide research-based evidence to inform the current public policy debate in this area.

Based on this scoping study, we believe that there is sub-sample of small and medium firms in the construction industry in Maputo which have similar characteristics and are potentially interested in participation in a management and consultancy experiment. There are also potential partners interested in providing tools and carrying out the intervention. For such a project, however, it would be necessary to have the financial and technical support of the IGC as well as the Ministry of Public Works and the Ministry of Planning and Development.

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**Figure 1: Industry and Product Mapping Survey**

Company ID	<input type="text"/>
Company Name	<input type="text"/>
<b><i>Company Basic Details (please confirm information)</i></b>	
Address	<input type="text"/>
City	<input type="text"/>
State	<input type="text"/>
Postal Code	<input type="text"/>
Landline	<input type="text"/>
Cellphone	<input type="text"/>
Website	<input type="text"/>
Email Address	<input type="text"/>

***Industry and Product Mapping***

A. Does your company manufacture any construction material products? <i>If yes, what are the 3 major products?</i>	<input type="text"/>	Interviewee Name:	<input type="text"/>
<input type="text"/>	<input type="text"/>	Interviewee Post:	<input type="text"/>
<input type="text"/>	<input type="text"/>	Was the Interviewee... receptive towards the call? expressed interest?	<input type="text"/>
<input type="text"/>	<input type="text"/>	willing to spend the time to provide answers?	<input type="text"/>
B. How many people work in the company?	<input type="text"/>	knowledgeable enough?	<input type="text"/>
C. How many people work in the plant/factory?	<input type="text"/>	provided reliable information?	<input type="text"/>
D. How many people work in the construction sites?	<input type="text"/>	Comments:	<input type="text"/>
E. How many construction sites is your company working in now?	<input type="text"/>		
F. When was the company founded?	<input type="text"/>		
G. Could you please recommend 2 companies manufacturing construction materials that you currently do business with?			
<i>Company name</i>	<i>Phone Number</i>	<i>Main Construction Material Product</i>	
<input type="text"/>	<input type="text"/>	<input type="text"/>	
<input type="text"/>	<input type="text"/>	<input type="text"/>	
<input type="text"/>	<input type="text"/>	<input type="text"/>	
Sites: Highways, Roadways, etc	<input type="text"/>	Foreign Company?	<input type="text"/>
Sites: Buildings +3 floors	<input type="text"/>	Foreign Owner?	<input type="text"/>
Sites: Buildings = or -3 floors	<input type="text"/>	Foreign Interviewer?	<input type="text"/>
			Recommend for Project? <input type="checkbox"/>

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