TOWARD PRODUCTIVITY IMPROVEMENT IN PRIVATE FIRMS AND PUBLIC OFFICES: CASE STUDIES IN TANZANIA

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Abstract

High productivity in the private and public sector is essential for rapid economic growth. The adoption of efficient management practices is expected to improve productivity in private firms and public offices. This dissertation analyzes the impact of an experimental management training program that featured *Kaizen*, a Japanese business philosophy and methodology of continuous improvement of working practices, product quality and productivity, and so forth, on the management practices and business performance of trained enterprises in Dar es Salaam, Tanzania. Previous experiments of management training found short-run impacts on business performance weak, but little has been known about longer-run impacts. This study extends the observation period to find positive and statistically significant impacts on the adoption of management practices and business performance three years after the training program. The dissertation also explores communication efficacy, a core component of management practices, in public offices. By conducting a questionnaire survey of 46 public offices and 171 civil servants in Dar es Salaam and Pwani, Tanzania, this study examines their communication practices as well as their educational and occupational backgrounds. The results suggest that communication breakdown and other communication problems prevail in public offices, harming their productivity, even though the civil servants are highly educated. Another finding is that public officer's participation in leadership and other soft skills training programs help mitigate such problems.

To my family

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Acknowledgments

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CHAPTER 1

INTRODUCTION

1.1 Motivation

A vibrant private sector and a capable public sector are indispensable for achieving sustainable economic growth (e.g., World Bank, 2003; Acemoglu, 2005; Otsuka and Shiraishi, 2014; Crafts, 2015). It is easy to imagine that such growth would not be realized if private firms and government offices were poorly managed (Turner and Craig, 1978; Bloom et al., 2013). However, in developing countries, both private and public sectors operate without sufficient managerial capability (Bruhn et al., 2010; World Bank, 2016a; 2016b). Thus, in both sector, low productivity is widespread, one of the causes of poverty (Tubbs and Widnery, 1978; McGowan, 1981; World Bank, 2012).

Poor management is one of the factors influencing the poor delivery of public services (Bloom et al., 2015; Dahlström and Lapuente, 2017; Rasul and Rogger, 2018). Private firms in lower-income countries fare more poorly than their counterparts in higher-income countries (Bloom and van Reenen, 2007; Bloom et al., 2012a; Bloom et al., 2017). Fortunately, management practices can be acquired by learning through attending management training programs (Giorcelli, 2018a; 2018b; Cai and Szeidl, 2018).

The provision of management training programs to entrepreneurs and public officers is likely to be an initial entry point towards the entrepreneur's managerial capability improvement (Bloom et al., 2013). Indeed, the emerging empirical literature suggests that the management training programs induce the adoption of efficient management practices

by micro- and small-sized entrepreneurs in developing countries (McKenzie and Woodruff, 2017). After the completion of the training programs, such trained entrepreneurs turn out to manage their scarcest resources more efficiently than their untrained counterparts.

Thus, strengthening managerial capability in private firms and public offices, particularly in SSA where poverty is widespread, is vital for boosting productivity and, hence, economic growth in the region[1]. To improve productivity, we should pay attention to the inner workings of private firms and public offices (Page and Söderborn, 2015). To the extent that managerial capability is linked to people or rather the workforce (Sutton, 2014), the private entrepreneurs', public managers', and frontline workers' adoption of efficient management practices is essential. Hence, it is worth studying the adoption of management practices for generating concrete evidence in a bid to constructing an effective development strategy aimed at strengthening the managerial capability of both sectors.

Knowledge transfer is a gradual process (Sonobe, 2016). Even so, most of the existing studies of the impact evaluation look at only a short period (i.e., at most one year) after the completion of the training programs (McKenzie and Woodruff, 2014). Indeed, the empirical literature regarding the impacts of such training programs in the medium-run (i.e., at least two years after the training had ended) is scant (Roberts, 2018).

Similarly, a problem of inadequate delivery of public services in developing countries is humongous (Collier and Gunning, 1999a; 1999b; Besley and Ghatak, 2007;

[1] This is consistent with Odagiri and Goto (1996) and Bardhan (2016), who emphasizes that strengthening the productivity of the state bureaucracy is necessary not only for the state to function as an overseer of property rights and markets but also to be a guide, coordinator, stimulator, and a catalytic agent for economic activities in the development process.

Crook, 2010). It has, among others, suffocated the development of an entrepreneurial-led private sector (World Bank, 2017).

1.2 Objectives of the Dissertation

This dissertation pursues two objectives. First, the dissertation attempts to fill the gap in knowledge as to the short- and medium-run impacts of a training program on the entrepreneurs' adoption of management practices and business performance. It will focus more on the analysis of the medium- than short-run impacts. In part, this is because a review by McKenzie and Woodruff (2014) show that studies have been conducted to evaluate the entrepreneurs' training impacts in the short-run. Such studies reveal the short-run impacts of training on the entrepreneurs' adoption of management practices taught in the training programs. In contrast, these studies present insignificant impacts of management training on business performance in the short-run. Moreover, studies that explore evidence related to the medium-run impacts of managerial training among the small-scale entrepreneurs in developing countries are relatively few in the empirical literature. The examples of such studies, which reveal a significant impact of training in the medium-run, include Berge et al. (2015), Higuchi et al. (2015), Bruhn et al. (2018), and Bloom et al. (2018).

The study uses the unique dataset of cluster-based small-scale garment manufacturing entrepreneurs from a developing country context: Tanzania to achieve the abovementioned objective. Such entrepreneurs, who are among the significant players in Tanzania's industrial sector, participated in a short-term management training program. In

this country, over the last fifty years, the industrial sector has been an economic agenda (Semboja and Kweka, 2001), but its productivity improvements have been insignificant (Dinh and Monga, 2013; MITI, 2016). Consequently, the country has not achieved sustained economic growth, and income poverty is still widespread. While several obstacles constrain Tanzania's industrial sector, poor firm-level productivity has recently been cited as a major one (Page, 2016). To improve industrial sector's productivity, the entrepreneurs' adoption of efficient management practices is essential (McKenzie and Woodruff, 2017). Thus, promoting the entrepreneurs' adoption of productivity-enhancing management practices can shed light on which evidence-based strategy is effective in mitigating poor productivity.

The second objective is to explore the quantitative evidence regarding the efficacy of communication (which is a subset of management practices), in a sample of public offices. This study utilizes the original micro-level survey dataset of public offices, office managers, and frontline workers from Tanzania. Even though inefficiency seems to be a common problem in developing countries, the study focuses on Tanzania as a case study because of my previous career as a government official in this country established rapport with government officials.

Historically, Tanzania and its government inherited administrative practices from the British colonial government. The British colonial government imposed indirect rule through the then pre-existed power structures of Tanzania (Crowder, 1964). By this system, the day-to-day administrative activities were left in the hands of traditional or local chiefs. The chiefs gained prestige at the expense of losing control of their external affairs,

communication, and some became authoritarian in their approach to local governance. Also, it is possible that bureaucratic practices during the colonial era have had a persistent effect on the management practices of postcolonial Tanzania. For instance, even at present, an average frontline worker cannot question his office manager. Thus, most of the time one-way communication – mainly from a manager to the frontline worker – is a common practice in Tanzania's public offices.

After independence, moreover, Tanzania became a socialist state. Socialism had much political propaganda to popularize socialistic ideologies. The socialistic government influenced communication as it decided the type of communication practices. Also, socialism was associated with close and constant surveillance. Under such a situation, bureaucrats might have reserved their independent opinion of advising the government. In part, because they potentially assumed everybody in a public office was a spy.

In the mid-1980s socialism collapsed and the country adopted reform programs. During the reform era, the country decentralized power and adopted participative management practices. However, until now, the aftermath of socialism is yet to be completely washed-out, especially among the older generation (henceforth older cohort). The old cohorts experienced the socialist state and are still serving the public sector. Thus, it is likely that history matters as it has potentially influenced the past and current communication practices in Tanzania's public offices.

Communication is indispensable for optimal organizational performance (Simon, 1947; Goldhaber et al., 1978). Through communication, managers and frontline workers elicit input from each other. It is one of the pillars of workplace productivity (Ruck and

Welch, 2012). Communication facilitates coordination of activities among employees (Imai, 2012). This, according to Cooper and John (1988) and Langbein and Jorstad (2004), is particularly necessary for employees whose work performance depend positively on other employees' work efforts. Thus, communication between the office managers and their frontline worker counterparts, especially in the public offices, can potentially explain workplace productivity (Tubbs and Widnery, 1978).

Some laboratory experiments have been conducted to examine the nexus between communication and productivity (e.g., Cooper et al., 1992; Brandts and Cooper, 2007; Brandts et al., 2015; Fehr, 2017; He et al., 2017). Few studies, however, been conducted to explore to what extent communication is missing and what consequences poor communication have in the real workplace, especially in the government offices. This dissertation attempts to narrow down this gap.

1.3 Main Features of the Study

One of the features of this study is to address the first issue above by using a randomized controlled trial (RCT) of management training among small-scale entrepreneurs in the garment cluster in Dar es Salaam, Tanzania[2]. Unlike other experiments, which provide only classroom training component of business management, our training had both components

[2] Thus, the study focuses on an industrial cluster (i.e., the geographical concentration of firms producing similar or closely related products). Historically and up to the present, industrial clusters have, in both developed and developing countries, actively contributed to industrial development due to localization economies (e.g., Marshal, 1920; Ruan and Zhang, 2009; Felkner and Townsend, 2011; Fujita and Thisse, 2013). Also, as suggested by Mckenzie (2011), our focus on a more homogeneous sample of garment manufacturing entrepreneurs, is another unique feature of our experimental study.

(i.e., classroom and onsite components). While the classroom component was provided between May and June 2010, the onsite component was provided between November 2010 and February 2011. Thus, some entrepreneurs, called "completely-treated entrepreneurs" participated in both the classroom and onsite components, whereas "partially-treated entrepreneurs" participated in only one component (i.e., either the classroom or onsite component, but not both). Others, called "untreated or control entrepreneurs" did not participate in either component.

Another feature is that the experimental program introduced two types of training materials. The first one was the training materials featuring a *Kaizen* approach to production management and quality control[3]. *Kaizen* is a Japanese word which connotates continuous improvement (Imai, 2012). It is a low-cost approach to productivity improvement that encourages both firm managers and workers to identify problems of workplace inefficiencies to find solutions to such problems.

The training program introduced basic practices of *Kaizen*. Partly because the sample entrepreneurs are larger (measured in employment size) than the micro-entrepreneurs who always benefit from the business development services (BDS) programs related to the Start/Improve Your Business (SIYB) training materials in developing countries (e.g., Dupas and Robinson, 2013; Fafchamps et al., 2014; Brooks et al., 2018). In this study, such production and quality control practices are referred to as *Kaizen* practices.

[3] Also, the experimental studies by Bloom et al. (2013) and Higuchi et al. (2015) introduced similar training components in the training program for medium-sized textile manufacturing plants in India and to small-scale entrepreneurs who produce steel products and knitwear and garment products in Northern Vietnam, respectively.

The second training materials introduced the contents of standard business practices of BDS training components developed by the International Labor Organization (ILO). Examples are marketing, planning, and recordkeeping practices (ILO, 2003). These practices are hereto dubbed as non-*Kaizen* practices.

A baseline survey of 114 randomly selected garment entrepreneurs in the garment cluster was conducted before the training program. Soon after the classroom training program had ended, in June 2010, an interim follow-up survey in September 2010 was implemented. Then, after the completion of the onsite training program in February 2011 three follow-up surveys were undertaken. The first, second, and third follow-up survey was conducted in April 2011, September 2012, and March 2014, respectively. Thus, the collected data allows to measure the short-run- and medium-run impacts of the training program. The other features of this study will be explained later in this dissertation.

As pointed out earlier, for the public sector the study investigates the quantitative evidence regarding communication efficacy in the public offices. There are three main features of this part of the study. First, the study encompasses two samples. That is to say, a sample of 46 public offices and 171 public officers. The latter is subdivided into two subsamples (i.e., 46 office managers and 125 frontline workers). While some of our samples are in Dar es Salaam, others are in Pwani, Tanzania. A common characteristic of our sample public offices is that they have a mandate to deliver public services to facilitate entrepreneurship development in their respective areas. The description of specific the examples of such public services is provided in the latter part of the dissertation.

The second feature is related to the field surveys. Two field surveys characterize this strand of the study. First, the preliminary informal survey which was carried out in September 2014 in Dar es Salaam. During the informal survey, the key informants and senior officials from the government Ministries, Departments, and Agencies (MDAs) in Dar es Salaam were interviewed. Second, the formal survey (conducted in March 2015 in Dar es Salaam and Pwani). During the formal field survey, information related to the characteristics of public offices, managers, and frontline workers were captured from the survey respondents. Other collected information included the mission, targets, performance targets achieved, and workplace communication practices.

The third feature highlights the method adopted to capture communication problems. The study uses the managers' and frontline workers' description of strategic management tools to trace the communication problems. Such tools, which have long been emphasized in organizational theory (Roberts et al., 1974), include the office mission and office targets (e.g., Bart et al., 2001; Krattenmaker, 2002; Rigby, 2007). The analyses conjecture that inconsistency is a proxy indicator of communication problems. Here, "inconsistency" means, an idea, opinion, not in agreement between parts of itself or with something else (Oxford Dictionary of English, 2009). From this meaning, the dissertation considers inconsistencies to mean variation or unpredictable communication between the managers and frontline workers in the same workplace. Specifically, the study cogitates the inconsistencies in the number of formal office meetings (i.e., the office managers' and frontline workers' difference in their reported number of formal office meetings) as a proxy measure of workplace communication problems (Putnam and Mumby, 2014).

1.4 Preview of the Major Findings

Chapter 3 presents the empirical evidence of a positive impact of management training program on the adoption of specific management practices among the completely- and partially-treated entrepreneurs in the short-and medium-run. Also, chapter 3 finds that the medium-run impact varies slightly by the quantity of training and the type of management practices (i.e., *Kaizen* and non-*Kaizen* practices). The finding may suggest that in the medium-run while some treated entrepreneurs continued to adopt *Kaizen* management practices, others continued to adopt non-*Kaizen* management practices depending on the specific needs of their business at the time and their own pace.

Likewise, unlike the results of the short-run impact analyses, the estimates of the medium-run report a statistically significant positive impact of *Kaizen* training program on business performance. That is, three years after the interventions, the value-added and profit among the completely-treated entrepreneurs, became more significant than that of their partially-treated and untreated counterparts. Comparatively, during the training program, the completely-treated entrepreneurs received more management skills than their partially-treated counterparts while untreated entrepreneurs received nothing from the *Kaizen* experts.

The above finding is different from most of the current impact evaluation studies which document the insignificant impact of training on entrepreneurs' business performance in the short-run. Three possible reasons standout to substantiate this finding. First, combining classroom and onsite training components is more effective in inducing business changes for the better. Second, in the medium-run, there is a possibility that the

completely-treated entrepreneurs gradually selected as assimilated adequately certain management practices (e.g., some *Kaizen* and non-*Kaizen* practices) which were appropriate to their operations of production and business activities. Third, and last, the completely-treated entrepreneurs required sufficient time to substantially improve their business using specific management practices taught in our *Kaizen* training program.

Admittedly, in this part of the study, the spillovers of information regarding the *Kaizen* training program were not controllable. Because of the endogeneity problem, however, the study cannot claim that spillovers account for a large part of the impacts of management training contained in chapter 3 of the dissertation. Presumably, the use of geographical information, for example, the distance from one entrepreneur to the other, would potentially make it possible to mitigate the endogeneity problem. Nonetheless, such information cannot be applied because of the unavailability of data and limited time. Thus, the analyses in the Appendix serves only as a robustness check.

A key finding in the Appendix is that many entrepreneurs, both the treated and untreated, knew each other in person, and after the *Kaizen* training program had ended, they talked about *Kaizen* and visited each other workshops. During the visits and interactions, the untreated entrepreneurs imitated certain management practices and applied them to their workshops. In part, this suggests that there would be spillovers, which would lower the intention-to-treat (ITT) and the treatment-on-the-treated (TOT) estimates of the training impacts. Nonetheless, some estimates are significant.

On the one hand, the estimates suggest that the untreated entrepreneurs' number of conversations with their treated counterparts about *Kaizen* and visits to the treated

workshops is correlated with the untreated entrepreneurs' adoption of certain management practices taught in the *Kaizen* training program. On the other hand, the analyses reveal the evidence of the insignificant correlation between such interactions and business performance among the untreated entrepreneurs. Such a finding can be ascribed to the possibility that some parts of the training contents would be difficult to be understood by the untreated entrepreneurs who just listened to or visited their treated entrepreneur counterparts. Signboards and some other visible practices would be easily imitated. However, some lessons that introduce invisible practices could be absorbed only by those who attended and listened to the training experts carefully.

Chapter 4 presents the findings regarding communication in the public offices. According to the preliminary survey materials with our key informants, Tanzania's public officers are supposed and encouraged to achieve the office targets in line with their official mission. Nonetheless, it is found that most of the sample frontline workers including office managers fail to describe clearly their office mission and targets. This finding may reflect the lack of incentive. However, this is not the same as the typical incentive problem analyzed by economics researchers (e.g., Holmstrom, 1999; Prendergast, 1999) which are associated with information asymmetry. Instead, it is likely to be an issue of extrinsic incentive (Dixit, 2002; Lavy, 2009; Propper and van Reenen, 2010). Partly, because most managers and frontline workers in our sample complained that their salary and allowance are low compared to the amount of work they pursue. In addition to the incentive problem, communication problems seem to matter. The data reveal that the number of formal office meetings is not high, and the frontline workers report a lower number than the managers,

suggesting that the managers exaggerate or that the workers do not find they are receiving enough information. The inconsistency, at least, suggests that the sample public offices are potentially trapped in communication problems.

Moreover, during the field survey, interview questions were designed to explore if there are communication problems in the public offices. The internal administrative memos were collected to learn how such office meetings are organized. Similarly, the office managers and frontline workers were requested to provide their independent opinion regarding their satisfaction with the office communication practices. The collected data show that in some offices the office meetings are poorly organized as the invitation letter do not highlight valuable information (e.g., venue, agenda, and starting and ending time) before the meeting. Also, the data show that a substantial number of the office managers and frontline workers were dissatisfied with the office communication practices by the time of our field survey. These findings suggest that inefficient workplace communication prevails in the sample public offices.

The estimation results suggest that the basic characteristics of offices (e.g., office size and the proportion of workforce age-heterogeneity) and some of the individual characteristics of managers and frontline workers (e.g., short-term training experience in leadership and management, recordkeeping practices of office activities, formal education, and age) are correlated with the description of office mission, targets, and the number of formal office meetings. The results point to the possibility that designing workplace communication-enhancing initiatives in the public offices should consider the

characteristics of the offices, managers and frontline workers, and the working environment in which the office managers and frontline workers are operating.

The empirical findings contained in this dissertation have several policy implications. Similarly, the findings have implications for future research. The discussion of such implications for policy and future studies is elucidated in the concluding chapter of this dissertation.

1.5 Organization of the Dissertation

The rest of the dissertation proceeds as follows. Chapter 2 reviews the literature concerning management practices in the private and public sectors. Chapter 3 analyzes the impacts of *Kaizen* management training program among the treated entrepreneurs in Tanzania. Additionally, an Appendix conducts the robustness check regarding the possible existence of spillovers of knowledge of the *Kaizen* training program. Chapter 4 describes the quantitative evidence of communication efficacy among the sample public offices in Tanzania. Finally, Chapter 5 concludes.

CHAPTER 2

LITERATURE REVIEW

In recent years, the literature on the economic analysis of business management has grown substantially. Measures of management practices, which were considered to be unmeasurable, have been developed. Some randomized controlled trials (RCTs) have been conducted in developing countries to access the impacts of basic management or business training on treated firms' management practices and business performances.

Chapter 2 reviews this new literature to point out the remaining gaps and to advance a few hypotheses to be tested in the subsequent chapters. This is done in Section 2.1. A basic finding from these experiments in the private sector is that many firms are poorly managed in developing countries. The finding suggests that at least some part of inefficiencies of government offices can be ascribed to poor management. It is difficult to imagine that government offices are efficiently managed in countries in which private firms are poorly managed. Section 2.2 reviews the literature on public administration, especially that on communication within government offices and the capabilities of government offices to plan and implement policies and deliver public services. Section 2.3 concludes.

2.1 Private Sector Development and Management

The private sector of the economies in the developing world is dominated by small and medium enterprises (SMEs) in terms of the number of enterprises (Ayyagari et al., 2007).

In East Asia, SMEs are predominant even in terms of employment (Yamawaki, 2002). In sub-Saharan Africa (SSA), however, individual SMEs are so small in terms of employment sizes than their counterparts in East Asia. Thus, they would be categorized as micro and small enterprises by the East Asian standard, and that SMEs as a whole are not dominant employers in SSA (e.g., Lall and Wangwe, 1998; Harvie and Lee, 2002; Dinh et al., 2012; Dinh, and Clarke, 2012).

If SMEs in SSA region could grow a little more in size, they could contribute to economic development further (McKenzie, 2011; Mano et al., 2012). Such growth in firm size, however, has not been taking place in SSA (Sonobe and Otsuka, 2011). Several impediments, both internal and external to firms, are likely to be the cornerstone of such a stunted growth of firms. One of the internal constraints to firm growth is manager's or entrepreneur's poor adoption and judicious application of efficient management practices (Fafchamps and Quinn, 2017). Thus, in the next section, I detail the review of this issue.

2.1.1 Management practices

Economists, who used to tend to be silent about business management, have recently accumulated evidence that the quality of management practices is one of significant determinants of total factor productivity and other aspects of firm performance, such as growth in operation size and longevity of the firm. As an excellent literature survey by Syverson (2011) attests, total factor productivity that is carefully estimated by using a large panel of firms varies considerably by firm even within the same finely classified industries in the same geographic administrative units in the same country.

It is likely to be management practices that make a difference between firms sharing the same access to the same technologies and facing the same output market prices, the same input market prices, and the same laws and regulations. Bloom and van Reenen (2007) developed an interview-based evaluation tool that defines and scores essential management practices to overcome the difficulty in measuring management practices, which may have made economists reluctant to discuss management. They found that the score varies a great deal by the firm within the same industry in the same country.

The management practice score codifies the concept of good management practices into a quantitative measure. Examples of such practices, based on diagnostic criteria, include shop-floor operations (focusing on Toyota's lean manufacturing techniques), systematic performance monitoring, setting appropriate targets, and providing incentives for good performance. For each practice, firms are rated on a scale from one (i.e., worst practice) to five (i.e., best practice). The sum of the rate over eighteen management practices is the management practice score of a firm. Because of unevenness of scale, Bloom and van Reenen (2007) convert the score (from a scale of one to five) to *z*-score by normalizing each practice to mean zero and standard deviation one. The sum of the normalized score of each specific practice constitutes the total management practices score.

To establish the validity of this measure of management practices, Bloom and van Reenen (2007) show that the score is closely correlated with some measures of firm performance that are accepted by economists, such as carefully estimated total factor productivity (TFP) and Tobin's *q*. The score is also found to be correlated with various correlates of productivity, such as the human capital of managers and workers, the degree

of market competition, and whether or not a firm is a family business. Another finding is that the management practice score varies considerably from country to country, depending on income levels. Indeed, the distribution of management practices score across countries is skewed toward developed countries (Bloom et al., 2012a; 2016). That is, developed countries (e.g., U.S., Japan, U.K., France, and Germany) have much higher management practices scores (aggregated over sample firms in the same country) than middle-income countries (e.g., Brazil, China, and India), which, in turn, have much higher scores than low-income countries (e.g., some African countries).

Some researchers have been collaborating to collect and analyze management practice score data from an increasing number of firms from an increasing number of countries. However, it does not seem to be a panacea. Firms, especially small ones, in low-income and lower-middle-income countries differ from firms, primarily medium and large ones, in upper-middle-income and high-income countries in the complexity of management and in the kinds of management practices that matter (McKenzie and Woodruff, 2017). The owners of microenterprises can directly grasp every transaction with suppliers or customers and every behavior of their workers, whereas the top management of large firms controls operation through middle-level managers based on information in the form of records and reports. Medium and large firms are more likely to face challenges of human resource management than micro and small firms and, hence, they do not have to delegate decision making to their employees. As the size of the business expands gradually, there will be higher needs for delegating decision making, which requires human resource development and management.

The management practice score developed by Bloom and van Reenen (2007) includes eighteen management practices that business consultants would recommend to medium- and large-sized firms. The alternative score developed by McKenzie and Woodruff (2017) includes twenty-six specific practices related to marketing, recordkeeping, financial planning, and stock control. McKenzie and Woodruff (2017), following the lead of ILO (2003), argue that these practices are relevant to the everyday business operations of microenterprises and small firms in developing countries. They refer to such practices as business practices instead of management practices to emphasize that human resource management practices are less likely to be relevant in the context of micro- and small-size firms. The key finding is that entrepreneurs' adoption of, and hence improvement in, such business practices is associated with quantitative improvement in labor productivity and total factor productivity.

The management practice score developed by Sonobe and Otsuka (2014) and Higuchi et al. (2015) lies somewhere between the above two types. It includes basic marketing practices and recordkeeping practices, reflecting the fact that many small manufacturing firms in developing countries do not correctly use such practices. It also includes human resource management practices, especially *Kaizen* practices related to production management and quality control practices. Both Sonobe and Otsuka (2014) and Higuchi et al. (2015) find a close correlation between their modified management practices score and firm performance in terms of value added, sales revenues, investment behavior, and longevity.

2.1.2 RCTs of management training

In recent years, an increasing number of randomized controlled trials (RCTs) have been conducted in developing countries to evaluate the impacts of entrepreneurs' management training programs. Examples include RCTs include Field et al. (2010), Bjorvatn and Tungodden (2010), Karlan and Valdivia (2011), Berge et al. (2012); Mano et al. (2012), Bruhn and Zia (2013), and Calderón et al. (2013). Others include de Mel et al. (2014), Sonobe and Otsuka (2014), Berge et al. (2015), Higuchi et al. (2015), McKenzie and Woodruff (2017), and Bruhn et al. (2018).

The finding of such RCTs is that many business owners and managers, who are also called entrepreneurs, in developing countries are unfamiliar with or unaware of standard management practices that are commonly used in developed countries and taught at experimental training programs. These training programs taught those management practices that are considered by the researchers or business consultants as basic or standard practices. Nonetheless, they had not been used by experimental subjects before the programs. However, they were adopted by training participants after the programs. These results of the RCTs are consistent with the results of the international comparison in the management practice score (Bloom et al., 2012b; 2017).

Moreover, at least a few of these studies involving RCTs report statistically significant impacts of training on business performance measured by sales revenues, value-added, profits, productivity, growth, or longevity, even though the training programs provided for experiment subjects were basic training, not advanced training. These results

lend support to the likelihood that many firms in developing countries are poorly managed but that training can improve their management.

This literature seems to have some problems, however. First, it is puzzling that most studies of management or business training RCTs, except a few, report statistically insignificant or only marginally significant impacts of training on business performance, while they report significant impacts on management practices. Second, many RCTs use microenterprises, including the self-employed, as experimental subjects, and, hence, evidence on larger firms (i.e., small, medium, and large firms), is scarce. Third, the existing studies could be more specific about what was taught in the training program, how many hours participants received training, what the instruction method was, what teaching materials were used, and so on. In short, the design of the training program is not described explicitly in many of the studies.

Fourth, few studies have attempted to address the issue of knowledge spillovers. Those who did not participate in a training program may imitate the management practices of training participants. Training participants may talk to non-participants about the training content. Knowledge spillovers can be an essential issue because spillovers would affect the measured impacts of training and because our understanding of how knowledge spills over is limited. See McKenzie and Woodruff (2014) for further discussion of these and other open questions related to the RCTs of management or business training.

2.1.3 Hypotheses

This dissertation will explore three issues. The first issue is, “why the evidence regarding training impact on business performance is weak (that is, statistically insignificant or only

marginally significant) in the majority of the existing experimental studies of management training programs?" Reviewing 20 studies, among which 16 studies are randomized control trials, McKenzie and Woodruff (2014) argue that the mixed evidence regarding the impact of management training on turnover, value added, and profit is attributed to noisy data, small sample sizes, and insufficient training program. They also argue that the standard management practices used commonly by medium- and large-sized firms in developed countries are likely to be inappropriate for micro- and small-sized firms in developing countries. For example, the self-employed business owners, who have no employees, would benefit very little from those management training programs that teach business owners how to coordinate the division of labor among workers, even though such training programs would be useful for firms employing some workers. Another possible explanation, as stated by Higuchi et al. (2015), is that the majority of the existing studies evaluate the impacts too soon after the interventions.

Thus, it is imperative to explore further the relationship between the entrepreneurs' adoption of management practices and business performance. Indeed, the reason why some entrepreneurs adopt useful management practices while others do not is unclear, especially among the micro- and small-sized entrepreneurs in developing economies. Also, we need to explore the reason why adopting specific management practices fails to improve business performance significantly. Therefore, the testable hypothesis on this research issue is specified as follows:

Hypothesis 2.1: It takes management training participants a longer time to improve their business performance than their management practices.

In other words, if the training impacts are assessed too early, one may find only a favorable impact on management practices but fail to detect that on business performance. This hypothesis is consistent with the views held by Imai (2012) and Morgan and Liker (2006) based on their training experiences. Their views, however, were based on their experiences in developed countries. Chapter 3 below will be devoted to testing this hypothesis. Following the lead of Bloom and van Reenen (2007), Higuchi et al. (2015), and McKenzie and Woodruff (2017), I will use a management practices score based on a set of twenty-seven questions about management practices.

Second, this dissertation attempts to address the issue of what to teach. Training impacts would vary considerably, depending on the kinds of management practices taught in the program and on how they are taught. For example, Drexler et al. (2014) took a rule-of-thumb approach to financial recordkeeping training. Many others provided basic business skills (e.g., Bruhn et al., 2018). While some programs are very short, some are longer. Some are for microfinance clients without paid workers; some are for small enterprises with some employees. Little is known about the question related to the impacts of a training program depending on the varieties of management practices and the training approach.

To address the aforementioned research problem, Chapter 3 will assess the impacts of a management training program on the quality of management practices and business performance of the treated firms with special attention to differences made by what to teach (e.g., teaching production management and quality control or teaching recordkeeping and marketing) and how to teach (e.g., classroom training, onsite training, or both components).

It is difficult to predict whether classroom training or onsite training (in which trainers visit trainees' workshops) is more effective. However, it is likely that more intensive or longer-term training programs, such as a program that combines both types, is more effective than less intensive or shorter-term programs, given the reported scarcity of management knowledge of small firms in developing countries. To guide the empirical analysis, it may be useful to advance the following hypothesis:

Hypothesis 2.2: Small enterprises that employ a few or several workers benefit more from participating in a training program that combines classroom training and onsite training than in a training program that offers only classroom or onsite training.

There may or may not be substantial knowledge spillovers from training participants to non-participants. Spillovers are essential for the diffusion of new technology (Keller, 2004). The issue of spillovers of knowledge is particularly significant because most of the micro and small enterprises are in industrial clusters in developing countries and because the existing studies document that knowledge spills over in clusters (e.g., Schmitz and Nadvi, 1999; Felkner and Townsend, 2011; Sonobe and Otsuka, 2011). Although few studies of management training RCT clearly state that their experiment subjects are taken from industrial clusters, it is likely that they are located in clusters.

According to Marshall (1920), spillovers of knowledge are one of the reasons why firms are geographically concentrated in a small area. Nonetheless, many of the existing experimental studies tend to ignore knowledge spillovers. A relatively small number of studies, including Mano et al. (2012), Giné and Mansuri (2014), and Higuchi et al. (2015) admit that spillovers of knowledge regarding management training may confound the

estimated training impact. Unfortunately, even these studies do not explore the specific channels through which knowledge spillovers occur after the training interventions.

The literature on spillovers is enormous. Some studies provide substantial empirical evidence that spillovers induce learning and adoption of new knowledge. For example, the empirical studies by Bandiera and Rasul (2006) and Conley and Udry (2010) reveal that social network is significantly associated with rapid adoption of modern high-yielding varieties and new farming or agronomic practices in rural Mozambique and Ghana, respectively. Some human networks have been created through the adoption of total quality management (TQM) by public hospitals in the U.S. (Young et al., 2001). In the manufacturing sector, Fafchamps and Quinn (2017) find that business networks have the potential to induce the diffusion of business practices (e.g., the registration of value-added tax (VAT) and current bank accounts) among manufacturing entrepreneurs in sub-Saharan Africa (SSA). Other studies present insignificant evidence regarding the impact of spillovers on adoption of new knowledge (e.g., Duflo et al., 2011; Fafchamps and Söderbom, 2011).

Such mixed evidence may be ascribed to endogeneity problems. For example, the treated entrepreneurs who are more sociable and who can learn more from the training program and hence able to expect good impacts of the training are more likely to share the training content with other people. Because of such endogeneity, it is difficult to deal with spillover effects squarely. However, the Appendix analyzes the data on conversations among training participants and non-participants to shed a little light on the spillover issue.

2.2 Public Sector Development and Management

If poor management prevails in the private sector of developing economies, it is difficult to imagine that excellent management prevails in the public sector. Many authors have argued that government activities in sub-Saharan Africa (SSA), for example, are not efficiently operated (e.g., Krueger, 1990; Therkildsen, 2000; Antwi et a., 2008; Asunka, 2013; AfDB et al., 2015; and Katera, 2015). Ineffective or inefficient delivery of public service may be ascribed to corrupt and/or incapable politicians (Dahlström and Lapuente, 2017). It may also be ascribed to corrupt and/or incapable frontline workers, such as public school teachers and clinic doctors and nurses.

Since the early 2000s, empirical researchers have presented evidence gathered from various parts of the developing world (e.g., Gagliarducci and Nankichi, 2013; Martinez-Bravo, 2014; Chaudhury and Hammer, 2004; Kremer et al., 2005; Chaudhury et al., 2006; Duflo et al., 2012; Ashraf, et al., 2014). The problem is also related to the local capture, public resources, such as subsidies to schools and villages, stolen by local leaders (e.g., Reinikka and Svensson, 2004; Olken, 2007; Litschig and Morrison, 2013).

Compared with studies of politicians and frontline workers, studies of bureaucrats are even fewer in number probably reflecting the difficulty of such studies. The civil service that bureaucrats provide is more diverse than that of frontline workers. The quantity and value of their output, as well as their efforts, are difficult to measure. A pathbreaking study was conducted by Rasul and Rogger (2018), who availed themselves of the results of a large-scale survey of government projects in Nigeria. This survey was organized by the presidency of Nigeria and conducted by a third-party expert group including engineers and

researchers, a rare attempt made by any government, especially by a developing country government.

The survey assessed a large number of federal government's construction projects and non-construction projects of federal government organizations, such as ministries and agencies, regarding the extent of progress and delay (which is referred to as project completion rate). Rasul and Rogger (2018) find that the completion rate can be used as an output indicator of federal government organization. Of course, the completion rate of project A cannot directly be compared with that of project B because government projects vary in nature and size so much. A low completion rate of a project may be due to the poor management of the organization in charge of the project, but it may also be due to the complex nature of the project. Rasul and Rogger (2018) use as controls various project characteristics, including not just project budget but also an indicator of project complexity rated by experts.

Rasul and Rogger's (2018) major purpose is to see how the project completion rate is associated with different types of management practices. Probably because bureaucrats seldom move from organization to organization, different organizations have different practices. The variation in practices among government organizations makes it possible to relate project completion to practices. To measure management practices, Rasul and Rogger (2018) apply the method of eliciting management practices through interviews developed by Bloom and van Reenen (2007) to nine categories of public office management practices: roles ("the extent to which bureaucrats input into policy formulation/implementation"), flexibility ("whether a bureaucratic agency can reorganize

bureaucrats and adopt tasks"), incentive, monitoring, culture, targeting, facilities, skills, and staffing. Rasul and Rogger (2018) pay special attention to the roles, flexibility, incentive, and monitoring and merge them into two composite indicators: one is the sum of scores on roles and flexibility which is used as a measure of the degree to which a bureaucratic agency is given autonomy, and the other is the sum of scores on incentives and monitoring, which is referred to as incentive/monitoring. The data on the other types of management practices are used as controls in regression analyses.

Autonomy is an essential concept in the public administration literature. While a strand of this literature argues that bureaucrats can demonstrate their professionalism when given a higher level of autonomy, another strand argues that public service is delivered reasonably efficiently under bureaucracy controlled strictly by organizational rules and procedures (e.g., Rose-Ackerman, 1986). In the economics literature, incentive/monitoring has been discussed extensively. Increases in incentives and monitoring intensity, for example, will lead an agent to make a higher level of effort in a single-task situation, but they may worsen overall performance in a multi-task situation and may also crowd out intrinsic motivations, such as a desire to serve the country. Rasul and Rogger (2018) find among other things that the project completion rate is associated positively with autonomy but negatively with incentive/monitoring.

Rasul and Rogger's (2018) study is probably the first to rigorously investigate the relationship between management practices and performance of the vital middle-tier civil servants. Its findings are insightful. However, I do not understand why the authors do not consider management practices facilitating workplace communication although they

consider nine other categories of management practices. Simon (1947, Ch. 8, p. 208) regards communication as "absolutely essential to organizations." Following his lead, studies of organizational theory tend to emphasize the role of communication in determining the way in which organizations function. Bloom, Propper, Seiler, and van Reenen (2015) include effective workplace communication in their list of good management practices in their study of the association among the competition, management practices, and service delivery, even though this is not a study of the mid-tier bureaucrats but English public hospitals. From my own experience as a government officer, I think that effective communication is missing in government offices at least in my country.

2.2.1 Workplace communication

Workplace communication is the process of transmitting information from one individual or group to another individual or group in an organization for a common understanding (Putnam and Mumby, 2014). Ruck and Welch (2012) argue that effective workplace communication is the key to organizational success. Ichniowski and Shaw (2003) emphasize the importance of connective capital, a worker's access to the knowledge and skills of co-workers.

Ruck and Welch (2012) and Ishinowski and Shaw (2003) survey some empirical studies provide support to their argument. For example, analyzing data of urban police officers in Caribbean islands, Langbein and Jorstad (2004) find that face-to-face communication at the police station level and the individual level increases work efforts and reduce the use of excessive forces, while increased monitoring by superiors has no

impacts on productivity. Malhotra and Ackfeldt (2016), who analyze data of frontline workers of UK based service organization find that internal communication help workers to express their feelings and grievances at the workplace, which in most cases have the potential to affect labor productivity.

Some laboratory experiments have been carried out to study the role of communication in avoiding coordination failure (e.g., Cooper and John, 1992; Corgnet and González, 2014; Brandts et al., 2015). For example, suppose that two players choose either high- or low- the level of work effort; the low-level effort gives a player a higher payoff if the other player also chooses the low-level effort, but the high-level effort gives a higher payoff if the other player also chooses the high-level effort. In this experimental game, there are two Nash equilibria in which both players choose the high-level effort or the low-level effort. If the high-effort equilibrium is associated with a higher payoff than the low-effort equilibrium, being stuck in the latter is called a coordination failure, in which both players would regretfully think that we could do better.

More generally, if two or more individuals work together in a manner in which their efforts are complementary, there can be multiple *Pareto*-ranked equilibria and hence a possibility of coordination failure. The game theory predicts that workplaces like government offices can be stuck in a coordination failure. This prediction is consistent with my own experience as a government officer: my colleagues and I often lamented in our minds, “We could do much better.” The results of laboratory experiments suggest that strong leadership and frequent communication can keep a team away or escape from a coordination failure, that even cheap talks (communication without any commitment) help

(Crawford, 1998; 2016), that coordination failure occurs more likely when the number of players is larger, that the leader's legitimacy (e.g., being elected) does matter (Brandts et al., 2015), and so on.

In both the organization theory literature and the coordination game literature, there are few studies of communication among the middle-tier bureaucrats. The argument that communication is essential for effective planning and implementation of policies is intuitively correct. The argument that poor performance is a result of coordination failure is appealing to those who had contact with the reality of government offices in some developing countries. Without empirical evidence, however, it is difficult to convince even bureaucrats of the need for stern efforts toward better leadership and communication.

2.2.2 Meeting and target

The frequency and quality of communication among bureaucrats may be measured by the frequency and quality of their meetings. The meeting is a vehicle for most of the activities of public and private organizations, and employees spend much time in meetings (Boden, 1994; Kaye, 1998; Streibel, 2003; Rogelberg et al., 2006). Office managers and frontline workers are expected to communicate how they are achieving the office performance targets in line with the official mission. In the context of Tanzania's public organizations, formal office meetings are recognized as official communicative platforms through which issues are discussed, and collective decisions are made (URT, 2005, 2009).

It must be easy to elicit the frequency of meetings in a government office from interviews with officers if due attention is paid to the fact that there are formal or plenary

meetings and informal smaller-scale meetings. The quality of meetings may be more difficult to elicit. Also, the quality of communication at a meeting varies depending on whether every member shows up on time, agenda are set in advance, the agenda are announced in advance, and the minutes of the meeting is taken (Asmuß and Svennevig, 2009).

Another possible indicator of the quality of communication is the extent to which officers understand the targets and missions of their offices. Partly this is because a substantial part of meeting time would be used to discuss how to achieve targets. Targets and missions are also considered to be critically important as a strategic management and communication tool (e.g., Bart et al., 2001; Mullane, 2002). A study of the twenty-five top management tools and techniques, which engaged senior managers from around the world, show that office mission is one of the top-rated management tools (Bain et al., 1996). A mission statement elucidates the organization's reason for existence and serves as a guide to the day-to-day operations. Moreover, a mission statement is a critical entry point to initiating modern management frameworks, such as total quality management (TQM) and business process reengineering (BPR) (Bart, 1997).

2.2.3 Knowledge gap and hypothesis

While workplace communication is recognized as vital for strengthening the organizational capability to deliver services, few attempts have been made to examine the situation of communication in government offices. Such studies would have been conducted in

developing countries; they would be very few in the context of the public sector in developing countries in general and particularly in sub-Saharan Africa (SSA).

As mentioned earlier, Rasul and Rogger (2018) include targeting in their list of management practices that are likely to affect the project completion rate. Questions about targeting are also part of Bloom and van Reneen's (2007) management practice evaluation tool. Thus, workplace communication is not completely ignored by these researchers, but communication may deserve highlight. Moreover, Rasul and Rogger (2018, Table A9) find that the coefficient on targeting in the regression equation explaining the completion rate is insignificant. Since the coefficient that is expected to be positive and significant can be insignificant for various technical reasons, this particular result is not inconsistent with the argument that targeting is critically important for most organizations. It seems worthwhile to investigate the reason why.

Rasul and Rogger (2018) define targeting by the following three questions: (1) "Does your organization have a clear set of targets derived from its mission and goals?"; (2) "How tough are the targets of the organization?"; and (3) "When you arrive at work each day, do you and your colleagues know what your organization is trying to achieve that particular day?" Probably in their survey of government organizations, it would be difficult to ask more detailed questions because many questions had to be asked about eight categories of management practices (in addition to these three questions about targeting) as well as many personal and office characteristics. However, it is easy to imagine that many officers were inclined to pretend that they and their colleagues knew what their organization was trying to achieve. The result of the regression analysis about the

relationship between targeting and the project completion rate might be different if the officers had been asked to write down the target of their organization on that day.

Although I do not have access to any data comparable to the extremely rich data set used by Rasul and Rogger (2018), I could manage to collect data from bureaucrats in Tanzania on their meeting and targeting practices. Although my dataset contains information on the officers' own subjective rating of target achievement, it does not contain information on the complexity or difficulty of projects or tasks or target, which would make the information of achievement meaningful as a performance indicator. The data set, however, contains information on whether officers said they knew their office mission and targets and whether those who said that they knew mission and targets could actually dictate or write the mission and targets.

Thus, I cannot link meeting and target practices with office performance, but I can show quantitatively how poor the meeting and targeting practices of many government offices in Tanzania are. Hence, it seems natural to advance the following hypothesis:

Hypothesis 2.3: The meeting and targeting practice scores, elicited through the Bloom and van Reneen (2007) method of management practice evaluation from government officers, are positively correlated with managers' (i.e., superiors') leadership training experience and negatively with the number of officers in an office.

2.3 Conclusion

This dissertation explores the possibility of improving productivity in both private and public sectors in developing economies not by introducing expensive machinery and

expensive policy reform proposals prepared by international consultants to the workplace but by recognizing how much resource has been wasted. The set of production management and quality control tools called *Kaizen* or lean manufacturing is known to be useful to reduce wasteful uses of materials, energy, and time and has been applied to numerous workplaces in the private sector and even the public sector in developed and emerging economies. However, it is known by only a limited number of business persons in sub-Saharan Africa (SSA). In the public sector, my own experience as a government officer in Tanzania suggests that government officers working within the same office are bogged down in coordination failure, which is by definition waste of time and energy of officers as well as the government as a whole. These considerations suggest that in SSA, appropriate measures should be taken or more strongly implemented than before in order to disseminate *Kaizen* and to improve leadership and communication in public offices.

Before embarking on, however, there should be a good understanding of the reality. Is *Kaizen* and other management or business training able to improve the performance of industries in developing countries, especially in Africa? The results of the existing randomized controlled experiments are mixed, but the mixed results may come from the fact that most studies assessed the impact of training on business performance only one year after or so and also from the fact that some experiments provided training participants with very short-term training. This dissertation, therefore, hypothesizes that it takes a longer time to see a significant impact of training on business performance and that more intensive training has stronger effects on business performance.

It seems intuitively obvious that the introduction of *Kaizen* and other modern management methods to the public sector in developing countries would improve the efficiency of public service delivery. However, there have been only a few rigorous studies of the impact evaluation in this context, especially in the context of middle-tier bureaucrats. In this sense, the progress of research in management practices in the public sector is behind that in the private sector. Instead, the former is still in the stage where it is essential to show that the problems of inefficiency in government offices are severe and that at least some of them are of the type that can be mitigated or solved by introducing better management practices. Thus, this chapter has advanced a primitive hypothesis that meeting and targeting practices and their correlates in government offices are poor.

CHAPTER 3

MEDIUM-RUN IMPACTS OF MANAGEMENT TRAINING

Thus far, the literature has been reviewed and discussed in chapter 2. Next, in chapter 3, the study attempts to explore the impacts of a short-term management training program on the entrepreneurs' adoption of management practices and business performance. The chapter analyses the medium-run impacts of a *Kaizen* management training program in Tanzania.

3.1 Introduction

In sub-Saharan Africa (SSA), the labor-intensive micro-, small-, and medium-sized enterprises (SMEs) dominate the industrial sector (Tybout, 2000; World Bank, 2012; Diao et al., 2018)[4]. However, their productivity levels are among the lowest in the world (e.g., Collier and Gunning, 1999a, 1999b; Adenikinju et al., 2002; Murphy, 2007; Goedhuys et al., 2008; Jones and Romer, 2010; Clarke, 2012; Page and Söderbom, 2015). The basic management practices have the potential to substantially improve productivity (Bloom and van Reenen, 2007). Unfortunately, in developing countries, the judicious application of such practices and the adoption of productivity-enhancing technologies, in general, remain

[4] The examples of such labor-intensive industries include garments, textiles, processed foods, leather and leather products, furniture, metalworking products, and simple machineries. The development of these industries is cluster-based (Sonobe and Otsuka 2014). Interestingly, they are market-led and in line with the theory of dynamic comparative advantage (Ostuka et al., 2017).

low (Bruhn et al., 2010; Roberts, 2018). Consequently, low productivity in manufacturing firms in SSA region is widespread (Sonobe and Otsuka, 2011).

Economists have implemented experimental studies of management training – famously dubbed as randomized controlled trials (RCTs) – in developing countries (e.g., Field et al., 2010; Karlan and Valdivia, 2011; Berge et al., 2012; Mano et al., 2012; Bruhn and Zia, 2013; de Mel et al., 2014). In such RCTs, management training programs have been provided to entrepreneurs. The findings reveal that those interventions improve the entrepreneurs' managerial skills in the short-run (i.e., one year after the intervention).

After the adoption, it can take a longer time for an entrepreneur to realize the improvement on accounting-based business performance than on knowledge or certain management practices (Morgan and Liker, 2006; Imai, 2012). However, most of the existing experimental studies only observe the training impact in the short-run (McKenzie and Woodruff (2014). Such studies present a statistically insignificant impact of the training impact on business performance. So, those studies tend to conclude that training programs have negligible impacts. This study argues that such a conclusion may not necessarily be valid if we extend the period of observation to estimate the training impacts in the medium-run (e.g., three years after the intervention).

Indeed, knowledge regarding the training impacts of the entrepreneurs' adoption of management practices on business performance in the medium-run is rather scant. The study by Higuchi (2014), Berge et al. (2015), Karlan et al. (2015), Valdivia (2015), and Bruhn et al. (2018) are notable exceptions. Such studies present evidence concerning the medium-run impact of management training among the micro- and small-sized

entrepreneurs in Vietnam, Tanzania, Ghana, Peru, and Mexico, respectively. The results from such studies are, so far, mixed. Thus, it is imperative to investigate the medium-run impact of training further to generate sufficient evidence to feed into the policymaking[5].

Those programs have provided various contents of training materials (e.g., either the standard business or production management practices but not both). Most of the present studies do not show what type of management practices are adopted by the entrepreneurs given their business contexts. To reduce the existing gap, therefore, chapter 3 analyzes the impacts of a training program on the entrepreneurs' adoption of management practices and business performance in the medium-run (i.e., three years after the intervention).

We conducted a high-quality management training program, based on RCT, among the small manufacturing entrepreneurs in Tanzania. A sample of entrepreneurs was drawn from a similar industry (garment – which is a typical industry in the developing world)[6] in the industrial cluster in Dar es Salaam. Such entrepreneurs produce garments[7]. Thus, the entrepreneurs' heterogeneity to be controlled is relatively small compared with other RCTs which draw the sample entrepreneurs from diverse industries.

[5] Another notable exception is the study by Bloom et al. (2013) which finds evidence of positive impact of management training on productivity and profitability among the treated medium- and large-sized textile manufacturing plants in India, four years after the intervention.

[6] Some of these garment producers cater for the local consumers as tailors. Others participate in international trade fairs held in neighboring countries and sometimes succeed in selling their products in large quantities. Some producers have already entered export markets in Europe and North America. According to our key informants, the production of batik gives these producers an advantage of the abundance of *kanga* and *kitenge*, traditional cotton printed fabric, over the garment producers in the neighboring countries.

[77] Examples of such garment products include dresses, batik, *kikoi*, school uniforms, canvas, cushions and cushion covers, tote bags, tablemats, and kitchen mittens.

The majority of training programs implemented by development economists in developing economies provide one type of training contents. The training contents are mainly from the standard business management. Nonetheless, the training program designed for this study highlighted both the standard business and production management practices. The former refers to the standard contents of business development services (BDS) using the Start/Improve Your Business (SIYB) training materials developed by the International Labor Organization (ILO, 2003). The latter, which featured *Kaizen* (a Japanese word which means "continuous improvement), is a process-oriented, commonsense, and cost-effective approach to productivity improvement (Imai, 2012).

Unless specified otherwise, the dissertation refers the standard or business management practices (e.g., marketing, planning, and recordkeeping practices) as non-*Kaizen* practices. On the other hand, the production management practices (e.g., production and quality control practices), which featured *Kaizen*, are referred to as *Kaizen* practices. Hence, the management practices equal the sum of *Kaizen* and non-*Kaizen* practices score (see Appendix Table 3-1 for the specific details of each type of management practices).

Another novel feature of an experimental training program considered fo this study is that two training components were provided. While the first one was called a classroom component, the second on was dubbed as an onsite component. Participation in each of the training component was through random invitation. Thus, some entrepreneurs, called "completely-treated entrepreneurs", participated in both components whereas "partially-treated entrepreneurs" participated in only one component (i.e., either the classroom or

onsite component, but not both). Others, called "untreated or control entrepreneurs" did not participate in either component.

In the classroom component, which was conducted for two and half hours a day, for five days a week, and for four weeks, such subjects as entrepreneurship, business strategy, planning, marketing, recordkeeping, and production management were taught. In the onsite component, trainers visited individual trainees' workshops twice or three times to give concrete advice (mostly about production management and 5S of *Kaizen*). The firm-level data were collected before, immediately after, and three years after the training programs ended. Thus, such a profile of the dataset allows the dissertation to measure (quantitatively) the medium-run impacts of the training program.

The study conducts three main analyses. First, the study analyzes the medium-run impacts of a *Kaizen* program on the adoption of management practices and business performance among the treated entrepreneurs. The analysis focuses on the medium-run impacts because this strand of literature is, so far, not yet explored adequately. Also, the medium-run impact evaluation is the first study in our study sites.

Second, the study decomposes the management practices into *Kaizen* and non-*Kaizen* practices and conduct candid analyses to find out evidence of what type of practices treated entrepreneurs are likely to adapt to their business contexts in the medium-run. This is important because learning hands-on management skills is a gradual process based on trial and error until the entrepreneur establishes the most appropriate ones. Third, and last, the analysis seeks to explore the factors associated with the adoption of management practices and business performance.

The following findings standout. First, the data show that in the medium-run (three years after the intervention); the completely- and partially-treated entrepreneurs adopted a significantly larger number of management practices than their untreated counterparts. Such a finding is similar to the results of the short-run analyses (i.e., one year after the intervention). Second, the study finds out a slight difference in the magnitude of the medium-run adoption of *Kaizen* and non-*Kaizen* practices. Third, estimation results show that the coefficient of education of entrepreneur is positive and highly significantly associated with the management and non-*Kaizen* practices whereas it is slightly significantly correlated with *Kaizen* practices in the medium-run. Fourth, and last, regarding training impact on business performance, which was insignificant in the short-run, the results indicate that in the medium-run, the completely-treated entrepreneurs had significantly higher value-added and profit than that of the partially-treated and untreated entrepreneurs.

The question arises, "Why the impact of training on business performance among the completely-treated entrepreneurs became significant in the medium-run?" It is likely that while the completely-treated entrepreneurs learned many management practices from the trainers, some practices are more relevant to their operation than other practices. Indeed, the interview materials indicate that they did not have to use all the management practices that they had learned. Hence, they gradually selected and assimilated sufficiently specific management practices to fit their local business contexts and that they needed sufficient time to change their businesses substantially. Probably, this is one of the reasons why the training impact on business performance has become significant in the medium-run.

Admittedly, the findings in chapter 3 are potentially underreporting the training impacts. In part, this is because it was not possible to control the information spillovers. During the field surveys, one of the collected information includes the data related to the entrepreneurs' communication. Nonetheless, such data are not used in the rigorous impact evaluation because of the endogeneity problem. Hence, the present study cannot rigorously claim that spillovers constitute a significant part of the analyses in chapter 3. The analyses of such data (in the Appendix) indicate that both treated and untreated entrepreneurs had conversations regarding the contents of our *Kaizen* program and the untreated entrepreneurs visited treated workshops. During such visits, untreated entrepreneurs (sometimes) copied visible practices and applied to their workshops. This finding suggests the potential existence of information spillovers, which would lower the training impact.

The rest of chapter 3 is organized as follows. Section 3.2 reviews the literature and discusses the hypotheses. Section 3.3 describes the study design. Section 3.4 and Section 3.5 presents the descriptive and econometric analyses, respectively. Section 3.6 concludes.

3.2 Literature Review and Hypotheses

Management capital, which is distinct from human capital, is one of the fundamental determinants of enterprise performance (Bloom and van Reenen, 2007). Insufficient management capacity has also been linked with poor enterprise growth in developing countries (Bruhn et al., 2010). The increasing attention to management has motivated economists to conduct randomized controlled trials (RCTs) by providing managerial training to micro- and small-scale entrepreneurs in developing countries.

The findings from such studies suggest that attending short-term classroom training or receiving tailor-made onsite coaching has a significant impact on entrepreneurs' improvement in managerial skills and execution of efficient management practices (e.g., Karlan and Valdivia, 2011; Mano et al., 2012; Bruhn and Zia, 2013). Nonetheless, the impact on business performance (measured by value added, sales or turnover, and profit) is insignificant (e.g., Gine´ and Mansuri, 2014; de Mel et al., 2014; Valdivia, 2015).

An insignificant impact of training on business performance worries policymakers. Partly, because from the standpoint of an individual firm owner, investment in management training and other forms of the technology or knowledge transfer is justifiable only when such investment eventually leads to profit maximization (McKenzie and Woodruff, 2014; Comin and Mestieri, 2018).

Even though the existing studies indicate that training improves entrepreneurs' management skills, the majority estimate the impacts only in the short-run (i.e., one year after intervention). The magnitude of training impact varies, and there is no consensus on what type of managerial training is useful in what context. Depending on the training methods (e.g., classroom, onsite, or a combination of both) the impact may vary. Also, the impact may vary depending on the contents of training programs (e.g., *Kaizen* and non-*Kaizen* practices). This is true when the practices are new to entrepreneurs. Hence, the treated entrepreneurs may take sufficient time to assimilate knowledge received in the training program.

As clarified earlier, in an experimental study in Dar es Salaam, the training contents featured 5S of *Kaizen* (e.g., sorting, setting in order, shining, systematizing or

standardizing, and self-discipline). Although the *Kaizen*-practices are common among entrepreneurs in Japan and the United States, they appeared to be new to our sample entrepreneurs. According to Imai (2012), it will not be difficult for many entrepreneurs to go through the first 3S of *Kaizen* (i.e., sorting, setting in order, and shining). They will, however, go back quickly to their original disorganized situation unless proper efforts are made. Also, it takes time for trainees to adopt appropriate management practices through trial and error (Morgan and Liker, 2006).

The lack of self-discipline, informational failure, and underestimating the value of training are perceived barriers to adoption of the management practices, especially in the medium-run (Imai, 2012; Glover et al., 2011; Bloom et al., 2013; Higuchi et al., 2015). If these barriers are significant, this raises questions about the medium-run training impact and even the sustainability of the short-run training impact on the adoption of management practices. However, if these perceived barriers are non-existent or they are insignificant, treated entrepreneurs are likely to continue adopting and modifying the management practices taught in the training programs even a long time after the training programs have ended. Also, the magnitude of adoption of the management practices among the treated is likely to be somehow different depending on the intensity of treatment (i.e., whether an entrepreneur was completely or partially treated). Thus, it is worth postulating hypothesis 3.1 about the training impact on the medium-run adoption of management practices:

Hypothesis 3.1: Participation in the management training program has a positive impact on the entrepreneur's medium-run adoption of management practices, and that the adoption depends on whether an entrepreneur was completely or partially treated.

Let us explore the literature regarding the magnitude of the entrepreneurs' adoption of management practices depending on the types of practices (i.e., whether they are *Kaizen* or non-*Kaizen* practices). The review begins by discussing the possible length of time needed for entrepreneurs to learn and adopt new practices (e.g., *Kaizen* and non-*Kaizen* practices). Time was noted by Griliches (1957) in his seminal work of the study of the economic determinants of the adoption of hybrid seed corn in the United States. Also, in the study of the adoption of innovations in the coal, iron and steel, brewing, and railroad industries, Mansfield (1968) argue that time is of the essence. The findings of these two studies suggest that the adoption of technologies by entrepreneurs begins slowly and accelerates with time.

The question arises, "What types of practices that entrepreneurs are likely to adapt slowly in the beginning and accelerates over time?" In the case considered for this study, most of the *Kaizen* practices are simple, visible, and cost-effective (Panel A of Appendix Table 3-1). These practices require commonsense and short time horizon for the entrepreneurs to learn and practice them at their workshops (Imai, 2012). Thus, it is likely that initially there is a high rate of adoption of *Kaizen* practices. Indeed, in the short-run, Sonobe and Otsuka (2014) find that the treated entrepreneurs in this cluster were more likely to adopt the *Kaizen* than non-*Kaizen* practices.

However, most of the non-*Kaizen* practices, including those practices in Panel B of Appendix Table 3-1, are invisible and conceptual. Those practices are difficult for the entrepreneurs to master for themselves in the short-run (ILO, 2003). They need more time to learn and assimilate before they put them into practice. This may suggest that in the

medium-run the treated entrepreneurs are likely to adopt more of non-*Kaizen* than *Kaizen* practices because they had sufficient time to learn and practice them at their own pace. Hence, it is imperative to advance hypothesis 3.2 regarding the magnitude of adoption of the *Kaizen* and non-*Kaizen* practices.

Hypothesis 3.2: In the medium-run, the treated entrepreneurs are likely to adopt more non-*Kaizen* practices than the *Kaizen* practices.

Another factor which is likely to be correlated with adoption is the education of entrepreneurs. The studies by Sonobe and Otsuka (2006), Sonobe, Sonobe, Akoten, and Otsuka (2011), and Squicciarin and Voigtländer (2015) indicate that to introduce profitable multifaceted innovations, the education of entrepreneurs becomes critically important in the adoption decision of innovative practices. While most enterprises in developing countries are poorly managed, many enterprises in developed countries continue to adopt innovative production management practices, like the measurement of quality defects, machine downtime, inventory, and efficient factory layout (Bloom et al., 2013). Sonobe and Otsuka (2014) indicate that this difference in entrepreneurs' management practices adoption decision arises partly from the insufficiency of education in general of firm managers. Entrepreneurs with higher education, a proxy indicator of human capital, tend to have a high absorption capacity of new knowledge in the process of technology transfer. Thus, they are likely to succeed in dealing with various disequilibria including those related to production and business management (Schultz, 1975; Backman, 2013).

While the entrepreneurs' education matters, the adoption of management practices may depend on two issues. First, the type of management practices. If they are simple,

visible, or non-conceptual (e.g., the *Kaizen* practices,), most treated entrepreneurs are likely to adopt and practice them without difficulty. For these types of practices, adoption by even entrepreneurs with low levels of education is possible because they only need commonsense about human nature and human behaviors combined with close observation and thorough analysis of each specific problem in the workplace (Imai, 2012). Second, is whether those practices are abstract, invisible, or conceptual (e.g., non-*Kaizen* practices such as planning and recordkeeping practices). These are potentially difficult for entrepreneurs to conceptualize and master for themselves especially in the short-term after the classroom training. This may result in a low rate of adoption. Considering the importance of education, it seems reasonable to specify the following hypothesis (3.3):

Hypothesis 3.3: While entrepreneurs' education is correlated with the management practices, especially non-*Kaizen* practices, it is insignificantly correlated with the *Kaizen* practices.

Finally, the review turns out to the training impact on business performance. A review of sixteen impact evaluation studies by McKenzie and Woodruff (2014) indicates three major findings. First, existing firm owners implement some of the management practices taught in the training sessions. Second, the magnitudes of the improvements in practices are often relatively modest. Third, few studies show the significant impact of training on business performance, although some studies with higher statistical power have done so (e.g., Bloom et al., 2013). In those studies, sales or profit are the measures of business performance. McKenzie and Woodruff (2014) suggest that the insufficient evidence of the training impact on business performance is related to the noisy data, small

sample sizes, inadequately designed training programs, and problems with survey attrition and the measurement of revenues and profit.

Contrary to the majority of RCT studies, Bloom et al. (2013) find an increase in annual profitability of over US$ 300,000 by large-sized textile firms in India, four years after the intervention. Also, Berge et al. (2015) find the significant impact of combined human and financial intervention on the sales and profit among the male micro-entrepreneurs in Dar es Salaam, Tanzania, two years after the intervention. Moreover, Higuchi et al. (2015) find the positive impact of training on value-added, two years after the intervention, in the knitwear industrial cluster in Hanoi, Vietnam. These studies suggest that estimating the impact one year after the intervention is too early for a business owner to make substantial changes. It takes time for the entrepreneurs to assimilate the appropriate management practices taught in training before making significant business changes (Morgan and Liker, 2006; Imai, 2012).

While in the short-run, training improved the adoption of management practices among the treated entrepreneurs in our experiment, evidence of the training impact on business performance is scant. In the current study, the analysis pays attention to the training impact on business performance among the treated entrepreneurs three years after the intervention. The analysis disaggregates the treated sample based on whether they are "completely-treated entrepreneurs" or they are "partially-treated entrepreneurs". Theoretically speaking, the "completely-treated entrepreneurs" learned more practices than their "partially-treated" counterparts. As time passes, the former has a higher chance of choosing the relevant practices to their business operation than the latter. Partly, this is

because while the former received both the classroom and the onsite training components, the latter received only one training component (i.e., either the classroom or the onsite but not both). Hence, it is likely that, in the medium-run, business performance among the two groups of treated entrepreneurs is substantially different (i.e., completely-treated entrepreneurs are likely to record higher business performance than partially-treated entrepreneurs). Thus, it is commendable to advance the hypothesis 3.4 linking management training and medium-run business performance:

Hypothesis 3.4: In the medium-run, an entrepreneur's participation in the training program has a positive impact on business performance, and that a completely-treated entrepreneur is likely to record higher business performance than that of a partially-treated entrepreneur.

3.3 Experimental Design

3.3.1 Study sites and sample enterprises

The study sites are in Dar es Salaam, the largest commercial city of Tanzania. In this city, a cluster of small-scale garment producers was formed by female entrepreneurs in the 1990s (Sonobe, 2016). Female entrepreneurs partly reinforced the development of this garment cluster after receiving training conducted jointly by the Tanzania government's Small Industries Development Organization (SIDO) and the United Nations Industrial Development Organization (UNIDO). The training, which targeted mostly housewives, covered such skills as sewing, bookkeeping, and business planning.

After the training, most of them started garment production close to their houses. Thus, they started as cottage industries. Once prosperous, they encouraged their neighbors

and friends to start the same business. Hence, these micro- and small-sized garment manufacturing firms are not geographically as concentrated as in other clusters observed in developing countries. Instead, they are scattered in various locations across Dar es Salaam city (see Figure 3-1 for illustration).

When this study was designed, we three associations of garment producers in Dar es Salaam[8]. The number of members was about 700. The leaders of such associations confirmed that almost all garment producers in the city were members of at least one of these associations[9]. During the preliminary interviews, we found from their member lists that 250 firms produced garment products (e.g., dresses, school uniforms, cushions and cushion covers, tote-bags, and tablemats). We selected 114 enterprises randomly from these 250 firms to be the sample enterprises for our baseline survey. In other words, the population from which the sample was taken was the group of garment firms with own space for production and sales. On average, the sample firm employs about four workers, while twelve of them are single-person entrepreneurs.

[8] They are Tanzania Handcraft Association (TANCRAFT), Handproducts of Tanzania (HOT), and Artisan Development Association of Tanzania (ADAT). These associations are organized by the entrepreneurs themselves. They offer a wide range of services (e.g., marketing information, coordination of local and international trade fairs especially in the neighboring countries, lobbying, and policy advocacy support).

[9] There was another business association called SHIME. This association had a common marketplace in which its members procured materials and sold products. Moreover, the few members of this association had employees. Thus, they did not need the knowledge of marketing or labor management as much as the members of the other associations, who operated independent businesses by owning or renting space for production and sales, as opposed to sharing space with other businesses. We excluded members of SHIME from our scope. We instead focused on the members of TANCRAFT, HOT, and ADAT.

3.3.2 Training intervention and field surveys

To give a complete view of the sequencing of the experimental activities, Figure 3-2 provides the timeline and sequence of events since the beginning of the program. The Figure shows the start and ordering of all the events that transpired during the program. As shown in Figure 3-2, before the intervention, we conducted a baseline survey of 114 sample enterprises in April 2010.

Then, we designed an intervention. In addition to the standard business management, our intervention introduced the *Kaizen* approach to production management. The contents of the *Kaizen* training emphasized productivity improvement by the collaborative and continuous effort of the entrepreneurs and their workers. Specifically, the *Kaizen* training contents emphasized that entrepreneurs should create a smooth, safe, and efficient workflow. Since garment manufacturing is a labor-intensive industry, entrepreneurs can mobilize workers and quickly make small changes to design a better workflow to reduce various wastes in production. According to *Kaizen* experts, effective communication between firm owners and workers is a necessary precondition to start *Kaizen* activities. Indeed, the contents of the *Kaizen* training encouraged entrepreneurs to explain to their workers why they want to introduce *Kaizen* and ask for their cooperation.

The program, through an implementing counterpart, signed a contract with a consulting firm in Japan. Such a firm dispatched a *Kaizen* expert with excellent command of English and with at least ten years of field experience to our study site. Also, we hired five local management consultants. The leader of the local consultants is qualified as a Master Trainer of the International Labor Organization's Start Your Business (SYB) and

Improve Your Business (IYB) training program. The ILO-S/IYB training is considered the international standard of business development service training. It includes entrepreneurship, business strategy, business planning, marketing, accounting, and recordkeeping.

The local consultants learned the basic *Kaizen* and the skills in teaching production management to business owners from the international expert. Such an international technology transfer to the local consultants was done after class during the period of the classroom training and during the period of making the model workshops. In the latter period, the international expert taught the local consultants how to improve workshop layouts, how to encourage business owners to talk with their workers, and other essential skills. The *Kaizen* international expert taught the local consultants in English, and the latter taught the training participants in Kiswahili language, which all the five local consultants and the invited entrepreneurs in our sample could understand without any problems associated with language.

The training intervention had two components. The first component was called classroom training. It was conducted between May and June 2010 and consisted of a series of lectures about the production and quality control practices. Other taught subjects in the classroom training included entrepreneurship, business strategy, planning, marketing, and bookkeeping. Additionally, we provided a training session about color coordination and garment product-design, responding to a strong request from the entrepreneurs.

The classroom training was held in the daytime at the New Africa Hotel in Dar es Salaam. A two-and-a-half hour lecture was held every day for four weeks, thereby making

the duration of the whole classroom training equal to 50 hours. To reduce the opportunity cost of attending the classroom training, the invited entrepreneurs could decide on the classroom time that they felt would least inconvenience their businesses. They chose to start the classroom training daily at 13:00 hrs. To the extent that this self-selected time was agreeable, most of the participants came on time for attending the training session. Also, the participants were provided with a token amount of money, about US$ 10, to cover transport costs each week.

The second type of training was the onsite training program. It was offered to the sample entrepreneurs for a minimum of two and up to eight days. In this program, which was conducted from November 2010 to February 2011, instructors visited the participants' workshops. In many cases, the instructors' advice was mostly about production management including the application of the 5S of *Kaizen*. Also, the onsite training participants were free to ask the instructors for advice about marketing, planning, and other aspects of business management. Each participant in this program received 14 to 18 hours of onsite consultation.

After the classroom training program and the interim follow-up enterprise survey, two model enterprises were selected from the classroom training participants. The model workshops were set up to train the local consultants about *Kaizen*. In this consultant training, the Japanese *Kaizen* expert instructed the local consultants. The local consultants learned how to implement *Kaizen* practices for small enterprises by working as assistants to the Japanese expert. Similarly, the model workshops were used as showcases displaying the basic *Kaizen* practices to the onsite training participants. Without visible examples, it would

be difficult for the local consultants to explain such practices to the entrepreneurs. For this purpose, each model enterprise had to have sufficient space so that visitors, namely other training participants, could be accommodated, and each model enterprise had to be willing to show their business operation and more importantly their application of the knowledge, mostly *Kaizen*, that they had acquired from the training to their practices, including workshop layout, the way of storing tools, materials, work in progress, and products, and various aspects of housekeeping and operation. The trainers and researchers agreed unanimously to select two classroom training participants' workshops as the models based on these criteria.

The two selected model workshops received intensive training from the local and international trainer for about two weeks in October 2010. Panel 3-3A and 3-3B of Figure 3-3 highlight the original inefficient storage and the more efficient storage that resulted after the training, respectively. Because of improved storage, the entrepreneur now avoids loss of time searching for the materials to sell and has reduced goods that suffer from obsolescence. The latter Panels 3-3C and 3-3D, as well as 3-3E and 3-3F of Figure 3-3, portray how the inefficient utilization of workshop space was transformed to a more efficient one, which created more space for the workers to work. Thus, the enterprise owner added more machines which were kept idle for years due to the limited space before the workshop transformation.

From November 2010 to February 2011 the consultants visited the participants' workshops for a minimum of two and a maximum of eight times. They demonstrated how to apply the *Kaizen* practices, mainly the 5S, to improve their working environment,

productivity, and product quality. The number of workshop visits was determined by the local consultants, depending on the willingness and availability of each trainee.

Finally, we conducted the first post-program follow-up enterprise survey in April 2011, soon after the on-site training program. The second and third post-program follow-up enterprise surveys were conducted in September 2012 and in March 2014, respectively. During the surveys, we collected data on the educational and occupational backgrounds and other basic characteristics of the entrepreneurs and their enterprise, employment, production costs, management practices, sales revenues, marketing, and investments.

3.3.3 Randomization and take-up rates of treatments

We randomly assigned a total of 114 sample enterprises in our baseline samples into three treatment groups and a control group. The first treatment group was invited to both the classroom and onsite training programs and labeled as Group TT. The second and third were labeled Group TC and Group CT, respectively. In these groups, entrepreneurs were invited only to either the classroom (TC) or the onsite program (CT). Group CC, the control group, was invited to neither of the programs. The model enterprises mentioned above, however, were not selected randomly. To serve as a role model, an enterprise had to be willing to accept other training participants' visits and hence had to have sufficient space.

Because they were treated differently from the other treated enterprises, we exclude them from our statistical analyses. Also, we exclude four exceptionally large enterprises that had above 95 percentile business size before the training (measured by sales revenue and profit in 2009) as well as one enterprise from which we were not able to collect reliable

data. Thus, our current empirical analysis is based on 107 sample enterprises, and Group TT, Group TC, Group CT, and Group CC consist of 26, 24, 28, and 29 sample enterprises, respectively.

Of the 50 sample enterprises invited to the classroom training (Group TT and TC), 45 participated (hence, the take-up rate of 90 percent). An invited entrepreneur was taken to be a participant if he or she attended at least 10 days out of the 20 days of training. By contrast, all 54 entrepreneurs invited to the onsite training (Group TT and CT) received our consultation, presumably because of the instructors' visits to each enterprise, which would reduce the opportunity cost of receiving an onsite consultation. For both the classroom and onsite training programs, the participants were those who had been invited to the programs. These take-up rates are higher than any take-up rates observed in the impact evaluation studies dealt with by McKenzie and Woodruff's (2014) survey of the literature.

High take-up rates suggest that our garment manufacturing entrepreneurs were eager to learn about management. Their enthusiasm to receive our management training was also observed during the classroom training sessions. That is, we often observed that the classroom training sessions went beyond the stipulated time with the consultants further being requested to explain some concepts to the participants. In some cases, the training participants stayed back on their own accord to explain the concepts to each other.

3.4 Descriptive Analyses

3.4.1 Balance

Table 3-1 shows the key variables by treatment status. Panel A presents the firm owners' characteristics for each treatment and control group. Middle-aged (i.e., about aged 45

years), female entrepreneurs dominate the sample entrepreneurs considered for this randomized controlled experimental study. Partly, it is because this industry was developed by the housewives who received SIDO-UNIDO training in the 1990s.

The education level of our sample entrepreneurs is about ten years of schooling. Such educational level is higher than the average schooling attainment in Tanzania, which is, 5.12 years for those aged 25 years or above as of 2010 (Barro and Lee, 2013). Together with the observation that most of our sample entrepreneurs had past business training experience or work experience in the textile industry, the high education level may illustrate that only a selected population could become manufacturers given the economic and business environment in Tanzania.

The entrepreneurs who are Chagga, an ethnic tribe known for being hardworking and having business networks throughout Tanzania (e.g., Samoff, 1982; Kristiansen, 2004; Egbert, 2009), account for about one-quarter of our sample. To the extent that the *t*-values are statistically insignificant for all variables except for the female dummy in column 5, our randomization was successful.

In order to quantify management practices, this study follows the lead of Bloom and van Reenen (2007) by constructing management scores based on 27 diagnostic criteria (see, Appendix Table 3-1). Also, the study decomposes such management scores as production management practices (henceforth "*Kaizen* practices") and standard business management practices (hereto referred to as "non-*Kaizen* practices") with maximum scores of 15 and 12, respectively. During the surveys, the enumerators visited each sample enterprise and judged whether the enterprise met each criterion based on either their visual inspection or on the

way in which the entrepreneur responded to our survey questions. For each enterprise, the management score is the number of the diagnostic criteria that it was found to meet. The lowest possible score is zero. The highest score of management, *Kaizen*, and non-*Kaizen* practices is 27, 15, and 12, respectively.

Regarding the measurement of business performance, the study applies the accounting-based indicators such as value-added and profit[10]. McKenzie (2012) posits that taking averages over time helps to reduce noise in the data on accounting-based performance indicators with low autocorrelation. Thus, the study takes the average values in 2008 and 2009 as the baseline business performance. To compare business performance covering several years, the values are adjusted by using the PPP conversion factor from the World Bank's World Development Indicators. Also, the analysis uses the exchange rates and GDP deflators to adjust the values of the business performance. The results are basically the same.

[10] de Mel et al. (2009) recommend directly asking the amount of profits for microentrepreneurs. But, we adopted the item-by-item data collection approach because all our sample entrepreneurs are garment manufacturers, and thus, we could list all the relevant items for the sales and costs. The enumerators did not ask respondents the amount of value added or profit. Instead, they asked the questions related to the quantity and price of each item produced and the costs of material, subcontracting, energy and utilities, transportation, and business communication. Sometimes, entrepreneurs presented written records to our enumerators. Using such information, our enumerators computed the value added by subtracting the costs from the sales revenue. Next, the enumerators showed the estimate to the entrepreneur. If the entrepreneur perceived the estimate to be unrealistic, the enumerator probed further information to revise the estimate until that estimate made sense to the entrepreneur. Admittedly, such data collection method required capable enumerators. We hired qualified enumerators with experience (i.e., they had bachelor degrees and prior field enterprise survey experience). Also, they received training before the beginning of the survey. All interviews with our sample entrepreneurs were conducted in Kiswahili. Finally, we computed the profit by subtracting their value added and labor costs from the sales revenue.

Panel B of Table 3-1 (and Figure 3-4 for easier visualization) diplays the management scores. Despite the randomization, Group TT has significantly higher baseline management scores compared with Group CC, see column (5). Presumably, this is because of the insignificant but higher human capital (years of schooling) and business training among entrepreneurs in Group TT (column (5) of Panel A of Table 3-1). Soon after the onsite training, the management scores of Group TT and Group CT became almost the same but higher than that of Group CC. The differences between the treated groups and control group were sustained one and half years after the training. The finding suggests the sustained training impact on the adoption of management practices taught in the training program.

Comparing the management scores at the baseline and one and half years after the training, however, the scores of Group CC also increased (potentially due to the spillovers of knowledge). Comparing one and half years and three years after the intervention, the increased score dropped among all groups while it remained at a higher level than at the baseline. Such changes are suggestive evidence that treated and untreated entrepreneurs became excited about our training programs and started to adopt some management practices regardless of their effectiveness or relevance to their business. As time passed, however, they possibly started selecting practices to adopt on a trial-and-error basis as they realized that some practices were more relevant to their operation than others. Indeed, our interview materials indicate that treated entrepreneurs gradually recognized that they did not have to use all the *Kaizen* practices that they had learned. Also, they modified the useful practices.

Panel C and D of Table 3-1 show the value-added and profit, respectively. Also, Figure 3-5 illustrates the value-added and profit of each group of entrepreneurs before and after the intervention. The *t*-values reported in columns (5) to (7) of Table 3-1 are insignificant for the baseline, 2011, and 2012 values of the value added and profit. However, the value added and profit of Group TT is significantly higher than that of Group CC in 2013 thereby implying that Group TT continued to increase value-added and profit (Figure 3-5). The finding suggests that combining classroom and onsite components is useful in accelerating business performance.

The cumulative distribution function (CDF) in Figure 3-6 to illustrates the differences in the value-added and profit by a group at the baseline (Panel 3-4A and 3-4C) and in 2013 (Panel 3-4B and 3-4D). Although there seems to be no baseline difference by the group, Group TT performs better than the other groups in 2013, almost first-order stochastically dominating other groups. The Kolmogorov-Smirnov test does not reject the null hypothesis of equal distribution in Groups TT and CC at the baseline, but it rejects the corresponding null hypothesis in 2013 with a *p*-value of 0.007 for the value added and a *p*-value of 0.088 for the profit.

The results, in Table 3-1, reveal changes in the business performance of Group CC (i.e., the untreated entrepreneurs). The value-added and profit of Group CC increased from the baseline in 2010 to 2011 and dropped again in 2012. The drop is potentially due to stiff competition with Chinese imports and partly because of Tanzania-China Friendship Textile Co., Ltd (URAFIKI), a major supplier of raw materials to small-scale garment enterprises, which stopped production.

Table 3-2 (and Figure 3-4), decomposes the management practices score into *Kaizen,* and non-*Kaizen* practices score. In so doing, it is likely to highlight remarkable changes in the adoption of each type of practices and each group of entrepreneurs across different surveys (i.e., before and after the intervention). While Panels A and C of Table 3-2 presents the average *Kaizen* and non-*Kaizen* practices scores, Panels B and D of Table 3-2 show the results of a *t*-test of changes in the adoption of such practices between surveys in each group, respectively.

From the baseline survey up to the second follow-up survey, there was an increase in the adoption of *Kaizen* and non-*Kaizen* practices. This finding applies to the treated and untreated entrepreneurs (potentially due to imitation from treated entrepreneurs). However, one and half years after the intervention *Kaizen* and non-*Kaizen* practices scores started to decline. That is, as shown in Table 3-2, such practices scores were significantly lower in the third follow-up survey (i.e., three years after the interventions) than in the second follow-up survey (i.e., one and half years after the interventions). The finding is likely to be stemming from the possibility that treated entrepreneurs, as well as the imitators (i.e., untreated entrepreneurs), discarded some practices which, given their business operation, were irrelevant. Additionally, Table 3-2 reveals that three years after the intervention, *Kaizen* and non-*Kaizen* scores remained higher than their baseline scores among all entrepreneurs.

3.4.2 Attrition

As discussed in section 3.3.2 of this dissertation, the experimental study conducted a baseline survey, an interim follow-up, and three follow-up surveys. From the baseline

survey to the first follow-up survey, there was no incidence of attrition. However, by the time of the second follow-up survey, three entrepreneurs had stopped operation. Thus, their data were not collected.

During the third follow-up survey, two out of the three entrepreneurs, who did not operate during the second follow-up survey, resumed their business operation. Hence, the fieldwork research team collected their data. Nonetheless, it was found that six enterprises had stopped operation by the time of the third follow-up survey. One enterprise in Group TC and two in Group CT did not operate at the time of the second follow-up survey. One enterprise in Group TT, three in Group CT, and two in Group CC did not operate at the time of the third follow-up survey.

To ascertain whether attrition is driving the estimation results, this dissertation explores the correlation between attrition and the entrepreneur's treatment status. That is, the study seeks to confirm whether or not a sample entrepreneur who was not in business operation during the third follow-up survey is not associated with its treatment status. The estimates show that attrition is not systematically correlated with the treatment status (see column (5) of Appendix Table 3-3). With these results, therefore, it is affirmed that attrition is not affecting the estimation results.

The high rate of attrition reported by McKenzie and Woodruff (2014) is one of the problems associated with the mixed results of many RCTs studies on development programs in developing countries. In this study, the attrition rate is kept to a minimum. Two possible reasons can explain such a minimum rate of attrition. The first reason is partly due to the focus of the study on the manufacturing entrepreneurs. The manufacturers are likely

to stay in the same business longer than micro-entrepreneurs due to the purchased production equipment. The second reason, which is linked to the empirical literature on the persistence of firms (e.g., Evans 1987; Söderbom et al., 2006), is likely to be explained by the relatively larger size of the sample enterprises considered for this study than most of the microenterprises considered in the RCTs conducted in developing countries.

3.4.3 Externality

During the follow-up surveys, the fieldwork team collected data related to the sample entrepreneurs' communication. In the initial design of the study, it was conjectured that such data could potentially provide suggestive evidence of knowledge spillovers. Admittedly, however, it is impossible to control for their effects because spillovers are possibly endogenous. Another challenge is a lack of suitable instrument variable that has the potential to mitigate the endogeneity problem. Regardless of the endogeneity problem, the empirical analysis cannot ignore the issue entirely. For further details on spillover issue, see the Appendix.

3.4.4 Reliability of outcome measures

One of the concerns in the existing impact evaluation studies is skepticism about the measures of the outcome variables. Before econometric analyses, studies that evaluate training impact should check the reliability of the outcome measures by examining how the management scores and business performance are correlated with the entrepreneurs' characteristics (Bloom and van Reenen, 2007). Some empirical studies have done so (e.g.,

Bloom et al., 2013; Mano et al., 2014; Higuchi et al., 2015). Thus, here a discussion of such regressions may not add much value.

Instead, the study investigates the reliability of the outcome measures by conducting regressions involving business performance and *Kaizen* practices scores, business performance and non-*Kaizen* practices scores, and business performance, *Kaizen*, and non-*Kaizen* practices scores. Thus, it is possible to discuss whether the *Kaizen* scores are more strongly associated with business performance than the other standard management scores, such as the non-*Kaizen* practices scores, or whether the *Kaizen* scores are associated with business performance conditional on standard management scores. These analyses can be done by using the baseline and endline data. However, the study uses the endline data because the main analysis is devoted to the medium-run training impact on the adoption of management practices and business performance[11].

Appendix Table 3-2 presents the results of the regressions for this purpose. Columns (1) to (6) and columns (7) to (12) show the correlates between the value-added and profit with both the *Kaizen* and non-*Kaizen* scores, respectively[12]. It is found that the coefficient of *Kaizen* scores is smaller than that of non-*Kaizen* scores. Indeed, business performance is endogenous. Nonetheless, the variables that capture business performance

[11] The regressions take the form of $y_i = f$(*Kaizen* practices scores, X_i), $y_i = f$(non-*Kaizen* practices scores, X_i), and $y_i = f$(*Kaizen* practices scores, non-*Kaizen* scores, X_i). The dependent variable y_i can be value added or profit, whereas X_i captures the basic characteristics of entrepreneur i.

[12] The study aggregated the *Kaizen* and non-*Kaizen* practices scores to get the overall management practices. Upon regressing the variables which capture business performance on the management practices scores (i.e., $y_i = f$(management practices, X_i), it is found, in Appendix Table 3, that business performance measured by value added and profit is correlated with the overall management practice scores.

are regressed on *Kaizen* and non-*Kaizen* scores while controlling for the baseline values of the value added and profit. The results, in the columns (2) and (4) and in the columns (8) and (10), indicate that the value-added and profit is positively associated with *Kaizen* and non-*Kaizen* scores, and their coefficients become smaller. While the coefficients of *Kaizen* scores are insignificant in columns (2) and (8), the coefficients of the non-*Kaizen* scores are significant in columns (4) and (10). This can be interpreted as being that part of the association is ascribed by their baseline values of the value-added and profit.

However, the results reveal that the coefficient of the *Kaizen* scores reduces in magnitude, remains positive, but becomes statistically insignificant conditional on the non-*Kaizen* scores (columns (5) and (11) of Appendix Table 3-2). This is due to the possibility that the non-*Kaizen* scores explain part of the correlation as its coefficient is positive and statistically significant. In columns (6) and (12), after controlling for the baseline values of value-added and profit, the coefficient of the *Kaizen* scores becomes negative and insignificant whereas that of the non-*Kaizen* scores remains positive and marginally significant for value added in column (6) and insignificant for profit in column (12). The estimates suggest that *Kaizen* and non-*Kaizen* scores are correlated with our measures of business performance. The correlation, therefore, suggests that the measurement of *Kaizen* and non-*Kaizen* practices is reliable.

3.5 Econometric Analyses

This section sketches out an approach for rigorous impact evaluation of the *Kaizen* training program on the entrepreneur's adoption of management practices and business

performance. First, the section presents the empirical specification (see subsection 3.5.1). Second, and last, the section discusses the estimation results (subsection 3.5.2).

3.5.1 Empirical specification

The study specifies the basic econometric equation (3.1), which characterizes the difference-in-difference (DID) estimator, as follow:

$$y_i = \tau_0 + \tau_B B_i + \tau_E E_i + X_i \tau + \tau_P Y_{Pi} + \varepsilon_i , \quad (3.1)$$

where y_i is the outcome variable (e.g., management practices scores, value-added, and profit) of enterprise *i*. Equation (3.1) is estimated by using the baseline and third follow-up survey data conducted in March 2014 because the scope of my study focuses mainly on the analyses of the medium-run impact of a management training program. B_i is a dummy variable taking 1 if an enterprise *i* was invited to both training programs, 0 otherwise. A dummy variable E_i takes 1 if an enterprise *i* was invited to one of the training programs, 0 otherwise. X_i is a vector of variables representing the characteristics of an entrepreneur *i*. Following the lead of McKenzie (2012), Y_{Pi} is included in equation (3.1). For the enterprise *i*, Y_{Pi} is the outcome variable in the past. The coefficients of B_i, E_i, X_i, and Y_{Pi} are τ_B, τ_E, τ, and τ_P, respectively. τ_0 is a constant term. ε_i is an error term.

The analysis uses two econometric strategies. They are the intention-to-treat (ITT) effects and the treatment-on-the-treated (TOT) effects. While ITT captures the impact of training on the invited entrepreneurs, TOT captures the training impact on the compliers (i.e., those who participated in the training program). To estimate TOT, the actual

participation status is instrumented with the random invitation status (Imbens and Angrist, 1994). Concretely speaking, the analysis replaces the invitation to both programs (either program) with participation in both programs (either program) in equation (3.1).

The invitation to both programs (either program) is used as an instrument for participation in both programs (either program). By so doing, it is possible to estimate the medium-run impact on the compliers, who were induced to participate in the training by the random invitation. The estimated TOT is expected to be about the same as or slightly larger than the ITT estimates because the take-up rate for the training programs was high (see, Section 3.3).

3.5.2 Estimation results

Table 3-3 presents the estimates of equation (3.1) with the dependent variable y_i being the overall, *Kaizen*, and non-*Kaizen* practices scores. While columns (1), (3), and (5) report the ITT estimates, columns (2), (4), and (6) present the TOT estimates. As expected, the ITT and TOT estimates are approximately similar due to the high take-up rate. The first-stage *F*-statistics reported toward the end of columns (2), (4), and (6) are larger than the minimum threshold of 10. Hence, the instrumental variable used in our analyses is valid.

Columns (1) and (2) indicate that the training impact on the entrepreneurs' adoption of management practices is positive and statistically significant three years after the intervention. The coefficient of 2.70 and 3.07 in the first and second row of column (2) can be interpreted that in the medium-run, the completely-treated entrepreneurs and the partially-treated entrepreneurs improve management practices by 2.70 and 3.07 points more

than their untreated counterparts. The size of coefficients suggests that in the medium-run, the completely-treated entrepreneurs adopted fewer practices compared to their partially-treated counterparts. The results, therefore, are in line with hypothesis 3.1 which postulates that training program has a positive impact on the entrepreneur's medium-run adoption of management practices and that the adoption depends on whether treated entrepreneurs participated in both or either training components.

As pointed out earlier, the study disaggregates the management practices into *Kaizen* and non-*Kaizen* practices. The results of the regressions with each type of practices as a dependent variable are shown in columns (3) to (6). The first and second rows of columns (3) to (6) show the positive impact of an entrepreneur's participation in both training programs and either program on the medium-run adoption of *Kaizen* and non-*Kaizen* practices. The estimates are all statistically significant except those of the first row of columns (3) and (4) for entrepreneurs who participated in both training programs. The insignificance of the coefficients in the first row of column (3) and (4) may potentially be attributed to the sample size because the *t*-value of 1.646 and *z*-value of 1.621 are close to the minimum threshold of the 10 percent level.

Also, there is a marginal difference in magnitude of the medium-run adoption of the *Kaizen* and non-*Kaizen* practices. For example, completely-treated entrepreneurs improved the *Kaizen* and non-*Kaizen* practices by 1.40 and 1.32 points more than the untreated entrepreneurs, respectively. Partially treated entrepreneurs improved the *Kaizen* and non-*Kaizen* practices by 1.19 and 1.94 points more than the untreated entrepreneurs, respectively.

The difference in the size of adoption suggests that in the medium-run, treated entrepreneurs adopt non-*Kaizen* practices more than *Kaizen* practices. However, the difference does not mean that *Kaizen* practices are less important than non-*Kaizen* practices. The difference may imply that while some entrepreneurs continued to adopt *Kaizen* practices, others continued to adopt non-*Kaizen* practices at their own pace. Indeed, the difference suggests that participants adopt appropriate management practices for their own business at a time. This is essentially different from one enterprise to another. Another possible reason is about the reasonable time needed for the treated entrepreneurs to learn and adopt abstract and conceptual practices (non-*Kaizen* practices) consistent with our hypothesis 3.2 on the probability that in the medium-run, the treated entrepreneurs may adopt more non-*Kaizen* practices than the *Kaizen* practices.

The results of the medium-run impact of training on the treated entrepreneurs' adoption of management practices mirror relatively similar results in the short-run (i.e., one year after the intervention). That is, in the short-run, the training had a positive and highly significant impact on the adoption of management practices among the treated entrepreneurs (see columns (1) to (6) in the Appendix Table 3-4). The findings point to two important observations that deserve clarity. First, while the adoption of non-*Kaizen* practices among the partially-treated entrepreneurs was significant in the medium-run (see the first two coefficients in columns (5) and (6) of Table 3-3), it was insignificant in the short-run (see the first two coefficients in columns (5) and (6) of Appendix Table 3-4). The finding is likely to be attributed to the invisibility nature of the non-*Kaizen* practices. Hence, it is possible that the partially-treated entrepreneurs needed more time to learn such

invisible practices than their completely-treated counterparts who benefited from both training components.

The second observation is related to the magnitude of adoption. The coefficients in the first row of columns (1) to (6) in Table 3-3 are smaller than their corresponding coefficients in the Appendix Table 3-4. The smaller coefficients may suggest that in the medium-run the completely-treated entrepreneurs discarded some practices (which they adopted in the short-run). Arguably, such discarded practices were potentially irrelevant to their business setup. In contrast, such coefficients in the second row of columns (1) to (6) in Table 3-3 are, on average, larger than their corresponding coefficients in the Appendix Table 3-4. The estimates may reflect that in the medium-run, the partially-treated entrepreneurs continued to progressively adopt more practices than the case encountered during the short-run.

Now, the study investigates the correlation between an entrepreneur's formal education and the adoption of management practices. The estimates reveal that an entrepreneur’s education, measured by the years of formal schooling, is associated with the adoption of the management practices. That is, as shown in columns (2) of Table 3-3, the coefficient of the entrepreneur’s years of formal schooling is positive and highly significant at the 1 percent level. Concretely speaking, a one-year increase in formal schooling is associated with a 0.473 point increase in the medium-run adoption of the management practices. This suggests the importance of the education of firm owners in inducing the adoption of profitable multifaceted innovations, including the management practices recommended by the instructors in our training program.

While education is positively associated with the adoption of management practices, its association with the medium-run adoption of *Kaizen* practices is marginally significant. As indicated in column (4), the positive coefficient of years of schooling in the adoption of *Kaizen* practices is smaller than that of the adoption of non-*Kaizen* practices in column (6). Whereas the correlation is marginally significant in column (4), in contrast, it is highly significant in column (6). The results suggest that even those entrepreneurs without high formal education can understand and adopt *Kaizen* practices, which were emphasized in both the classroom and onsite training programs. Likewise, the results suggest that for non-*Kaizen* practices, which are abstract and conceptual, the high education of entrepreneurs is necessary for facilitating the medium-run adoption. These findings are consistent with hypothesis 3.3 which asserts that whereas the entrepreneurs' education is correlated with the adoption of management practices, particularly the non-*Kaizen* practices; it is marginally correlated with the *Kaizen* practices.

Thus far, the estimation results have proved, beyond a reasonable doubt, that the *Kaizen* training program had a positive and statistically significant impact on the adoption of management practices in the medium-run. In the next strand of analysis, the study diligently conducts a rigorous investigation to generate evidence related to the training impact on business performance. To do that, the study estimates equation (3.1) using value-added and profit (the preferred measures of business performance) as dependent variables. The analysis uses the 2013 data collected three years after the intervention, for the medium-run regression analyses while controlling for the baseline average values of value-added and profit in 2008 and 2009. The results of the medium-run impact on business

performance are presented in Table 3-4. Columns (1) and (2) present the ITT and TOT estimates for value added, while columns (3) and (4) present the ITT and TOT estimates for profit, respectively. The first-stage *F*-statistics reported toward the end of columns (2) and (4) for the TOT estimates are larger than the minimum threshold of 10. Thus, the instrumental variable is valid.

As shown in columns (2) and (4), the coefficient of completely-treated entrepreneurs is positive and statistically significant for value-added and profit. The coefficient of value added has a higher statistical significance than that of profit. The finding may be ascribed to the fact that during training, the *Kaizen* component emphasized the reduction of material waste. This has a direct bearing on value-added through production management and quality control practices. The coefficient for participation in both training programs is economically large (i.e., the estimated medium-run impact of the combination of the two programs on value added in column (2) is 3,017 USD and on profit in column (4) is 2,380 USD). The finding offers support to hypothesis 3.4 that, in the medium-run, the completely-treated entrepreneurs are likely to record higher business performance than their partially-treated colleagues.

These positive and statistically significant coefficients are, however, different from most impact evaluation studies that analyze training impact in the short-run. Two possible reasons can explain the findings. First, participation in the classroom and onsite programs is more effective than participation in either one program. This is because completely treated entrepreneurs learn more management practices in the former than in the latter. Thus, on a

gradual basis, they potentially have more options to select some relevant practices suitable to their business context gradually.

Second, time is of the essence. That is, maybe the treated entrepreneurs, especially those who benefit from both classroom and onsite training components, need sufficient time to make changes to improve their businesses substantially. To strengthen such a conjecture, the study has shown that in the short-run (i.e., one year after the training intervention), the *Kaizen* training program had a positive but marginal impact on business performance among the treated entrepreneurs (see columns (7) to (10) in the Appendix Table 3-4). Such an insignificant impact on the accounting-based measures of business performance is, indeed, related to the necessary amount of time required by the treated entrepreneurs to integrate the adopted management practices in their business. There is the likelihood that one year after the intervention was too early to gauge the significant impact on business performance.

Another observation, in the medium-run impact analysis, is an insignificant coefficient of the partially-treated entrepreneurs on the measures of business performance (i.e., the value added and profit). Admittedly, this is a puzzle because of two reasons. First, the partially-treated entrepreneurs adopted certain management practices (see column (2) and (3) in Panel B of Table 3-1). Second, the coefficient of the partially-treated entrepreneurs in the second row of Table 3-3 is larger than that of their completely-treated counterparts. Such a significant coefficient implies that the training impact on this group of treated entrepreneurs induced the adoption of the management practices, *Kaizen* practices, and non-*Kaizen* practices.

A question arises, “How to explain such a puzzle?” There is a probability that such a puzzle can be explained by the extent to which entrepreneurs assimilated the relevant practices adequately from a pool of many practices covered during the training interventions. That is, since they attended both training components, the completely-treated entrepreneurs had a broader choice to select practices which were more relevant for effective transformation of their businesses than their partially-treated counterparts. Thus, it is possible that the completely-treated entrepreneurs (who had a wide-ranging choice of practices) assimilated sufficiently such relevant practices to their business operation whereas their partially-treated counterparts (who had limited choices of practices) simply adopted as many practices as possible. Such a simple adoption of certain management practices (without necessarily being relevant to business operations) is likely to be one of the explanations for such a puzzle.

Next, is to investigate the possible answer to the follow-up question, “What are those relevant practices adopted by the completely-treated to effectively contribute to improving their business performance?” The answer to this question can provide supportive evidence specific management practices that matter. For this purpose, columns (2) to (6) in the Appendix Table 3-1 present the specific practices adopted by the treated and untreated entrepreneurs by the time of the third follow-up survey in March 2014. The descriptive analyses reveal that such relevant practices include some *Kaizen* and non-*Kaizen* practices. Examples of such *Kaizen* practices include recordkeeping of quality defects and customers’ complaints about the products sold, sorting value-adding raw materials from the scrap, removing scraps and cleaning the floor of the workplace, and weekly maintenance of

machines. Similarly, the example of non-*Kaizen* practices is recordkeeping of materials purchases. As shown in the corresponding rows in the Appendix Table 3-1, these practices were largely adopted by the completely-treated entrepreneurs than their partially-treated counterparts. Those practices, according to management experts, eliminate wastes, improve product quality, and gradually they are likely to improve business profitability.

Lastly, columns (2) and (4) of Table 3-4 show that in the medium-run, female entrepreneurs recorded higher value-added and profit than their male counterparts. Specifically, I find in column (2) and (4) that, on average, female entrepreneurs recorded about 3,058 USD and 3,204 USD higher value-added and profit than that of male entrepreneurs, respectively. These estimates are statistically significant, which may suggest that, in the medium-run, female entrepreneurs in this cluster performed better than male entrepreneurs. Another finding to note is the coefficient of the baseline value-added and profit. I find, towards the bottom of Table 3-4 that the coefficient of the value added and profit in the past is positively associated with the value-added and profit in 2013, respectively. The estimates suggest that part of the value-added and its corresponding baseline value explains profit recorded by an entrepreneur in 2013.

3.6 Conclusion

Chapter 3 analyzes the impact of a training program on the adoption of management practices and business performance among small-scale entrepreneurs in Dar es Salaam. Four key findings stand out. First, the study finds out evidence revealing significant training impact on the adoption of certain management practices among the treated

entrepreneurs in the short- and medium-run. The finding provides evidence about the sustainability of the training impact on the adoption of management practices. Similarly, the finding confirms that management training programs improve the hands-on management skills of entrepreneurs in developing countries.

Second, the empirical analysis reports a slight difference in the magnitude of the entrepreneurs' medium-run-adoption of *Kaizen* and non-*Kaizen* practices. Such a difference may suggest that some treated entrepreneurs continued to adopt *Kaizen* practices while others continued to adopt non-*Kaizen* practices at their own pace given the specific needs of their business at a time.

Third, the estimation results show that education is significantly associated with the medium-run adoption of the management practices. However, its statistical significance, regarding the medium-run adoption of *Kaizen* practices, is marginal. The finding suggests that even entrepreneurs with a low level of formal education can understand basic *Kaizen* practices. Also, the results may suggest that because of the abstract and conceptual nature of non-*Kaizen* practices, high level of entrepreneurs' education is necessary for the adoption of such practices.

Fourth, and last, the estimates reveal a positive and significant impact of *Kaizen* management training program on business performance in the medium-run. Specifically, the study finds that the completely-treated entrepreneurs had significantly higher value-added and profit three years after the intervention. Such finding suggests that reasonable time is necessary for completely-treated entrepreneurs to assimilate certain management practices absorbed in the training program before they make substantial business changes

for the better. Likewise, it is possible that completely-treated entrepreneurs who learned many practices gradually selected certain management practices that are relevant to their business contexts. Thus, the finding suggests that complementarity between the classroom and onsite training programs is useful for inducing the adoption of relevant management practices by the treated entrepreneurs, which, in turn, may substantially ignite entrepreneurs' business performance.

Admittedly, the issue of spillovers of knowledge in our training program cannot be completely dismissed. The central assumption for this analysis is that there are no spillovers of knowledge (Rubin, 1978). However, this assumption may not hold rigorously, especially in an industrial cluster setting. As shown in the Appendix, the treated and untreated entrepreneurs had conversations about our *Kaizen* training program. The untreated entrepreneurs sometimes visited the workshops of their treated entrepreneur counterparts where they admitted to having imitated some useful practices. Hence, such entrepreneurs' conversations and workshop visits may suggest the potential existence of spillovers of knowledge. If that is true, spillovers will lower the intention-to-treat (ITT) and the treatment-on-the-treated (TOT) estimates of our training impacts reported in chapter 3.

However, the study has no rigorous evidence to claim that such conversations and workshop visits indeed transferred knowledge regarding certain management practices from the treated to untreated entrepreneurs. Partly, because of the potential endogeneity problem associated with the entrepreneurs' communication and social network. We need suitable instrumental variable (IV) to rigorously explore evidence that will enable us to claim causal effects of such conversations and workshop visits on knowledge spillovers.

Unfortunately, the current dataset does not contain such information of suitable IV. Thus, the current study defers this issue for future studies.

Mindful of the above caveat, the findings in chapter 3 have two implications. First, the findings suggest that an industrial policy that considers investing in the entrepreneurs' managerial capital improvement through training is paramount for supporting industrial development. At the same time, since the dissertation finds that the effectiveness of management training varies across completely- and partially-treated entrepreneurs; such a policy should consider the appropriate quantity and level of training at a point in time.

The second implication is for future studies. Indeed, the study has provided only an indicative explanation why the training impact on business performance emerged in the medium-run. More follow-up analysis is essential to inform policymaking. The option available for now is to defer this issue for future studies. Another issue is related to waves of the field surveys. That, since the findings suggest that reasonable time is necessary for treated entrepreneurs to significantly assimilate and make substantial business changes, conducting follow-up surveys over a more extended span after an intervention is crucial.

CHAPTER 4

COMMUNICATION EFFICACY IN PUBLIC OFFICES

Using a novel field survey data of government officials, chapter 4 describes the communication practices in the public offices of Tanzania. The analysis aims at generating evidence for supporting managerial capability improvement in the public sector.

4.1 Introduction

The efficient public sector matters for achieving pro-poor economic growth (World Bank, 2017; Song et al., 2018). Similarly, efficient delivery of public goods and services (a primary function of the public sector), also matters from a microeconomic standpoint. That is, an efficient public sector is expected to scale-up the microeconomic development program interventions once such programs are, based on small-scale randomized controlled trials (RCTs), proved through rigorous evaluations (Rasul and Rogger, 2018).

Notwithstanding the abovementioned importance, the performance of the public sector in most of developing countries is, and continues to be, poor (Crook, 2010). The literature suggests that weak adoption of efficient management practices is one of the sources of the inefficient public sector (Bloom et al., 2015a; 2015b). However, there is still a knowledge gap because such existing literature is derived mainly from developed economies. There is a paucity of empirical analyses in developing countries.

Following the lead of Bloom and van Reenen (2007) and Bloom et al. (2015a), it is possible that even in developing countries, the adoption of management practices can

potentially contribute to the public sector's efficiency improvement. Examples of such practices include effective communication, coordination, and leadership. Nonetheless, the adoption of such practices in most of the public offices in developing countries is inadequate (Rasul and Rogger, 2018). Admittedly, studying each of the practices above takes longer time. Therefore, the scope of this study concentrated on communication practices in the public offices.

Communication is vital for optimal organizational performance and the efficient delivery of services (Calvó-Armengol et al., 2015). Communication, one of the fundamentals of organization theory (Arrow, 1974), facilitates effective coordination, leadership, and cooperation, especially in a working environment characterized by a strategic complementarity (Brandts et al., 2015; He et al., 2017). Indeed, the public offices present one of the typical examples characterized by such a working environment. That is, teamwork, cooperation, and collective decisionmaking (which all require effective communication) are vital in facilitating performance in the public offices (Lazear and Shaw, 2007; Bandiera et al., 2013). In fact, corporate managers utilize at least eighty percent of their work time on communication activities (Bandiera et al., 2011).

Despite its importance, quantitative studies regarding communication efficacy, especially in the public offices in developing countries, are relatively scant. In contrast, many of the existing studies pay more attention to broad issues which are, in most cases, peripheral to the workplaces of the public sector (see chapter 2). Such workplaces are the public offices in which office managers and frontline workers pursue the activities leading to production and delivery of public services.

Likewise, there is a dearth of literature regarding the empirical evidence of communication practices within the public offices. Admittedly, studies regarding the role of communication in achieving efficient productivity equilibria exist (e.g., Cooper et al., 1992; Brandts and Cooper, 2007; Brandts et al., 2015). Nonetheless, such studies, which utilize coordination game theory approach, are experimentally conducted in the laboratory. The empirical literature regarding communication in the real workplaces is insufficient. Thus, there is a knowledge gap in the empirical literature that deserves further analysis.

In an attempt to narrow down such an existing knowledge gap, chapter 4 describes the communication efficacy quantitatively in the public offices in a developing country perspective: Tanzania. This study hypothesizes that the sample public offices operate in an environment rife with communication problems. The study tracks communication problems using the office manager's and frontline worker's description of office mission and performance targets. The mission and targets carry an organization identity and serve as office management tools (Voss et al., 2006). They encompass the core values and beliefs which determine the organization's behavior. Communicating the office mission and targets to all workers is vital. Indeed, the belief in the organization's mission also affect the ways managers interact and communicate with their frontline worker counterparts regarding the performance targets they have achieved and how they spent the scarcest resources (Glynn, 2000; Garicano and Rayo, 2016).

Why, then, managers and frontline workers fail to describe their office mission and targets to various stakeholders? Although lack of incentive can potentially explain such a failure, it also possible, in addition to incentive issue, that poor communication, henceforth

workplace communication problems (WCPs), possibly matters. Here inconsistency is an idea or opinion not in agreement between parts of itself or with something else (Oxford Dictionary of English, 2009). From this definition, this study considers workplace communication inconsistencies (WCIs) to mean variation or unpredictable communication between the managers and frontline workers in the workplace. Thus, the study measures the WCIs quantitatively as the difference in the number of formal office meetings reported by the managers and frontline workers who serve in the same public office.

To ascertain whether such WCIs indicate the incidence of WCPs, the analysis explores the administrative data (e.g., the internal memos for a call of formal office meetings in some of our sample public offices), if they reflect WCPs. Also, during the field surveys, our respondents were requested to explain if they were satisfied with the workplace communication practices. Our dataset contains answers to such a question. Thus, the analysis exploits such answers to explore if, indeed, WCPs prevail in our sample public offices. If the majority of our sample respondents turn out to be dissatisfied with the workplace communication practices prevailing in their offices that might suggest the presence of WCPs.

The sample public offices have a mandate to produce and deliver public services to facilitate Tanzania's trade and industrial development. Such services include the registration of companies, trade names, and trademarks, the issuance of industrial and business licenses, the certification of product quality and safety standards, the provision of barcodes, tax identification numbers (TIN), and tax clearance certificates (TCC). Other services include the certification of food safety standards, import permits (and registration)

of medicines, cosmetics, and medical devices. Effective production and efficient delivery of these public services have the potential to contribute to the smooth functioning of entrepreneurs' activities.

The study design focuses on the offices mentioned above because of three reasons. First, studies of public services such as education, healthcare, and security are available (e.g., Banerjee et al., 2004; Kremer et al., 2005; Alcázar et al., 2006; Chaudhury and Deverajan, 2006; Chaudhury et al., 2006; Banerjee et al., 2010; 2014; Das et al., 2016; de Ree et al., 2018). Second, the decisions that influence workplace productivity are mostly made at the office level. Third, and last, the managers and frontline workers are vital players in the decisions that affect the production and delivery of public services (Bloom et al., 2015a).

The survey team conducted the preliminary and informal interviews (from August to September 2014) with officials from the government Ministries, Departments, and Agencies (MDAs) in the city of Dar es Salaam. After that, between January and March 2015, a fieldwork team conducted a detailed structured questionnaire survey of the government officials in 46 public offices in Dar es Salaam city and Pwani region. During the field survey, a total of 171 public officers were interviewed. Forty-six (46) public officers out of 171 public officers were office managers. The remaining 125 public officers were frontline workers. Such frontline workers are under the supervision of one manager from each office.

The collected information included data regarding communication practices (e.g., the number of formal office meetings), office size (measured by employment size), the

proportion of old-cohort workers, office mission, and targets, and office annual performance targets achieved. Also, the collected data captured the characteristics of managers and frontline workers, skills specific training experience, recordkeeping practices of office activities, and worker's salary and allowances.

Using field survey data, chapter 4 of this dissertation investigates the quantitative evidence regarding workplace communication problems (WCPs) in the sample public offices. Also, the chapter explores the evidence concerning the office- and individual-level factors associated with WCPs in the sample public offices. The micro-level analytical approach adopted for the study is a unique one as it considers the two workplace-oriented factors directly. Such factors are the environment in which public service delivery activities are carried out by the workers. Indeed, this novel approach is in line with the longstanding proposition that early attempts in public sector's productivity improvement should start with simple, cost-effective, easily understood, and proven techniques that virtually assure success (Tubbs and Widery, 1978; Turner and Craig, 1978; Takeuchi, 1981).

Two findings stand out in chapter 4. First, the results show that most of the sample managers and frontline workers failed to describe clearly their office mission and performance targets. That is, only about 52 percent and 41 percent of managers could clearly describe their office mission and targets, respectively. Likewise, the findings show that only about 23 percent and 20 percent of average frontline workers, respectively, could clearly describe their office mission and targets.

The above finding is documented while the execution of Tanzania's public service reforms is ongoing. Such reforms emphasize achieving performance targets consistent with

the office mission. The fact that achieving office performance targets is emphasized, but few workers are familiar with their targets, it is possible that there is a problem. Such a problem might be stemming from monetary incentive issue because the majority of our sample managers and frontline workers complained about their low salary and allowance (suggesting that incentive matters). Likewise, the failure to describe their office mission and targets is likely to underpin communication problem. If the managers communicate effectively with their frontline workers to discuss the performance targets consistent with the office mission, they can potentially describe such office mission and targets (Ruck and Welch, 2012; Malhotra and Ackfeldt, 2016). The literature, however, ignores this point.

Whether failure to describe office mission and targets is related to poor communication or otherwise will depend on whether managers and frontline workers have office formal meetings to discuss, among other things, the progress of achieving office performance targets as per their office mission. The data reveal that managers and frontline workers reported having had office formal meetings. However, the number of such meetings based on managers' response is not in agreement with the number reported by their average frontline worker counterparts. The office managers and average frontline workers in the same office report to have had about 5.65 and 2.17 formal office meetings in one month, respectively. The inconsistencies of about 3.48 formal office meetings, is significant at the 1 percent level.

It is likely that such inconsistencies are suggestive evidence of communication problems. To qualify my conjecture, the analysis provides two possible reasons. First, it was found that in some of the sample offices a call for an office meeting lacks critical

information such as pre-arranged venue, starting and ending time, and a specific agenda. In other offices, a call for a meeting is not even confirmatory (i.e., the memo does not affirm that the meeting will actually be conducted). These issues, according to Boden (1994) and Asmuß and Svennevig (2009), create poor communication.

The second reason is concerned with the managers' and frontline workers' satisfaction with their communication. The data reveal that many of the office managers and frontline workers were not satisfied with the office communication practices by the time of our field survey. Thus, the sample public offices are potentially trapped in a working environment rife with communication problems.

The second finding is related to the correlates of the proxy measures of workplace communication problems. The estimation results reveal that manager's and frontline worker's training experience in leadership and management has a negative correlation with our proxies of workplace communication problems. Also, the estimates suggest that manager's and frontline worker's recordkeeping practices of office activities is likely to reduce communication problems.

The main contribution to the literature is the novel descriptive evidence of the workplace communication problems. While qualitative evidence exists, quantitative evidence of communication problems in the public offices in developing countries is insufficient. Similarly, the public administration literature is almost devoid of evidence about communication practices in public offices. Hence, this study provides among the first suggestive evidence of communication problems at a time when many developing countries

are pursuing public sector reforms to support private sector-led economic growth. Also, the study provides the micro-level correlates of the within-the-office communication problems.

Admittedly, the contribution of chapter 4 to the empirical literature merits a word of caution. In part, this is because the findings in this chapter are mostly from the descriptive analyses of survey data on the organization of office formal meetings. Likewise, the chapter reports statistical correlations (not causal relationship) between the proxies of communication problems and the potential triggers of such problems. Thus, the findings in chapter 4 provide, at most, the suggestive, but not conclusive, evidence.

While mindful of the abovementioned caveat, the findings in chapter 4 have suggestive wide-reaching research implications. They point to the need for further empirical research to better understand the multifaceted communication practices in public offices and lay out an agenda for future research to establish the causal impacts of workplace communication practices on strengthening public sector's managerial capability. Indeed, Acemoglu (2005), Besley and Personn (2010), Goldfinch et al. (2012), Hasnain et al. (2012), and Muralidharan et al. (2016), among others, emphasize this issue.

In what follows, the study reviews the literature to clarify the testable hypotheses (Section 4.2). Next, Section 4.3 describes the study design. Section 4.4 and 4.5 presents the descriptive and econometric analyses, respectively. Finally, Section 4.6 concludes.

4.2 Literature Review and Hypotheses

The functioning of various economic organizations (e.g., governments, firms, corporations, nonprofit entities, and society) requires effective communication. One of the purposes is to

induce desirable resource allocations since relevant knowledge and skills are dispersed among its workers (Oniki, 1974; Radner, 1993; Bolton and Dewatripont, 1994). Despite its importance, studies have shown that communication presents one of the management challenges to many organizations (e.g., Goldhaber, 1990; Jehiel, 1999).

There are questions of central interest. What is effective communication? How to achieve effective communication? What are the indicators of effective (or ineffective) communication in an organization? What factors influence workplace communication? These questions are interconnected. The study reviews the literature and develop testable hypotheses to address these questions.

Effective communication is a two-way successful conveying of information, ideas, and feelings (Ellingsen and Östling, 2010). It involves the sender, who sends a clear (and easy to understand) message, and the receiver, who receives and understands the message from the sender. In teamwork settings, effective communication disseminates the information needed by the managers and employees to get things done and build relationships of trust, commitment, and coordination (Black and Lynch, 2001; Lazear and Shaw, 2007).). It is an interpersonal process that underpins the management of the daily activities of administration, clerical work, and the production of goods and services in public and private organizations. It improves monitoring and ensures higher payoffs (Rahman, 2014).

Also, effective communication has the potential to reduce worker's stress, absenteeism, and intention to quit the job (e.g., Takeuchi, 1981; Firth et al., 2004; Alcázar, et at., 2006). In turn, this mitigates employees' turnover rates because both the managers

and employees feel secure when they are updated with information about the organization to which they belong[13]. Moreover, effective workplace communication shapes relationships among organizational members (Garofalo and Rott, 2018).

To achieve effective workplace communication, the managers and frontline workers should make deliberate efforts to communicate. One of the reasons for the importance of both players to commit enough effort is that communication between the managers and frontline workers is, fundamentally, a coordination game (e.g., Cooper et al., 1992; Brandts et al., 2015). Since effective communication is beneficial to each player, therefore, each subject involved in the communication game must choose the effort level that will maximize the achievement of dominant communication payoffs. Apart from each player's effort level, the leadership role is also key to achieving effective workplace communication. The leaders, especially good leaders, can exhibit either cheap-talk or first-mover communication practice[14].

Both types of communication are essential to encourage their followers. For instance, leaders who communicate good messages (to encourage cooperation) and conduct repeated follow-up communication affect group members' decisions toward choosing an efficient equilibrium (Levy et al., 2011). Hence, in the absence of effective communication,

[13] Turnover has economic implications to an organization performance. For example, lack of employee continuity is associated with the high costs involved in the induction and training of new staff, and, not least, issues of organizational productivity.

[14] Cheap-talk communication is a communication practice by a leader who suggests an effort level, but a leader is free to choose a different level from the one suggested. A first-mover communication is a communication practice through which a first-mover leader suggests a choice of effort level that is observed by the rest of the group and s/he influences the choice of effort level by the laboratory game players or subjects to achieve efficient productivity (Dong et al., 2017).

uncertainties and coordination failures emerge, and the subjects involved in the game may erroneously choose inefficient productivity equilibrium (Van Huyck et al., 1990).

One of the indicators of communication problems is the manager's and frontline workers' poor familiarity with the strategic management tools such as office mission and performance targets (Roberts et al., 1974). If workplace communication is effective, they are likely to discuss their performance targets as guided by the office mission. Thus, if managers and frontline workers fail to describe the office mission and performance targets, it is likely that workplace communication is poor. Another proxy indicator of poor communication in the workplace is the existence of inconsistencies regarding the number of formal office meetings (Putnam and Mumby, 2014). That is, if managers and frontline workers from the same office report a different number of formal office meetings, such a difference is likely to be an indicator of poor communication between or among them.

Since the inception of public service reform programs, Tanzania's government embarked on strategic planning by formulating mission and targets to guide the office performance (Rugumyamheto, 2004). Consequently, the participatory planning and effective communication practices, especially formal office meetings between managers and frontline workers were emphasized (URT, 2005). Hence, in line with the literature reviewed, thus far, and given the importance of communication, it is imperative to explore whether the managers and frontline workers do communicate effectively the office mission and targets to various stakeholders. Hence, it is worth framing hypothesis 4.1 about communication between the office managers and frontline workers in the public offices.

Hypothesis 4.1: As indicated by the managers' and frontline workers' poor description of the office mission and targets as well as inconsistencies in the number of formal office meetings, there are communication problems.

The other question is about the factors affecting communication. The characteristics of public offices, office managers, and frontline workers are likely to be correlated with communication. Cho and Kim (2014) find that office size affects the participative management practices in public enterprises in South Korea. Such a finding is consistent with Corgnet and González (2014) in an experimental principal-agent game setting. Also, Andrews and Boyne (2014) find that office size is correlated with the administrative intensity of public universities in the UK[15]. Moreover, the results of coordination games indicate that size, defined by the number of game players, matters for the choice of effort level among the game players to achieve a given payoff (Brandits and Cooper, 2006).

The size of the office can shape communication practices (Hall et al., 1967; Cullen and Baker, 1984). There are two arguments about office size. First, the complexity-administrative growth hypothesis, that is, increased office size brings with it inflated complexity in the coordination of an organization's activities and the proliferation of communication problems (Rushing, 1967). Second, the internal economies of scale perspective (Blau, 1972). That is, being bigger can enable an organization to spread its

[15] Both Cho and Kim (2009) and Andrews and Boyne (2014) use the total number of office workers as a quantitative measure of office size. The current study adopts similar measurement approach. That is, the total number of employees (e.g., manager, frontline workers, clerical, and supporting staff) for office size. Focusing on the staffing level is essential because this variable feature widely in arguments about complexity in organizational management and workplace communication practices (Putnam and Mumby, 2014).

administrative costs across a more substantial number of individuals and to reinvest the savings in the improvement of organizational functioning. Thus, theoretically, office size may have either a positive or negative relationship with communication practices in organizations or no relationship as the costs and benefits of increasing scale cancel each other out. In practice, the office size is likely to be negatively associated with the management practices of governance functions. Thus, the larger the office size, the larger the likelihood of communication problems and the longer the time required to resolve them.

Different sizes characterize the public offices in various MDAs in Tanzania. The size (measured by the number of workers) of some public offices are large while others are small. Demand for the workforce, skills, and ability of the government to hire new workers are the determinants of office size. Hence, communication practices (among others) may also be affected by the office size. The increase in office size is likely to be associated with complexity in the coordination of office activities and the proliferation of communication problems. The study, therefore, advances the testable hypothesis 4.2 regarding the nexus between the size of the sample public office and the efficacy of workplace communication:

Hypothesis 4.2: There is a positive correlation between the size of the office and workplace communication inconsistencies.

Workforce age-heterogeneity (a consequence of an aging workforce and poor succession plans) is critical in shaping communication practices. It can influence organizational behavior, administration, and performance (Zenger and Lawrence, 1989; Wiersema and Bird, 1993). However, workforce age-heterogeneity is not always bad. For example, old and young employees possess different skills and capabilities (Johnson,

2005). Hence, age-heterogeneity can potentially provide benefits (e.g., the institutional memory and experience) and costs (e.g., the proliferation of communication and interaction problems either between managers and frontline workers or among frontline workers).

Whether workforce age-heterogeneity produces benefits or costs largely depends on the nature of the tasks pursued by the organization[16]. For example, it is likely to produce more benefits than costs in dynamic organizations pursuing creative tasks than stable organizations pursuing routine tasks such as public administration (Backes-Gellner and Veen, 2009). The institutional memory and experience are associated with an old workforce. Hence, when an old workforce is mixed with a young workforce, the net effect is more beneficial in dynamic organizations which require high skills than in stable organizations which may not necessarily require high skills to pursue their routine tasks.

Homophily (the tendency of various types of individuals to associate or interact with others who are similar to themselves) affects communication (Currarini et al., 2009). Homophily manifests across age, race, gender, religion, and profession (Golub and Jackson, 2012). Indeed, the similarity is likely to ease communication, increase predictability, and foster trust and reciprocity (McPherson et al., 2001). That is, employees are likely to communicate better with persons who are similar to themselves because they share similar experiences, a common language, and a standard set of communication symbols. In contrast, communication and the formation of social relationships between highly

[16] The drivers of potential benefits are positive complementarities and composition effects. For example, the benefits of complementarities emerge when cooperation in group work enables individual workers to be more productive than working in separation. Consequently, the group output exceeds the sum of the individual outputs. The composition effects emerge when different organizational activities can be better performed by staff with multidisciplinary hands-on skills.

dissimilar individuals entail higher cost than that within relatively homogenous groups of individuals (Lazear, 1999; Harrison et al., 2002). Also, age differences among employees hinder communication and social integration (Tsui et al., 1992; Milliken and Martin, 1996).

In Tanzania's public sector, the workforce age-heterogeneity exists (Mæstad, 2006; Rolfe et al., 2008). Partly, this is owing to the public-sector employment freeze in much of the 1990s during the reform programs (Rugumyamheto, 2004). During this period the government retrenched staff[17]. The decision lasted for about ten years (i.e., from 1996 to 2004). The new recruitments in the public offices gradually resumed in 2005. This study constructs two cohorts of workers, namely: the *old*- and young-cohort workers. Whereas the old-cohort workers joined the public sector before 1996, their young-cohort counterparts joined from 2005 until the present. The two cohorts form the basis of the workforce age-heterogeneity in the public sector. Hence, the study postulates hypothesis 4.3 to link communication inconsistencies and workforce-age heterogeneity in the sample public offices:

Hypothesis 4.3: There is a positive correlation between the proportion of old-cohort workers and communication inconsistencies.

The human resource is another factor associated with organizational practices (Barney, 1991). Organizations that accumulate human resources are more likely to fix various disequilibria than those with limited human resources (Schultz, 1975; Acemoglu et al., 2014). The knowledge-base and skills of organizations, which are both rare and difficult

[17] For example, about 355,000 employees in 1992 were reduced to 260,000 employees by 1998, a reduction of approximately 27 percent (Ndulu and Mutalemwa, 2002).

to imitate, affect workplace communication. Also, the public organizations which continuously accumulate human resources are likely to exhibit distinctive management competencies and service delivery capability (Andrews et al., 2016).

Formal schooling and skills-specific training enable an organization to accumulate the human resources (Barney, 1991). Training is recognized in Tanzania's Public Service Training Policy (URT, 2013). The government encourages workers to participate in the short- and long-term training programs. While the examples of short-term courses include tailor-made management and leadership programs, long-term courses are typified by graduate degree programs in various specializations. To the extent that public offices in Tanzania can accumulate their human resources, they are also likely to adopt useful management practices required to achieve their goals. Hence, it is worth investigating how workers' participation in skills-specific training and formal education are correlated with communication. Thus, it is imperative to develop hypothesis 4.4 regarding workplace communication and the accumulation of human resources.

Hypothesis 4.4: There is a negative correlation between the managers' and frontline workers' skills-specific training and education and the communication inconsistencies.

Finally, the study reviews the literature on recordkeeping practices. In the management of the household economy, recordkeeping has long been recognized as one of the principles of family finance (White, 1952). Similarly, in managerial economics, recordkeeping is recognized as one of the basic management practices (Bloom and van Reenen, 2007). In the private firms, recordkeeping of business transactions or quality defects has been found to be associated with the good management of firms (Sonobe and

Otsuka, 2014). In most bureaucratic organizations such as public offices, the recordkeeping of office activities and strategic information is a fundamental undertaking of public administration and management (World Bank, 2000). Indeed, in the public sector, recordkeeping of office activities facilitates the rule of law, continuity of service delivery, accountability, and service improvement.

The existing empirical literature indicates that recordkeeping is beneficial to public service delivery improvement. For example, a study by Bloom et al. (2015a) shows that recordkeeping practice in hospitals in the U.S. and Europe facilitates effective communication between hospital managers and frontline workers, such as clinical officers and nurses. Also, the study suggests that recordkeeping contributed to the effective delivery of hospital services.

The recordkeeping of the office activities is articulated in Tanzania's National Records and Archives Management Policy (URT, 2011). Additionally, the government established designated units responsible for records management. Accordingly, each public officer is required to keep the records of office activities and correspondences accurately. Reports suggest that proper management of records has improved the delivery of birth and death certificates, confirmation of voting rights, verification of land ownership, tax administration and management, healthcare services, and justice administration in Tanzania (URT, 2011). Thus, the study formulates hypothesis 4.5 regarding communication and the manager's and frontline workers' recordkeeping practice in the sample public offices.

Hypothesis 4.5: There is a negative correlation between the managers' and frontline workers' recordkeeping practice of office activities and communication inconsistencies.

4.3 Design of the Study

4.3.1 Study sites and field surveys

The sample public offices are situated in Ilala, Kinondoni, and Temeke Municipal Councils, in the city of Dar es Salaam. While other offices are in Kibaha Township Council, others are located in Kibaha, Bagamoyo, and Mkuranga District Councils in Pwani region. Dar es Salaam is the country's mainstay of public offices and dominates government business and the commercial activities of private entrepreneurs. Pwani is an annex region, which is about 45 kilometers from Dar es Salaam city center. Compared to Dar es Salaam, Pwani accommodates a relatively smaller number of public offices and private businesses.

The sample consists of 46 public offices. Among them, 9 offices and 37 offices are government and semi-autonomous offices, respectively. These offices have a mandate to deliver public services to facilitate entrepreneurship development in their respective areas of jurisdiction. The public services include the registration of companies, trade names, and trademarks and the issuance of industrial licenses and business licenses. Others include the certification of product quality and standards, the enforcement of conformity to the quality and standards, the certification of food safety standards, import permits (and registration) of medicines, cosmetics, and medical devices, and the issuance of barcodes (to facilitate product traceability).

Additionally, some of our sample public offices deal with production and delivery of public services related to tax administration. They include the provision of tax identification numbers (TIN), value added tax registration numbers (VRN), and tax

clearance certificates (TCC) to tax agents (e.g., individuals, entrepreneurs, and corporates). We choose these offices because their performance targets are relatively easier to measure quantitatively compared to other public offices whose performance targets are qualitative. Also, other public services such as education, healthcare, and security have been extensively studied.

This study conducted two field surveys. First, between August and September 2014, a preliminary informal survey was conducted during which the key decision-makers from the MDAs in Dar es Salaam were interviewed[18]. During this informal survey, collected information included the number of public offices responsible for facilitating private sector development in the study sites. Also, the collected information encompassed the specific activities that they undertake. Moreover, information related to office communication, filing practices, management, incentives, workflow, office missions and targets, and opinions about office performance were seized. Second, the study design conducted the formal field survey between January and March 2015. The formal survey was designed based on the information obtained from the key informants during the preliminary informal survey.

The sample respondents are the office managers and frontline workers. They serve in the smallest operational units (hereto referred to as "public offices"). The office managers are the heads our line supervisors. They have discretion over the office budget and the frontline workers. While they have limited control over organizational policy, they

[18] They included the Permanent Secretaries of Government Ministries as well as the Chief Executive Officers, Director, and Commissioner Generals of semi-autonomous organizations.

are responsible for analyzing inputs for the formulation, implementation, and management of various economic policies. The frontline workers are technical staff under the supervision of office managers. They are the key players in the groundwork related to and operations of the technical assignments of the office.

Two reasons underpin our focus of study with the offices, managers, and frontline workers. First, the focus on the offices is attributable to the fact that the decisions which influence the production and delivery of public services and management of economic policies are mostly made at the office level (Bloom et al., 2015a). Hence, it is worth investigating various management practices, including communication practices, at the office level. Given the importance of public services in economic growth, studying management practices at the point of production (i.e., public offices) and the managers and frontline workers who actually produce those services, may help us to understand the bottom-up reform initiatives for strengthening the public sector's managerial capability.

Second, the study focuses on the managers and frontline workers. In part, this is because, like other developing countries, in Tanzania, discussions with the key informants pointed out that public service delivery activities are implemented by the managers (line supervisors) and frontline workers within the smallest operational units (called offices). Indeed, these officials are the primary interface between the government and the beneficiaries of public services. The focus is consistent with the McKinsey report by Gibbs et al. (2011) that middle managers, supervisors, and frontline workers are vital in shaping the working conditions and implementing workplace productivity improvement programs.

A total of 171 respondents in 46 public offices were interviewed. The composition of the respondents included 46 managers and 125 frontline workers. In each office, the enumerators interviewed the manager, hence, making a total of 46 office managers. During the field survey, it was found that some offices employed 2 frontline workers while others employed more than 3 frontline workers. Whereas the enumerators interviewed 2 frontline workers in the offices with only 2 frontline workers, they randomly selected a sample of 3 frontline workers for interviews in the offices with at least 3 frontline workers.

Before the implementation of the field survey, the research team of this study recruited and trained enumerators with at least a bachelor's degree and prior field survey experience. To confirm the appropriateness of our structured questionnaires, a pilot survey was conducted in three public offices in Dar es Salaam. However, the analysis excludes the data from such pilot offices in the main analyses. The pilot survey also served as a platform to test the understanding and internalization of the survey questions and objectives by the enumerators.

During the formal field survey, trained enumerators collected information regarding the basic characteristics of the public offices and office communication practices. Other information collected included the managers' and frontline workers' description of office missions and targets as well as a description of the office annual performance targets achieved for each respective fiscal year. Likewise, information related to performance appraisal systems, training experience, and salary and allowances were collected. Moreover, information regarding the individual characteristics of managers and frontline

workers were captured. The office managers and frontline workers were interviewed separately to avoid any potential bias.

4.3.2 Measures

A quantitative measure of the primary variables of interest is essential for any empirical analysis. Thus, section 4.3.2 describes the approaches adopted to measure such variables to inform this study. Examples of such variables include office mission and targets, formal office meetings, annual office performance, and office recordkeeping practices.

4.3.2.1 Description of office mission and targets

The interviewer requested office managers and frontline workers to describe the office mission and targets. The managers (frontline workers) did not know that similar questions were being asked to their frontline workers (managers). Answers to the description of the mission included the mission statement, strategies to achieve the mission, the time frame of the mission, and the roles of stakeholders in achieving the mission. Answers to the description of office targets included quantitative and qualitative target descriptions, resources needed to achieve the targets, the timeframe of the targets, and the roles of stakeholders in achieving the targets.

The answers from each manager and frontline worker were evaluated as either clearly or poorly described against the description provided in the office documents, which we collected during preliminary informal interviews. The analysis uses the managers' and frontline workers' description of the office mission and targets to explore if they have

effective communication. If they communicate effectively, one expects them to describe their mission and targets successfully. Failure to describe them may imply that the mission and targets are poorly communicated (Ichniowski and Shaw, 2012; Hermalin, 2012).

4.3.2.2 Formal office meetings

Formal office meetings are among the platforms for organizational communication (Goldhaber, 1990). In Tanzania, the formal office meetings underpin codes of ethics and conduct for public services. Such meetings, which are defined as the deliberative gatherings of office workers convened to discuss and make a collective decision on specific issues (URT, 2005), have the potential to promote effective communication (URT, 2009). They are usually supposed to be held at a definite place, mainly within the office or workplace, at a definite time, and for a definite duration in line with the agreed agenda. During the preliminary informal surveys, it was unearthed from the informants that while the office manager or supervisor is the Chairperson of the formal office meetings, one subordinate is usually nominated amongst the team of subordinates to take the minutes of the meeting.

During the field survey, the interviewers requested the respondents to provide the number of formal office meetings. To mitigate potential recall bias, they asked preliminary questions that would help the respondents to provide correct figures. Specifically, they asked, “Do you have formal office meetings to communicate, consult, or share ideas with your manager (frontline workers)?” If the answer was “Yes”, they introduced a follow-up question, “What are the issues or ideas that you and your office manager (frontline workers) communicate about, consult on, or share in the formal office meetings?” The

answers included the office performance indicators, mission, strategies, core values, work ethics, budget allocation and position, procedure manuals to guide workflow, staff welfare, and training programs.

Afterward, the trained enumerators asked, “How often are the formal office meetings conducted in one month?” Since they are formal, one would expect that office meetings are communicated well in advance to all employees. Depending on the prevailing communication efficacy, this assumption may not always be valid. Thus, using the manager’s and frontline worker’s responses on the number of formal office meetings in one month, the analysis computes the discrepancies in the number of formal meetings (a proxy indicator of poor communication).

4.3.2.3 Annual office performance

The office performance refers to whether the office does well in discharging the operational targets and whether the office produces outputs under the organizational mission (Cho and Kim, 2014). Measuring performance in public organizations is difficult. The objective data are preferred because they are more impartial and independent. Admittedly, the objective performance measures are not free from potential challenges. First, they are not always available. Second, they can also be biased in objective measures; for instance, administrative data often rely on information reported by the office of the register, and this information can also be manipulated. However, due to the paucity of such data, subjective data may be a reasonable alternative (Schmid, 2002).

In this study, the perceptions of office managers and frontline workers are used as a proxy measure of annual office performance. It is conjectured that internal management by managers or immediate supervisors and operations by frontline workers have contributed substantially to the achievement of annual performance targets (Ginsburg, 2003). Hence, their responses regarding the office performance targets achieved in a respective fiscal year are a close reflection of the actual office performance. The managers and frontline workers who provided us with affirmative answers during field interviews are the ones responsible for implementing tasks leading to the achievement of the annual office performance targets.

To elicit information about the office performance, the enumerators asked the question, "In your opinion, for the last three fiscal years (i.e., 2012/13, 2013/14, and 2014/15) to what extent would you say that your office annual performance targets have been realized?" The answers were ranked as less than 50 percent, between 50 and 80 percent, between 81 and 100 percent, and above 100 percent. Then, a follow-up question was, "Are you sure are about the percentage? The answer to this question was either, "Definitely sure" or "Not really sure".

According to Blumenschein et al. (2008), the "definitely sure" answers to a follow-up question provide affirmative answers to the corresponding question being asked. Hence, from the answers to the above set of questions, the study constructs a variable called "high performance" as a dummy variable taking 1 if the office targets were achieved by at least 81 percent and the answer to the follow-up question is "Definitely sure", 0 otherwise. The manager's and frontline worker's difference in the perception of their own office performance is another sign of poor communication.

4.3.2.4 Recordkeeping practices

The study elicited information regarding the individual recordkeeping practices of office activities. An interview approach was designed to overcome the respondent's potential recall bias of recordkeeping practices. Specifically, the interviewer asked the respondents, "Are you supposed to keep track of your office activities in a work-log or a business diary?" All of the respondents answered "Yes" to this question. The next question to the answer "Yes" was, "Could you specify the office activities you are supposed to record?" The list of activities included minutes of meetings, individual performance reports and appraisal, work in progress, and annual office targets.

Subsequently, a follow-up question was administered, "Do you actually keep records of your activities?" Hence, recordkeeping takes 1 if the affirmative answer to this follow-up question is "Yes", 0 otherwise. This study considers the response, "Yes", to this follow-up as an affirmative answer about individual recordkeeping practices (Blumenschein et al., 2008). Additionally, if the answer to the follow-up question was "Yes", another follow-up question was asked, "How frequently are you actually recording your activities?" Answers to this question included frequencies of recordkeeping of office activities on the daily, weekly, and monthly basis.

4.4 Descriptive Analyses

What are the public offices considered for this study? Who are the managers and frontline workers in those offices? Table 4-1 reports the background of the sample public offices, managers, and frontline workers. Panel A shows the basic characteristics of the sample

public offices. Panel B shows the individual characteristics of the managers and frontline workers. Columns (1) and (2) display the descriptive data based on full samples. Columns (3) and (4) and columns (5) and (6) show the characteristics of the offices, managers, and frontline workers in the government offices and in the semi-autonomous offices, respectively. Columns (7) to (11) present the results of a *t*-test of the equality of the means.

The size of office based on the full sample, government, and semi-autonomous offices is 10.4, 11.0, and 10.2 workers, respectively (see the first row of column (1), (3), and (5) of Table 4-1). The second row of column (1), (3), and (5) indicates that, on average, the proportion of old-cohort workers based on the full sample public offices, government offices, and semi-autonomous offices is 60 percent, 57 percent, and 61 percent, respectively. Also, the results reveal that the highest proportion of old-cohort workers in the government and semi-autonomous offices is 75.0 percent and 88.9 percent, respectively.

The managers are older than frontline workers (i.e., 49.1 years versus 43 years and 44.9 years versus 40.4 years of age for managers and frontline workers in government and semi-autonomous offices, respectively). Based on the full sample in columns (1) and (2), most of the managers belong to the old-cohort workers compared to the frontline workers (i.e., 72 percent versus 47 percent). However, columns (3) and (4) show that the managers are less likely to belong to the old-cohort workers than their frontline worker counterparts in government offices (i.e., 44 percent versus 53 percent). In contrast, columns (5) and (6) indicate that managers in the semi-autonomous offices are more likely to belong to the old-cohort workers than their frontline worker counterparts (i.e., 78 percent versus 43 percent). Moreover, male managers and male frontline workers dominate in our sample offices.

Next, the discussion is switched to the formal education of the survey respondents. The office managers and frontline workers in the full sample, government, and semi-autonomous offices went to school for about 17 years. According to column (1) and (2), 63 percent and 50 percent of managers and frontline workers, respectively, attained at least postgraduate education. However, a smaller proportion of managers attained a graduate level of education compared to frontline workers in government offices (55.6 percent versus 64.4 percent) than their counterparts in semi-autonomous offices (i.e., 64.9 percent versus 45.0 percent). The managers are likely to be more experienced than frontline workers (i.e., 21.2 years versus 18.2 years and 19.2 years and 13.8 years for managers and frontline workers in government and semi-autonomous offices, respectively). Similarly, managers are likely to have more years in their current job than frontline workers (i.e., 12.8 years versus 9.5 years and 14.5 years and 10.3 years for managers and frontline workers in government and semi-autonomous offices, respectively).

The managers received more skills-specific short-term training than the frontline workers, see columns (1) and (2). A similar finding applies after decomposing our sample offices to the government and semi-autonomous offices. For example, 66.7 percent of managers versus 34.7 percent of frontline workers and 83.8 percent of managers versus and 23.7 percent of frontline workers in the government and semi-autonomous offices received training on the report writing, respectively. Also, 77.8 percent of managers versus 49 percent of frontline workers and 70.3 percent of managers versus 38.2 percent of frontline workers in government and semi-autonomous offices received management training, respectively. Furthermore, leadership training was received by 66.7 percent of managers

versus 26.5 percent of frontline workers and 78.4 percent of managers versus 27.6 percent of frontline workers in government and semi-autonomous offices, respectively.

Regarding recordkeeping of office activities, most managers and frontline workers across the sample public offices kept records. As shown in columns (1) and (2), based on the full sample, about 89 percent and 78 percent of managers and frontline workers, respectively, keep records of office activities. Hence, recordkeeping of office activities in the sample public offices seems to be reasonably well practiced by both managers and frontline workers[19]. The figures in columns (3) to (6) reveal that managers across offices are more likely to keep records of office activities than their frontline worker counterparts.

Table 4-2 displays descriptive statistics about salary and allowance (our proxy measure of extrinsic incentive), healthcare insurance, and perceived opinion about the sufficiency of salary and allowance compared to the amount of work[20]. Columns (1) and (2) report the means based on the full sample of managers and frontline workers, respectively. Columns (3) and (4) show the means of the managers and frontline workers in the government offices, while columns (5) and (6) display similar estimates of the managers and frontline workers in the semi-autonomous offices, respectively.

[19] Kept records serve as a reference for communication, planning, reviews, and evidence-based research. Although recordkeeping is crucial, its impact largely depends on the utilization of the kept records. During the field survey, however, we did not ask further follow-up question(s) related to the actual utilization of the kept records by our respondents. We only assume that recordkeeping practices by managers and frontline workers entail utilization as well.

[20] We requested our respondents to provide information about monthly salary (after tax) and allowances they receive. Then we asked the question about the respondents' opinion about the sufficiency of the salary and allowances received based on the amount of work they do. We did not ask them to compare the amount they receive with the amount they would otherwise desire to receive. The questions were: "Is the salary sufficient for the work you do?" and "Is the average monthly allowance sufficient for the work you do?"

Based on the full sample in columns (1) and (2), managers and frontline workers by the time of our survey received a monthly salary of TZS 2.28 million and TZS 1.49 million monthly allowances of TZS 0.77 million and TZS 0.46 million, respectively. The managers in government offices are paid less salary compared to their counterparts in semi-autonomous offices (i.e., TZS 1.62 million versus TZS 2.45 million), see columns (2) and (5) indicate. Similarly, managers in government offices receive a smaller amount of allowances than their counterparts in semi-autonomous offices (i.e., TZS 0.51 million versus TZS 0.83 million).

The higher salaries and allowances of managers in the semi-autonomous offices could be the result of two possibilities. First, it may be that they are more extrinsically motivated than their counterparts in government offices. Second, they are highly educated, and able persons hired by these semi-autonomous offices designed to fast-track the delivery of public services. The finding in Table 4-1 reinforces the second possibility. As columns (3) and (5) of Table 4-1 show, a smaller proportion of managers in the government offices attained postgraduate education than their counterpart managers in the semi-autonomous offices (i.e., 56 percent versus 65 percent). In contrast, the average monthly salary and allowances for frontline workers are almost similar in the government and semi-autonomous offices (i.e., the salary of TZS 1.45 million and TZS 1.54 million and allowance of TZS 0.48 million and TZS 0.44 million in the government and semi-autonomous offices, respectively).

Table 4-2 shows that only a small proportion of managers and frontline workers (i.e., 22 percent versus 18 percent in the government offices and 41 percent versus 20

percent in the semi-autonomous offices) felt that they received sufficient salary compared to the amount of work they do. Also, a small proportion of managers and frontline workers (i.e., 11 percent versus 25 percent in the government offices and 30 percent versus 22 percent in the government and semi-autonomous offices) felt that they received sufficient allowances in comparison with the amount of work they do.

During the interviews, some respondents noted that sometimes they conduct follow-up activities (e.g., verification of various licenses, conformity to standards, tax compliance, and enforcement of electronic fiscal devices). Some respondents lamented the challenge of the insufficient or weak management of transport facilities. As a result, in pursuit of catching up with their deadlines or targets, they occasionally incur their transport costs to conduct follow-up field visits and inspections to enforce compliance with standards, licenses, and applicable taxes by entrepreneurs. Also, Table 4-2 shows that most of our respondents have healthcare insurance coverage.

In what follows, the analysis concentrates on the primary focus of this study, that is, exploring the efficacy of workplace communication in the sample public offices. Table 4-3 presents the descriptive statistics of the proxies of workplace communication. Columns (1) and (2) display the means reported by the office managers and average frontline workers, respectively. Column (3) reports the two-way *t*-test of the equality of means reported by the managers and frontline workers in column (1) and (2), respectively.

The estimates, in the first and second rows of columns (1) and (2) of Table 4-3, indicate that about 52 percent and 41 percent of the office managers and 23 percent and 20 percent of the average frontline workers described clearly the office mission and targets,

respectively. The second and third rows of column (3) show that the *t*-values are significant at the 1 percent level, suggesting that, indeed, the mean differences between managers and average frontline workers who clearly described the office mission and targets are significant.

Overall, the above finding reveals that most of the office managers and frontline workers fail to describe their office mission and targets. It is possible that the failure is associated with lack of incentives because most of the managers and frontline workers complained that their salary and allowance (our measures of extrinsic motivation) are low compared to their duties.

Also, it is likely that such a finding can largely be ascribed to poor workplace communication. That is, if managers and frontline workers, who are encouraged to achieve office performance targets, have formal instances to discuss the achievement related to performance target as per office mission, they would have been able to articulate their office mission and targets. To qualify this conjecture, in the next paragraph, the study endeavours to explore if the office managers and frontline workers are formally communicating using office meetings.

The office managers and average frontline workers reported that they had had formal office meetings. On average, the number of meetings is not that large. The office managers and average frontline workers report about 5.65 and 2.17 formal office meetings in one month, respectively (see the third row of columns (1) and (2) of Table 4-3, respectively). Now the problem is the difference, which is 3.48 formal office meetings, between manager's and average frontline worker's response, see the third row of column

(3). Such a difference (henceforth "workplace communication inconsistencies") is statistically significant at the 1 percent level. A question arises, "How to explain such inconsistencies?" Partly, the inconsistencies are likely to be attributable to either a tendency of exaggeration or poor workplace communication. It seems that while the managers tend to overstate the number of formal office meetings, their average frontline worker counterparts tend to understate it.

Two possible questions emerge from the above inconsistencies. First, "Why does there seem to be a tendency of exaggeration?" There are two possibilities to substantiate a tendency of exaggeration. Firstly, although the managers and frontline workers have had formal office meetings, it may be that they are not standardized, not communicated well in advance, or there is the poor quality of discussion of issues during the meetings. Thus, either the managers of frontline workers may not commit sufficient effort or pay due attention to such formal meetings. In turn, this may cause inefficient workplace communication and coordination problems. Secondly, the managers are required to convene and chair at least one formal office meeting in a week (URT, 2009). Thus, if for some reason(s) they fail to convene the formal meeting(s), managers may pretend that they have had the number of formal office meetings consistent with the Standing Orders of Public Service to maintain their positive image.

Second, "Do the inconsistencies indicate communication problems?" The answer to this question is "Yes." Responding to this question, two possible reasons are likely to hold. The first reason is concerned with the poor organization of such office meetings. The call for formal meetings in some of our sample offices reveals a lack of vital information,

namely: pre-arranged venue, starting and ending time, and specific agenda of the meeting (Panels 4-1A to 4-1F of Figure 4-1). In some offices, a call for a meeting does not affirm that the meeting will undoubtedly be conducted. Such encumbrances suggest the potential existence of poor communication.

The second reason is concerned with the managers' and frontline workers' satisfaction with their workplace communication. During the field surveys, enumerators asked the respondent, "Are you satisfied with the way you communicate with your manager (frontline workers) in terms of frequency, mode, and type?" The follow-up question was asked after the respondents provide the number of formal office meetings.

The data show that about 48.3 percent and 61.6 percent of the office managers and frontline workers were dissatisfied with the office communication practices by the time of the field survey, respectively. The natural question follows, "Why these civil servants were dissatisfied with the way they communicated?" This study ponders that the managers' and frontline workers' dissatisfaction with their communication practices is corroborative evidence that, indeed, the sample public offices were experiencing workplace communication problems or inefficiencies, at least, by the time of the field survey[21]. Accordingly, and consistent with the review of literature in chapter 2, the finding related to the poor description of office mission and targets as well the inconsistencies in the number

[21] They provided several reasons for their communication dissatisfaction. The reasons included insufficient communication facilities, weak teamwork, insufficient training on effective workplace communication to employees given the ever-changing communication technologies, poor implementation of issues discussed in the previous meetings, weak support from higher authorities, top-down approach of office management, and absenteeism of some staff members.

of formal office meetings lends support to hypothesis 4.1 regarding the existence of poor workplace communication in our sample public offices[22].

Another finding in Table 4-3 is that, in 2012/13, the high annual performance targets achieved among the sample offices were affirmatively reported by about 40 percent and 38 percent of the managers and average frontline workers, respectively. Also, in 2013/14, about 50 percent and 44 percent of office managers and frontline workers reported having achieved high annual performance targets. In contrast, there was a slight difference in the office performance targets achieved as reported by about 52 percent and 55 percent of the managers and the average frontline workers in 2014/15, respectively. The finding suggests that the level of office performance targets achieved by most of our sample public offices is arguably low. Potentially, this may imply inefficient delivery of public services in our sample offices.

Finally, in the last three rows of column (3), reports statistically insignificant differences between the number of office managers and average frontline workers who reported that their offices achieved high office annual performance targets. The finding may suggest that most of the office managers and their frontline worker counterparts are familiar with the level of their annual office performance achieved in the fiscal years.

[22] The natural question arises, "Why communication problems persist in most of our sample public offices even when the office managers and frontline workers recognize the existence of such problems?" The question is an empirical one, and it is still open for scientific investigation. However, our survey of the literature (that utilizes game theory approach) suggests that either coordination (or cooperation) failure (i.e., the prisoner's dilemma), in many cases, is associated with communication problems (e.g., Van Huyck et al., 1990; Brandts and Cooper, 2006, 2007; Brandts et al., 2015; Salmon and Weber, 2017). Admittedly, this question is beyond the scope of this dissertation. Thus, the present study accedes this issue for future studies.

4.5 Econometric Analyses

Section 4.5 extends the basic descriptive to econometric analyses. The section begins by describing the econometric strategies (sub-section 4.5.1) that underpins the office- and individual-level of analyses. The subsection presents a more systematic regression-based analytical framework of potential correlates of the proxy measures of workplace communication. The next subsection (i.e., sub-section 4.5.2) turns to a candid discussion of the estimation results.

4.5.1 Estimation strategy

Let y_i be the dependent variable, which can be the manager's and frontline worker's clear description of the office mission, office targets, and high office performance targets achieved. Also, y_i can be the number of formal office meetings, the differences in the number of formal office meetings, and the satisfaction status with the communication practices by the manager and frontline worker in the office *i*. The basic equation for the office- and individual-level analyses is, respectively, specified in equation (4.1) and (4.2).

$$y_i = \beta_0 + K_i\lambda + M_{ij}\theta + \overline{W}_{i\bar{e}}\delta + \varepsilon_i, \quad (4.1)$$

$$y_i = \alpha_0 + W_{ie}\alpha + \eta_i + \mu_i, \quad (4.2)$$

where K_i, M_{ij}, $\overline{W}_{i\bar{e}}$, and W_{ie} are vectors of covariates capturing the basic characteristics of office *i*, manager *j*, average frontline worker $\bar{e}$, and individual frontline worker *e*, respectively. The vector of parameters for K_i, M_{ij}, $\overline{W}_{i\bar{e}}$, and W_{ie} are, respectively, specified as λ, θ, δ, and α. The constant term in equation (4.1) and (4.2) is β_0 and α_0, respectively.

In equation (4.2), η_i (i = 1….n) captures the unobserved characteristics of office *i* by. The error term in equation (4.1) and (4.2) is ε_i and μ_i, respectively.

On the one hand, the econometric analysis uses the PROBIT model to estimate equation (4.1) when y_i is a binary dependent variable. There are three binary dependent variables. First, a dummy variable taking 1 for the clear description of the mission or targets, 0 otherwise. Second, a dummy variable which takes 1 if the respondent affirms that the office realized a performance target of at least 81 percent of the planned office performance targets, 0 otherwise. Third, the satisfaction with the office communication (i.e., 1 if the respondent is satisfied with the office communication practices, 0 otherwise).

On the other hand, the analysis exploits the ordinary least square (OLS) to estimate equation (4.1) when y_i is a continuous dependent variable (e.g., the number of, and the inconsistencies in the formal office meetings and the proportion of average frontline workers who clearly described the office mission and targets). For the individual level of analysis – in equation (4.2) – the office-fixed effects (O-FE) approach is applied. Technically, the O-FE is applied with a view of controlling for the office-level unobserved heterogeneity.

4.5.2 Estimation results

The section begins by analyzing the correlates of the managers' and frontline worker's description of the office mission and targets by using equation (4.1). The results are presented in Table 4-4. Columns (1) and (2) as well as columns (3) and (4) display the

correlates regarding the managers' description of the office mission and targets. While columns (1) and (3) capture the correlates of managers' description of the office mission and target without controlling for the basic characteristics of the average frontline workers, columns (2) and (4) control for the basic characteristics of the average frontline workers, respectively.

While the coefficients of the managers' training background in leadership and recordkeeping practices of office activities are positive and significant at the 10 percent level, the coefficient of the old-cohort is negative and significant at the 5 percent level, see column (1). After controlling for the average characteristics of the frontline workers, the coefficients of leadership and recordkeeping remain positive but become smaller and statistically insignificant, while the coefficient of the old-cohort remains negative and significant at the 5 percent level, see column (2). The estimates suggest that managers who received leadership training and those who kept records of office activities were more likely to succeed in describing their office mission. Also, the estimates suggest that managers who belong to the old-cohort category were less likely to describe precisely the office mission.

In column (3), the coefficient of the proportion of old-cohort workers is negative and significant at the 5 percent level. After controlling for the average characteristics of frontline workers, its coefficient remains negative, but its significance becomes marginal at the 10 percent level, see column (4). This implies that managers in the offices with a large proportion of old-cohort workers were less likely to describe precisely the office targets. Although it is difficult to explain, potentially this could be attributable to the fact that

offices with a large proportion of old-cohorts require higher management intensity to manage such workers. If the manager, who should contribute substantially to the required management intensity, is insufficiently equipped with hands-on management skills, internalizing operational targets, which in most cases is executed by the frontline workers, might be a challenge.

While in column (3) the coefficients of leadership training, recordkeeping, and postgraduate education are positive and significant, the coefficient of the old-cohort is negative and marginally significant. Even after controlling the average characteristics of frontline workers in column (4), these coefficients maintain the same signs as in column (3) and remain statistically significant. Hence, leadership skills, recordkeeping of office activities, and education are likely to improve managers' capability to communicate the office targets. Also, the negative coefficient of the old-cohorts for managers suggests that older managers are less likely to communicate the office targets.

Generally, in Table 4-4, the positive and significant coefficient of managers' training in leadership suggests that the acquired leadership skills help managers to communicate the office mission and targets. Potentially, the short-term training improves leadership qualities and induces participative management practices (e.g., a shared mission and targets). The finding is consistent with Brandts et al. (2015) who find that good leaders communicate effectively by sending messages to encourage cooperation by subordinates toward choosing dominant and efficient payoffs. We have also seen that the positive coefficient of recordkeeping is more highly significantly associated with the description of the office targets than of the office mission. Possibly this is because office targets entail

daily office activities. Thus, the recordkeeping of activities related to office targets is more likely to help managers to communicate the office targets to their frontline workers and other stakeholders.

Next, the analysis turns to results of equation (4.2) which investigates the correlates of the individual frontline workers' description of the office mission and targets. The results are in columns (5) to (8) of Table 4-4. Columns (5) and (6) and columns (7) and (8) present the correlates of the description of the mission and targets by frontline workers, respectively. In columns (5) and (7), the basic characteristics of the offices and the individual characteristics of the managers are, respectively, not controlled. Columns (6) and (8) control for these covariates. Finally, the estimates in columns (5) and (7) are those which apply office fixed effects to control for office unobserved heterogeneity.

The coefficients of recordkeeping practices and postgraduate education are positive and statistically significant (columns (5) and (7) of Panel C). The coefficients remain positive but become statistically weaker in columns (6) and (8), possibly because of other controls added to the regression. These estimates suggest that frontline workers, who kept records of office activities and those with at least a postgraduate level of education, were more likely to describe the office mission and targets clearly. In columns (5) to (8), the coefficient of the old-cohort is negative. Although it is insignificant in columns (5) and (6), it is significant at the 10 percent level in column (7) and at the 5 percent level in column (8). The estimate implies that frontline workers who belong to the old-cohort were less likely to have described clearly the office targets. Indeed, frontline workers in offices with a

large proportion of old-cohort workers were also less likely to describe precisely the office mission and targets (columns (6) and (8) in Panel A of Table 4-4).

Table 4-5 presents the estimates based on equation (4.1). Column (1), (2), and (3) reports the managers' correlates of the number of formal office meetings, the average frontline workers' number of formal office meetings, and the correlates of the managers' and average frontline workers' inconsistencies, respectively. Column (4) displays the correlates of the managers' opinion about their satisfaction with the communication. Additionally, the estimate equation (4.2) was estimated to establish the correlates of the frontline worker's communication satisfaction. The results are shown in columns (5) and (6). While the OLS regression was used in columns (1) to (3), the PROBIT regression, reporting marginal effects, was applied in columns (4) to (6). Lastly, findings in column (5), uses the office-fixed effects to control for unobserved office features.

The coefficients of office size in columns (1) and (2) are, respectively, positive and negative. They are insignificant potentially due to the small sample size because the *t*-values of 1.529 and -1.534 are close to the minimum threshold of the 10 percent level of significance. Despite the insignificance, the positive and negative signs of such coefficients suggest that managers, in the large offices, tend to report a large number of formal office meetings while in the same size of offices, the average frontline workers report fewer meetings. In column (3), the coefficient of office size is positive and significant at the 10 percent level suggesting that the large offices are likely to be associated with a proliferation of communication problems. Possibly this is because such offices have many potential communication channels that require increased communication management intensity.

Now, it is pertinent to explore if the working environment, which is difficult to measure, is associated with the communication. This study, however, uses the workforce age-heterogeneity (i.e., the proportion of old- and young cohort workers) as a proxy measure of the working environment. In the second row of columns (1) and (2), the coefficient of the proportion of old-cohort workers is positive and negative, respectively. The coefficient is significant at the 1 and 5 percent level in column (1) and column (2), respectively. The coefficient in column (1) suggests that managers in offices with a relatively larger proportion of old-cohort workers seem to have reported larger numbers of formal office meetings than managers in offices dominated by young-cohort workers. In contrast, the coefficient in column (2) suggests that average frontline workers in offices with a relatively larger proportion of old-cohort workers seem to have reported smaller numbers of formal office meetings than average frontline workers in offices with a large proportion of young-cohort workers.

Why do managers in offices dominated by old-cohort workers tend to state a larger numbers of formal office meetings? A potential reason is the difficulties which are likely to be associated with managing older workers due to their inflexibilities to adapt to workplace management changes (Yeatts et al., 1999). Consequently, managers in those offices may have been forced to communicate more frequently with them, potentially causing them to report a larger number of meetings. The assertation is supported by the positive and statistically significant coefficient of the old-cohort variable, which suggests that managers belonging to the old-cohort category reported a larger number of formal office meetings

(see toward the end of Panel B). The coefficient of this variable is positive and significantly correlated with communication inconsistencies (column (3) in Panel B).

The coefficient of the proportion of old-cohort workers, the second row of column (3), is positive and significant at the 5 percent level. The finding suggests that communication inconsistencies increase with the increase in the proportion of old-cohort workers. During the field surveys, some of our respondents admitted the existence of weak interactions (work and social), between old and young cohort workers. Other respondents said, "Old-cohorts, especially those who have served for a long time and have not been promoted to higher positions, are frustrated. They find it difficult to easily interact with young-cohorts who either got promoted or are likely to be promoted." Such a reported weak work-and-social interaction is likely to cause communication inconsistencies.

Next, the analysis attempts to investigate the correlation between skills training and our proxies of communication. The coefficients of managers' training in management and leadership skills are negative; see columns (1) and (3). While the coefficients of management training are insignificant (i.e., the *t*-value in column (1) equals -1.287 while in column (3) the *t*-value equals -1.351), the coefficients of leadership training are significant at the 10 percent and 5 percent level in column (1) and column (3), respectively.

An important question, which deserves careful clarification, is specified as follows, "What does the above finding inform the nexus between the office manager's training experience in management and leadership skills and the reported number of formal office meetings?" Indeed, the above finding evidently suggests that the office managers who received training programs in office management and leadership were more likely to report

a smaller number of formal office meetings than their counterparts who were not trained in the same type of skills[23]. Also, the negative coefficients in column (3) suggest that training in management and leadership is likely to improve workplace communication by reducing communication inconsistencies.

In column (1) of Panel B and column (2) of Panel C, the coefficients of recordkeeping practices are negative and statistically significant. As previously shown in Table 4-3, the managers and average frontline workers tend to exaggerate and understate the number of formal office meetings, respectively. Nonetheless, as the coefficients of the recordkeeping practices show, if they keep records of office activities, they tend to exaggerate less and understate less. In column (3) of Panel B, the coefficient of recordkeeping practices is negative and statistically significant at the 10 percent level. In line with hypothesis 4.5, manager's recordkeeping is negatively associated with communication inconsistencies.

The last three columns, that is, columns (4) to (6), of Table 4-5, present the results of the factors associated with managers' and frontline worker's satisfaction with workplace communication practices. Managers in offices with high a proportion of old-cohort workers are likely to be dissatisfied with communication practices, see column (4). The finding provides suggestive evidence regarding the possible difficulty faced by managers to efficiently manage communication with a workforce composed of a large proportion of old-

[23] "Does reporting fewer formal office meetings imply improved communication?" The answer is probably "Yes" because having high frequencies of formal office meetings may supply too much information, which is as bad as too little information (Goldhaber, 1990). Also, unreasonably large number of formal office meetings may indicate poor communication (Putnam and Mumby, 2014). However, optimality in the number of formal office meetings is beyond the scope of this study.

cohort workers. In contrast, the coefficients of leadership skills training and recordkeeping practices are positive and significant. Thus, training in leadership is likely to help managers improve workplace communication, and hence communication satisfaction. Also, managers who kept records of office activities, as well as the frontline workers who kept records of office activities and those with at least a postgraduate education, were more likely to be satisfied with the communication practices, see the coefficients in columns (5) and (6).

Table 4-6 presents the results showing the factors associated with managers' and frontline workers' evaluation of the office annual performance targets achieved in the 2014 fiscal year[24]. The dependent variable is office annual performance targets achieved in 2014. It is a dummy variable that takes 1 if the manager or frontline worker reported affirmatively that the office realized a high performance target of at least 81 percent of the planned office performance targets, 0 otherwise. While columns (1) and (2) report the correlates of managers' evaluation of the office annual performance targets achieved in 2014, columns (3) and (4) report the correlates of the frontline workers' evaluation of the office annual performance targets achieved in the same year. Column (1) controls for the office and the manager's characteristics. In column (2), the workers' average characteristics are included as additional controls. While column (3) only controls for the individual characteristics of the frontline workers, column (4) adds the characteristics of the office and the managers as additional controls. The estimates in column (3) apply office fixed effects.

[24] The results of regressions involving the office performance in 2012/13 and 2013/14 fiscal years are qualitatively similar to those of the office performance in 2014/15.

The coefficient of office size is positive whereas that of the proportion of old-cohort workers is negative (columns (1) and (2) of Panel A). These coefficients, which are significant at the 10 percent level, suggest that managers in the large offices seemed to have reported high office performance targets achieved. The finding is ascribed by the likelihood that managers in those offices feel they achieve high office performance due to the collective effort of a large number of workers. In contrast, managers in offices with a large proportion of old-cohort workers self-reported low office performance targets achieved. Indeed, during the field survey, some managers admitted that most old-cohort workers are timeservers (i.e., they make little effort at work because they are waiting to leave the office or retire). In another case, some old-cohort workers seemed to have unresolved grievances. They complained about office practices and low office performance. This finding is reinforced by the negative and significant coefficients of the old-cohorts in columns (1) and (2) of Panel B implying that managers in the old-cohort category reported low office performance. This finding may be due to the existence of a large proportion of timeservers. Another reason could be related to the conservativeness of the old managers.

Moreover, in columns (1) and (2), the coefficients of managers' training background in management and leadership, recordkeeping practices, and postgraduate education are positive. However, except for the coefficient of leadership in column (1), which is significant at the 10 percent level, these coefficients are statistically insignificant. The insignificance may be potentially attributed to the small sample size because their *t*-values are somewhat close to the minimum threshold of the 10 percent level of significance. It is suggestive that managers who received leadership training are good at

organizing various scarce resources in the office, including the human resources which, in turn, contributed to improved office performance.

The coefficient of recordkeeping is positive (see columns (3) and (4) of Panel C). While it is significant at the 5 percent level in column (3), it is significant at the 10 percent level in column (4). Such coefficient may imply that the frontline workers who kept records of office activities reported high office performance targets achieved in 2014/15. On the contrary, the coefficient of the old-cohorts is negative. Whereas it is significant at the 5 percent level in column (3), it is significant at the 1 percent level in column (4). Consistent with the previous explanation, some older frontline workers are likely to be timeservers. Thus, their contribution to the office performance is marginal. This may be one of the reasons why they reported conservative office performance targets achieved in 2014/15.

4.6 Conclusion

Chapter 4 reports that most of the office managers and frontline workers (in the sample public offices from Dar es Salaam and Pwani, Tanzania) fail to describe clearly the office mission and targets. Such a failure is likely to be associated with incentive issue. Also, and more importantly, failure to describe office mission and targets is likely to be related to poor communication. That is, if the office managers and frontline workers had effective communication, they would have been able to describe clearly the office mission and targets to various stakeholders.

The chapter reveals that the managers and frontline workers have had formal office meetings. The office managers and their average frontline workers reported having had

about 5.65 and 2.17 formal office meetings in one month, respectively. The manager's and frontline worker's difference of about 3.48 formal office meetings is not just mere statistical noise. Instead, it suggests the existence of communication problems. The problems are affirmed by the manager's and frontline worker's dissatisfaction with their office communication practices by the time of the field surveys[25].

Moreover, chapter 4 documents the factors associated with our proxies of communication. They include the basic characteristics of offices (e.g., office size and the proportion of workforce age-heterogeneity). Others, especially those that are likely to reduce workplace communication problems, include the manager's and frontline worker's training experience in leadership and management. Also, recordkeeping practices of office activities have a negative correlation with our measure of communication problems.

The empirical findings contained in chapter 4 warrant two implications. First, they highlight the importance of developing evidence-based and office-level reform policy that can efficiently initiate workplace communication improvement to enhance the performance of public service delivery. Such a proposed reform policy may, among other things,

[25] Note that the communication problems found in the sample public offices in Tanzania are not necessarily "developing country" problems. They are also likely to prevail in public offices in developed countries. For example, public offices in Japan and the US may face many of the same issues, especially if managers and frontline workers do not adopt the efficient communication practices. A study by Bloom et al. (2015a) show that only those hospitals in the U.S. and Europe with their managers and frontline workers (e.g., clinical officers and nurses) adopting efficient management practices, including communication, were more likely to effectively deliver hospital services to patients. This implies that some hospitals had managers and frontline workers who experienced communication problems. However, the comparative empirical analyses regarding communication problems in the public offices in developed and developing countries is beyond the scope of this dissertation.

consider executing proper human resources succession plans for the public offices to have an appropriate mix of old- and young-cohort who serve therein.

Second, the findings warrant further research to strengthen our understanding of communication practices and other practices of public administration, such as coordination and leadership. Also, the study recommends a training program to establish causal impacts of training on the adoption of effective communication practices. Such training may include *Kaizen* (communication is one of the *Kaizen* pillars). The implementation of JICA's supported-*Kaizen* training program in public offices in Bangladesh is an outstanding example (JICA, 2014). Tanzania's public offices can emulate from a similar initiative.

Admittedly, the findings presented in chapter 4 deserve an explicit word of caution. One of the caveats is related to the analytical approach used to identify communication problems. That is, the finding of the potential existence of communication problems in our sample public offices is mostly through descriptive analyses. Such a finding matters as it provides, at most, suggestive evidence of such problems. However, it is not conclusive evidence. Thus, the future research can attempt to explore it further with a view of concretizing such evidence.

Four more caveats are necessary. First, recall bias due to the possibility of either exaggerating or understating the number of formal office meetings. Second, the enumerators' bias in evaluating the manager's and frontline worker's description of office mission and targets. Third, the managers and frontline workers may have erroneously evaluated the achieved annual office performance targets. Fourth, and last, social desirability bias (i.e., the possibility of providing the level of office performance which is

socially pleasing). Section 4.3.2 discusses the measures implemented in this study to mitigate such caveats. Thus, it safe to assume that such issues have not significantly influenced the results documented in chapter 4.

CHAPTER 5

CONCLUSION

This dissertation has addressed two issues related to productivity improvement in the private and public sectors. First, the entrepreneurs' adoption of efficient management practices for building a vibrant, self-sustaining, and competitive private sector-led industrial sector. Second, the workplace communication, which is one of the central tenets of management practices (Bloom and van Reenen, 2007), in the public offices with a mandate to support private sector development. The data for the analyses originates from a developing country context: Tanzania.

Chapter 3 has investigated the impacts of a training program, which included *Kaizen*, on the entrepreneurs' adoption of management practices and business performance. The analysis has taken advantage of the firm-level survey data consisting of micro- and small-sized entrepreneurs in the garment cluster in Dar es Salaam. The sample entrepreneurs were branded as "completely-treated entrepreneurs" (i.e., those who participated in classroom and onsite training components) and the "partially-treated entrepreneurs" who received only one training component (i.e., either the classroom or onsite component, but not both). Others were the "untreated or control entrepreneurs" who did not participate in either component.

The estimates show that the *Kaizen* training program had a positive and statistically significant impact on the treated entrepreneurs' adoption of certain management practices.

The positive impact, which was also realized in the short-run (i.e., one year after the training intervention), remained positive and statistically significant among the treated entrepreneurs in the medium-run (i.e., three years after the intervention).

Also, the study finds out a slight difference in the adoption of *Kaizen* and non-*Kaizen* practices. The finding may suggest that while some treated entrepreneurs adopted *Kaizen* practices, others adopted non-*Kaizen* practices depending on the specific needs of their businesses at a time. Moreover, the analysis reveal that an entrepreneur's education is significantly correlated with the adoption of management practices. However, it is weakly correlated with the adoption of *Kaizen* practices. The finding may imply that even those entrepreneurs with a low education level can understand and adopt *Kaizen* practices. Thus, *Kaizen* is an inclusive approach towards an entrepreneur's managerial capability improvement.

Furthermore, the estimation results indicate a positive and statistically significant impact of management training program on business performance among the completely-treated entrepreneurs in the medium-run. The finding is relatively new in the existing literature. Two potential reasons are likely to be associated with this finding. Firstly, it is possible that unlike in the short-run, in the medium-run, the completely-treated entrepreneurs gradually selected relevant management practices from a pool of many management practices learned in the training program to suit their business contexts. Secondly, the completely-treated entrepreneurs needed sufficient time to assimilate adequately such relevant practices toward business performance improvement.

Why such a medium-run impact of training on business performance became evident among the completely-treated entrepreneurs but not on their partially-treated counterparts? It is likely that this group of treated entrepreneurs, who benefited from the training program more than their partially-treated counterparts, had a more extensive range of choices of relevant practices to assimilate to their businesses. Thus, it is possible to infer that a training program which combined classroom and onsite components was more useful to bring about desired impacts than only one training component.

The randomized controlled experimental evidence in chapter 3 contributes to a body of emerging empirical literature. That is, our management training program, in a developing country setting (Tanzania), had a positive impact on the entrepreneur's adoption of efficient management practices and firm performance. Likewise, the findings are in line with earlier stylized facts by Bloom et al. (2013) and McKenzie and Woodruff (2017) that management practices are relevant not only for medium- and large-sized firms in developed countries but also for micro- and small-sized firms in developing countries.

Admittedly, the findings in chapter 3 are likely to be understating the impact of our training program due to rampant information. The sample entrepreneurs are cluster-based and are organized in business associations. They occasionally attend similar regional markets to sell their products. Indeed, the participants were too excited about the training program, particularly the *Kaizen* component. These features suggest knowledge spillovers. However, this study cannot rigorously claim spillovers of knowledge of our *Kaizen* training program. Partly, this is due to the potential endogeneity problem associated with the entrepreneurs' communication and lack of suitable instrumental variable (IV). Thus, as a

robustness check, in the Appendix, an attempt has been pursued to highlight this issue. As shown in the Appendix, many entrepreneurs (both treated and untreated) in our sample, know each other in person and that they discussed the contents of our *Kaizen* training program. Such interactive communication continued even after the training program had ended. Moreover, untreated entrepreneurs visited the treated workshops where they claim to imitate some observable practices deemed useful for their workshop too.

Chapter 4 has explored the prevalence of and the factors associated with communication efficacy in public offices by using office managers' and frontline workers' description of office mission and targets and the inconsistencies in the number of formal office meetings (reported by office managers and frontline workers). Also, the study used administrative evidence and the managers' and frontline workers' communication satisfaction to infer communication efficacy. The study have utilized a novel cross-sectional survey data of public offices, office managers, and frontline workers from the public offices in Dar es Salaam and Pwani.

The descriptive results show evidently that most of the office managers and frontline workers in our sample public offices fail to describe precisely the mission and targets of their respective offices. Failure to describe such strategic management tools can be associated with the lack of monetary incentive. Also, it is more likely such failure is associated with communication problems. If they communicate effectively, it would have been possible for them to chat out the office mission and targets more precise than the case documented in chapter 4.

Similarly, the findings show that the office managers and frontline workers do communicate (though not very often) using formal office meetings. However, there are inconsistencies in the number of such formal meetings. That is, while managers reported having had about 5.65 formal office meetings in one month, their frontline worker counterparts claimed that, during the same period, they had had about 2.17 formal office meetings. The difference, henceforth "communication inconsistencies", was about 3.48 formal office meetings. The inefficient organization of such meetings and the managers' and frontline workers' poor satisfaction with their communication practices are among the indicators suggesting poor communication.

Lastly, chapter 4 reveals the factors associated with our proxies of communication (i.e., the managers' and frontline workers' description of office mission, performance targets, and the number of formal office meetings). The study have categorized them as the office- and individual-level factors. The office-level factors include the office size (measured by the total number of employees) and the proportion of workforce age-heterogeneity (i.e., the composition of old- and young-cohort of employees). Specifically, the estimates, in chapter 4, reveal that the increase in office size and proportion of old-cohort employees is associated with the proliferation of workplace communication inefficiencies. The individual level-factors include the managers' and frontline workers' short-term training experience in leadership and management, recordkeeping practices of office activities, and formal schooling. The coefficients of such individual factors suggest that they contribute substantially to the workplace communication improvement in the sample public offices.

The empirical findings in chapters 3 and 4 of this dissertation have implications for policy. This section, therefore, highlights some of the policy issues that deserve due consideration. Indeed, such policy issues are relevant for supporting the development of vibrant private and public sectors in developing countries.

First, the findings in chapter 3 indicate that our short-term management training program had a positive impact the entrepreneurs' adoption of management practices as well as on the business performance (among the completely-treated entrepreneurs) in the medium-run. Such a finding implies that developing and implementing an industrial policy should consider management training as one of the key components for strengthening firms' productivity and competitiveness. Also, the policy should consider relevant design and contents of such training programs as well as an appropriate quantity of training.

Second, the findings in chapter 4 suggest that policy which aims at reforming the public sector in developing countries should consider the working environment of public offices in which the production and delivery of public services take place. Such policy should, among other things, consider implementing office-level initiatives that can potentially improve the managers' and frontline workers' adoption of good management practices (e.g., efficient communication practices). In so doing, the characteristics of public offices, the background of public officers, and timely implementation of efficient succession plans of human resources should be taken into consideration. An improved communication not only encourages an efficient working relationship among the public officials but also is closely associated with workplace productivity (one of the fundamental determinants of efficient delivery of public services).

The findings contained in this dissertation warrant further studies. First, future studies that consider collecting follow-up data over a longer span after the training interventions are vital. Such follow-up data may confirm if longer time is indeed a necessary pre-condition of realizing the significant impact of managerial training on business performance.

Second, the findings in chapter 3 suggest that differently treated entrepreneurs adopted different sets of management practices. In addition to the standard business practices (i.e., non-*Kaizen* practices), the training program included subjects covering *Kaizen* practices. Nonetheless, the study has not rigorously assessed the impacts of including such subjects of *Kaizen* practices. This issue is deferred for the future studies.

Third, chapter 3 has shown that our treated and untreated entrepreneurs have had interactive communication regarding the contents of our *Kaizen* training program. This has a potential to induce knowledge spillovers. Hence, the estimates (in chapter 3) are likely to be lessened by spillovers. Admittedly, in the Appendix, the analysis has not been able to establish rigorous evidence as to whether such entrepreneurs' communicative interactions transmitted knowledge (from the treated to untreated entrepreneurs) regarding the contents of our training programs. Thus, this issue can be considered for future research.

Fourth, chapter 4 provides suggestive evidence of communication problems in the sample public offices. The evidence is generated from a cross-sectional survey data. If any time-specific factor significantly influences our cross-sectional data, it may affect our results too. In that case panel data with a reasonable long-time dimension is preferred over cross-sectional data. Future studies can, for example, implement an experimental training

program of communication to managers and frontline workers. This approach can permit analyses of causal impacts of training on the adoption of efficient communication practices.

Likewise, the emerging theoretical literature from the laboratory coordination games indicates that one of the roles of the within-office communication is to facilitate the coordination of office activities. However, the scope of the study in chapter 4 focuses on the exploring and describing the efficacy of workplace communication between the office managers and frontline workers in the sample public offices. Thus, the study remains passive on the role of the within-office communication in the coordination of the performance of office activities. Hence, the discussion of the topic of the role of the within-office communication on management calls for future studies.

Appendix

KNOWLEDGE SPILLOVERS

This Appendix analyzes the entrepreneurs' communication and social network. The analyses is a robustness check that explores how the estimates in chapter 3 change once we control for the entrepreneurs' communication and social network.

A.1 Data

A.1.1 Sources of data

The analyses use firm-level data to analyze the entrepreneurs' communication. Such data were collected during the field surveys as part of our experimental *Kaizen* training program. Chapter 3 describes the details of sampling procedures, experimental design, training interventions, and waves of field surveys. The next subsection sketches out key features related to the analyses of entrepreneurs' communication.

A.1.2 Features of the study

Three features form the basis of our conjecture of the potential existence of knowledge spillovers. First, the sample entrepreneurs are members of business associations. Such business associations conduct their activities within the vicinities of garment cluster in which entrepreneurs operate their businesses. They conduct regular meetings to engage their members. Thus, the entrepreneurs are likely to share information related to *Kaizen*.

Second, both the treated and untreated entrepreneurs coexist in the same garment cluster. They have instances of business communication and social interactions. Thus, they are likely to share information concerning the contents of our *Kaizen* training program too.

Third, and last, only the treated entrepreneurs were the source of information. Only randomly invited entrepreneurs could participate in the training programs. There was no incidence of uninvited entrepreneurs participating in either the classroom or onsite training. One may wonder if the untreated entrepreneurs happened to solicit information regarding the contents of the *Kaizen* training program from another source. Presumably, they received such information only from the treated entrepreneurs[26]. Thus, it is possible to rule out the likelihood that the effect of communication was confounded with training directly improving the knowledge and the management practices of untreated entrepreneurs.

Moreover, the *Kaizen* training materials used by our training experts were not available in the local business consulting firms. Such training materials were customized based on the specific needs of the experimental design. Hence, the only way the untreated entrepreneurs could gain access to knowledge of *Kaizen* program is through communication with their treated counterparts. The cost of training is one of the reasons why entrepreneurs do not receive training in the first place (Bruhn et al., 2010). This study

[26] We are aware that from April 2013 to October 2016 the Ministry of Industry and Trade (MIT) in collaboration with Japan International Cooperation Agency (JICA) implemented a *Kaizen* project for strengthening manufacturing enterprises in Dar es Salaam, Morogoro, and Dodoma. The project focused on training *Kaizen* master trainers not entrepreneurs. Such trainers qualified as local *Kaizen* experts and graduated in October 2015, nearly five years after our experimental intervention. Hence, we further assume that the untreated entrepreneurs in this garment cluster could not access *Kaizen* knowledge from the MIT-JICA project. Instead, they potentially accessed such knowledge from our treated entrepreneurs.

rules out the possibility that untreated entrepreneurs solicited treatment from the consultants. The reason for this is due to the prohibitively high training cost for one entrepreneur.

A.1.3 Description of data

During the training programs and follow-up surveys, it was noted that treated entrepreneurs talked to other treated fellows and their untreated counterparts in the sample. Also, it became a common knowledge that entrepreneurs visited other entrepreneurs' workshops. Thus, at each round of the field survey, the enumerators visited the entrepreneurs' workshop for personal interviews using a networking questionnaire. To elicit information about the entrepreneurs' network, they showed the respondent a name list of the treated and untreated entrepreneurs. While pointing at each name on the list, they asked whether the respondent knew that the entrepreneur personally and whether the respondent had talked to him or her about our *Kaizen* program. Also, they asked whether each respondent had visited the workshop of that entrepreneur.

Using such data collection approach, the enumerators collected information concerning the number of entrepreneurs that an entrepreneur knows in person, the number of entrepreneurs each entrepreneur talked to about *Kaizen* after the training program, and the number of visits an entrepreneur had made to the workshops of other entrepreneurs in the sample. Also, they collected information regarding the number of entrepreneurs whose conversations about *Kaizen* with an entrepreneur led to a change in business and information about whether visiting or being visited resulted in imitation of certain

management practices. In the next section, the baseline and endline data are used to explore if conversations about *Kaizen* training, workshop visits, and acquaintanceship with treated entrepreneurs is associated with the adoption of the management practices by the partially treated and untreated entrepreneurs.

A.2 Empirical Results

A.2.1 Descriptive analyses

Appendix Table 3-5 displays the descriptive statistics of the entrepreneurs' communication by treatment status. In this Appendix Table, irrespective of the treatment status, an entrepreneur reports the number of sample entrepreneurs s/he interacts with. Panel A and B show that before and soon after the classroom training, an entrepreneur knew about 29 entrepreneurs in the sample. Panel C and D indicate that at the time of the first and second follow-up surveys, a typical entrepreneur knew about 35 and 36 sample entrepreneurs, respectively. The number of acquaintances continued to increase such that by the time of the third follow-up survey, a typical entrepreneur knew about 40 entrepreneurs (Panel E).

A typical entrepreneur had conversations about *Kaizen* training with about 14 entrepreneurs at the interim follow-up survey. At the first, second, and third post-program follow-up surveys, about 19, 20, and 18 entrepreneurs, respectively, had talked about *Kaizen* training. Moreover, the conversations about *Kaizen* led to a change in the businesses of about 18 entrepreneurs by the time of each of the first and second follow-up surveys, and about 15 entrepreneurs by the time of the third follow-up survey. Additionally, about 12, 11, and 9 entrepreneurs reported that they had visited the workshops of their fellow

entrepreneurs at the first, second, and third post-program follow-up survey, respectively. During these visits, some entrepreneurs copied some useful practices. Thus, a significant finding is that a substantial number of entrepreneurs communicated with each other about the *Kaizen* program.

I counted the number of treated entrepreneurs with whom a typical entrepreneur interacts. The direction of this type of interaction is from both the treated and untreated to the treated entrepreneurs in the sample. As shown in the Appendix Table 3-6, about 4 untreated entrepreneurs talked about *Kaizen* training soon after the classroom training with a typically treated entrepreneur. At the time of the first, second, and third follow-up surveys, about 8, 10, and 5 untreated entrepreneurs, respectively, had talked about *Kaizen* training with a typically treated entrepreneur. By the time of the first, second, and third follow-up surveys, about 7, 8, and 4 untreated entrepreneurs, respectively, reported that their conversations with their treated counterparts led to changes in their own businesses.

Similarly, about 5, 6, and 5 untreated entrepreneurs had visited the workshops of their treated counterparts by the time of the first, second, and third follow-up surveys, respectively. Upon visiting the workshops of the treated entrepreneurs, some entrepreneurs, including untreated entrepreneurs, admitted to having copied something (Panel B, C, and D). The fourth row and column (4) in Panel D indicate that about 4 treated entrepreneurs had visited the untreated workshops of entrepreneurs by the third follow-up survey. The fifth row of Panel D in column (4), indicates that 3 treated entrepreneurs who had visited the workshops of untreated entrepreneurs copied something from the latter's enterprises.

This was unexpected because one would assume that the direction of knowledge is from the treated to untreated entrepreneurs.

Appendix Table 3-7 reports the number of interactions from the treated entrepreneurs to the untreated entrepreneurs (i.e., the interactions the treated entrepreneurs have had with the untreated entrepreneurs in the sample). Thus, the direction of interactions is from the treated entrepreneurs to their untreated counterparts. As shown in Appendix Table 3-3, there is evidence of interactions from the treated to the untreated entrepreneurs. However, the entrepreneurs' interactions are relatively smaller in this direction compared with the direction of interactions from the untreated to the treated entrepreneurs (Appendix Table 3-6). This may imply that the untreated entrepreneurs were enthusiastic about interacting with the treated entrepreneurs, partly because they expected to learn new management knowledge from their treated counterparts.

The purpose of setting up the role model workshops was to provide access to other treated and untreated entrepreneurs to visit and visualize the *Kaizen* practices by themselves. The model workshops were expected to be open for this purpose if they exist in business. The analysis explores if the purpose of the role model workshops was accomplished. The estimates in column (3) of Appendix Table 3-8 suggest that the sample entrepreneurs, both treated and untreated, had interacted with the role model entrepreneurs. Also, column (1) and (2) indicate that indeed the direction of the interaction was from the treated entrepreneurs to the role model entrepreneurs and from the untreated entrepreneurs to the role model entrepreneurs. Thus, the role model workshops fulfilled the purpose.

A.2.2 Correlates of communication and outcome measures

Using the endline data, before implementing the econometric analyses, I explore the correlation coefficients between the entrepreneurs' communication and the outcome variables. Next, I regress the communication variables on our outcome variables[27]. The coefficients (in the first part) and the regression estimates (in the second part) test a null hypothesis that there is no correlation between the entrepreneurs' communication and our outcome variables.

Appendix Table 3-9 presents the correlations between the variables that capture the communication and the outcome variables. Panel A, B, C, D, and E present the correlations for Group TT, Group TC, Group CT, Group CC, and the full sample, respectively. I find positive correlations between the communication and our outcome variables of interest for the treated and the untreated entrepreneurs (Panel A, B, C, and D). Most of the coefficients of the untreated entrepreneurs are significant compared to those of the treated entrepreneurs.

Panel E indicates the positive correlations between the communication variables and the management scores, value-added, and profit. The coefficients are positive and statistically significant except for the correlation coefficient between the number of workshop visits and the profit, which is positive but statistically insignificant. These correlation coefficients suggest that one of the reasons why some entrepreneurs self-

[27] The regressions take the form of $y_i = f$(number of conversations about *Kaizen*, X_i), $y_i = f$(number of visits to the treated workshops, X_i), and $y_i = f$(number of acquaintances just by name, X_i). y_i is a dependent variable (e.g., the management scores, value added, or profit). X_i captures the basic characteristics of entrepreneur i.

selected to talk to their fellow entrepreneurs about the *Kaizen* training and visited the workshops of the other entrepreneurs may be that they expected improvement in their management skills, value-added, and profit. Hence, they became enthusiastic to learn about the contents of our *Kaizen* training program.

Appendix Table 3-10 and 3-11 present the correlates of the communication and management scores, communication and value added (profit), respectively. I find that the communication variables are positively associated with the management scores (the first row of Appendix Table 3-10). Also, I find positive associations between the communication variables and the value added and between the communication variables and profit, respectively (the first row of Appendix Tables 3-11). The level of significance in the even-number columns change after controlling for the baseline value of the management scores, value-added, and profit. Nonetheless, the coefficients remain positive. Such correlation coefficients reinforce our earlier conjecture that our entrepreneurs communicate with other entrepreneurs because they possibly expected, by doing so; they will learn certain practices taught in the *Kaizen* training. This, in turn, could potentially lead to the improvement of business performance. In part, this explains why the management scores of the untreated entrepreneurs increased compared to their baseline management scores soon and three years after the *Kaizen* training program (see, Table 3-1 in chapter 3).

A.3 Econometric Strategy

To explore the correlation between the entrepreneurs' communication and social network and our outcome variables in the medium-run, the study specifies the following basic econometric equation (3A.1):

$$y_i = \alpha_0 + \alpha_B B_i + \alpha_E E_i + \alpha_{BZ} B_i Z_i + \alpha_{EZ} E_i Z_i + \lambda(1 - B_i - E_i)Z_i + X_i\beta + \alpha_P Y_{Pi} + \varepsilon_i', \quad (3A.1)$$

where y_i is the outcome variable of interest which can be the management practices scores, value-added, or profit of entrepreneur *i*. B_i is a dummy variable which takes 1 if entrepreneur *i* was invited to both training programs, 0 otherwise. E_i is a dummy variable which takes 1 if entrepreneur *i* was invited to one of the training programs. Z_i captures the communication of entrepreneur *i* which can be "talked" (i.e., the number of invited/participants with whom s/he talked to about the *Kaizen* training), "visited" (i.e., the number of invited/participants with whom s/he have visited their workshop), and "known" (i.e., the number of invited/participants whom s/he knew in person).

The variable $(1 - B_i - E_i)Z_i$ captures the untreated entrepreneurs' communication with their counterparts (both treated and untreated entrepreneurs). X_i is a vector of variables representing the basic characteristics of entrepreneur *i*. Consistent with McKenzie (2012), the baseline value, Y_{Pi}, the outcome variable of entrepreneur *i* is included in the right-hand side of equation (A3.1). The coefficients of B_i, E_i, $B_i Z_i$, $E_i Z_i$, $(1 - B_i - E_i)Z_i$, X_i, and Y_{Pi} are, respectively, α_B, α_E, α_{BZ}, α_{EZ}, λ, β, and α_P. The parameters α_0 and ε_i' represent the constant term and error term, respectively.

The study estimates the intention-to-treat (ITT) and the treatment-on-the-treated (TOT) effects. To estimate TOT, the actual participation status is instrumented with the random invitation status, following the lead of Imbens and Angrist (1994). Concretely speaking, the invitation to both programs (either program) is replaced with participation to both programs (either program) in equation (3A.1).

The analysis uses the invitation to both programs (either program) as an instrument for participation in both programs (either program). Admittedly, Z_i is potentially endogenous. For example, even though the number of treated entrepreneurs whom the respondent knew before the *Kaizen* training program is predetermined, it is likely to be endogenous. This is because if the sociability of the respondent is high, s/he may have a higher number of entrepreneurs in her or his social network. Also, s/he is likely to have high business performance because of his or her good relationship with the business partners and workers.

Moreover, the number of treated entrepreneurs with whom the respondent talked to about the contents of our *Kaizen* training program and the number of visits to the other entrepreneurs' workshops is endogenous because of rampant communication. I include Z_i in the regression to see whether it is associated with the outcome variables when the influences of the other variables are controlled. Indeed, Z_i may be correlated with an entrepreneur's communication skills or sociability (Sonobe and Otsuka, 2014). Since these attributes are unobservable, therefore, they are taken care by the error term, ε_i'. Thus, the estimates involving Z_i are correlates, not causal effects.

A.4 Estimation Results

Appendix Table 3-12 presents the estimates of equation (3A.1) with the dependent variable, y_i, being the management practices scores. Whereas columns (1) and (2), control for Z_i being "talked" (i.e.; the entrepreneurs' number of conversations about *Kaizen* training with treated entrepreneurs), columns (3) and (4) control for Z_i being "visited" (i.e., the entrepreneurs' number of visits to the treated workshops). Finally, columns (5) and (6) control for Z_i being "known" (i.e., the entrepreneurs' number of treated entrepreneurs who are known to them in person or just by name). Columns (1), (3), and (5) report the ITT estimates, while the TOT estimates are reported in columns (2), (4), and (6). The TOT estimates are larger than the ITT estimates potentially due to the high take-up rate in the *Kaizen* training program as discussed in Section 3.3.3 of chapter 3. The first-stage *F*-statistics toward the end of columns (2), (4), and (6) are larger than the minimum threshold of 10. Hence, the instrumental variable used is valid.

Consistent with the findings in chapter 3, the estimates in the first and second row of Appendix Table 3-12 indicate that in the medium-run, entrepreneurs who participated in both training programs or in either program have higher management scores relative to their untreated counterparts even after controlling for communication, Z_i. In column (2), the size of the coefficients when Z_i is defined by the number of conversations with treated entrepreneurs is smaller than when Z_i, in column (4), is defined by a number of visits to the treated workshops. This may suggest that the visits are more likely to induce learning than the conversations about the *Kaizen* training program. The coefficients that capture participation in both or either training program in column (6) are positive but insignificant.

This may suggest that knowing the treated entrepreneurs just by name is not likely to be compelling enough to induce learning by both the treated and untreated entrepreneurs.

The coefficients capturing the interaction terms between B_i and Z_i as well as E_i and Z_i in the third and fourth rows are positive but insignificant. They may suggest that in the medium-run, the management scores of treated entrepreneurs do not improve with conversations about the *Kaizen* training with fellow treated entrepreneurs, visits to the treated workshops, and the number of acquaintances among their treated counterparts. The estimates are, however, different from the short-run estimates, which suggest that the management scores of the treated entrepreneurs improve with Z_i (Sonobe and Otsuka, 2014). One may wonder why in the medium-run the management scores of the treated entrepreneurs seem not to improve with Z_i. One of the explanations is, in the medium-run, most of the treated entrepreneurs have almost a similar level of management skills such that there are few new skills to learn from fellow treated entrepreneurs. Indeed, in the medium-run, management scores of different groups of treated entrepreneurs are about 16 (see Table 3-1 in chapter 3).

The coefficient, λ, in the fifth row of Appendix Table 3-12 that captures the interaction between $(1 - B - E)$ and Z_i, that is, $(1 - B_i - E_i)Z_i$, is positive. While in column (2) and (4), λ is statistically significant, it is insignificant in column (6). This may suggest that actual conversations about *Kaizen* training between untreated entrepreneurs and visits to the workshops of treated entrepreneurs are more likely to induce untreated entrepreneurs to learn, and hence adopt certain management practices than untreated entrepreneurs merely knowing their treated counterparts in person or just by name.

The coefficient λ in column (4) is larger than that in column (2). This implies that untreated entrepreneurs' visits to the workshops of their treated counterparts are associated with higher chances of learning and adopting some management practices than just their conversations about the *Kaizen* training program. The coefficient λ in column (2) and (4) can be interpreted as follows: a one unit increase in the untreated entrepreneurs' number of conversations with their treated counterparts about the *Kaizen* training and visits to the treated workshops is, on average, correlated with a 0.126 and 0.160 point increase in adoption of certain practices taught in the *Kaizen* program by the untreated entrepreneurs, respectively. The finding suggests that conversations between treated and untreated entrepreneurs about the *Kaizen* training program and visits to the treated workshops are potentially correlated with the transfer of certain management practices to untreated entrepreneurs.

Appendix Table 3-13 reports the results of the regressions of the partial management practices scores (i.e., the *Kaizen* and non-*Kaizen* scores), on the same set of explanatory variables. The qualitative results in the first and second rows about the adoption of the *Kaizen* and non-*Kaizen* practices are almost like those in Appendix Table 3-12. The major difference is that, in the medium-run, adoption of the non-*Kaizen* practices seems to be larger than that of the *Kaizen* practices. Another difference is that adoption of the non-*Kaizen* practices is positive and significant for the partially treated entrepreneurs after controlling for the number of acquaintances of their treated counterparts.

In the fifth row of all the columns, the coefficient λ is positive suggesting that untreated entrepreneurs' communication with their treated counterparts is associated with

the increased adoption of the *Kaizen* and non-*Kaizen* practices. Nonetheless, the association is significant only for the non-*Kaizen* practices. The difference may be explained by the probability that the untreated entrepreneurs adopted a certain practice based on not only its relative observability or straightforwardness to imitate from their treated counterparts, but also on its relevance to their local situation and business at a point in time.

Finally, Appendix Table 3-14 presents the estimates of equation (3A.1) with the dependent variable, y_i, being the value-added and profit. In this table, only value-added has a positive and statistically significant coefficient for the completely-treated entrepreneurs as indicated in column (6). The coefficients of value-added and profit for the partially-treated entrepreneurs are all negative. In the third row, the correlation between Z_i and value-added as well as profit for the completely treated entrepreneurs is statistically insignificant. The finding may suggest that the completely-treated entrepreneurs had a small room for learning new management practices from the untreated entrepreneurs.

The coefficient in the fourth row of Appendix Table 3-14 indicates the positive correlation between Z_i and the value-added and profit for the partially-treated entrepreneurs. Consistent with Sonobe and Otsuka (2014), such coefficient reinforces the finding that our outcome variables and the communication variables, Z_i, are positively correlated with each other. Furthermore, in the fifth row, the coefficient λ is statistically insignificant in all specifications. Consistent with Beaman et al. (2015), BenYishay et al. (2015), Higuchi et al. (2015), and Bloom et al. (2018), this finding may suggest that it may take time for the

untreated entrepreneurs to assimilate the management practices learned from their treated counterparts before they can substantially make changes for their business improvements[28].

The question arises, "How to explain an insignificant correlation between untreated entrepreneurs' communication with business performance while it was significant with the adoption of certain management practices among the untreated entrepreneurs?" There are two possible reasons. First, there is a possibility that some contents (e.g., invisible practices) of the training program would be difficult to be understood by the untreated entrepreneurs who just listened to or visited their treated entrepreneur counterparts. Second, the finding is likely to be associated with the necessary time and selective efforts required to adopt certain practices. Similar reasons hold true for the completely-treated entrepreneurs (see page 74 in chapter 3).

A.5 Conclusion

The Appendix reveals that many of the sample entrepreneurs knew each other. Through their communication network, they shared the information regarding the contents of our *Kaizen* training program. Such information sharing, which transpired in the short- and medium-run, was pursued through conversations about *Kaizen* and visits to the fellow

[28] Nevertheless, this conjecture does not mean the untreated entrepreneurs' learning from their treated counterparts is of less importance. Only that the treated entrepreneurs are likely to be less capable in teaching their untreated entrepreneur counterparts regarding management practices compared to the training experts. In fact, learning from other businesses or individuals in various contexts has been documented in the empirical literature (e.g., Foster and Rosenzweig, 1995; Munshi, 2004; Bandiera and Rasul, 2006; Conley and Udry, 2010). While such studies focus on information flow through social networks, the findings in the Appendix show that the interaction between the treated and untreated entrepreneurs via communication networks is correlated with the untreated entrepreneurs' learning and adoption of management practices.

entrepreneurs' workshop. Indeed, the analysis reveals that the entrepreneurs' interactions and conversations about *Kaizen* occurred among the treated entrepreneurs as well as between the treated and untreated entrepreneurs, between the treated and role model entrepreneurs, and between the untreated and role model entrepreneurs.

Admittedly, due to the endogeneity problem, the study cannot rigorously claim that such conversations and workshop visits indeed transferred knowledge regarding *Kaizen* training program from the treated to untreated entrepreneurs. The estimation results only suggest that such conversations about the *Kaizen* program and the workshop visits are correlated with the adoption of certain management practices (*Kaizen* and non-*Kaizen* practices) by the untreated entrepreneurs from their treated counterparts. Furthermore, analysis discovers that in the medium-run entrepreneurs' interaction is statistically insignificantly correlated with the variables that capture business performance among the untreated entrepreneurs.

Overall, the Appendix reveals a positive correlation between treated and untreated entrepreneur's communication and our key outcome variables. Such correlation is only a signal of the potential existence of knowledge spillovers. Thus, it is likely that our estimates in chapter 3 are underreporting the impact of our training program. Nonetheless, this is just conjecture because the analysis has not been able to conduct rigorous analysis of knowledge spillovers. Such analysis calls for further studies.

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Table 3-1: Entrepreneur's Characteristics, Management Scores, and Business Performance

	Treatment Status				Test of equality of means		
	Group TT	Group TC	Group CT	Group CC	(1) – (4)	(2) – (4)	(3) – (4)
	Mean [Std.] (1)	Mean [Std.] (2)	Mean [Std.] (3)	Mean [Std.] (4)	MD (*t*-value) (5)	MD (*t*-value) (6)	MD (*t*-value) (7)
Panel A: Individual Characteristics							
Age (as of baseline survey)	44.5	44.9	45.2	44.8	-0.30	0.01	0.40
	[9.06]	[7.52]	[9.49]	[7.53]	(-0.11)	(0.03)	(0.08)
Sex of entrepreneur	0.92	0.83	0.86	0.76	0.16*	0.07	0.10
(Female=1)	[0.29]	[0.31]	[0.32]	[0.46]	(1.83)	(1.28)	(1.58)
Education of entrepreneur	11.3	10.3	10.6	10.7	0.60	-0.40	-0.10
(years of schooling)	[2.62]	[2.12]	[2.66]	[2.85]	(0.77)	(-0.58)	(-0.13)
Parent's experience in the	0.35	0.29	0.39	0.45	-0.10	-0.16	-0.06
same business (Yes=1)	[0.49]	[0.46]	[0.50]	[0.51]	(-0.97)	(-1.59)	(-0.59)
Any prior business training	0.73	0.67	0.61	0.55	0.15	0.09	0.03
experience (Yes=1)	[0.45]	[0.48]	[0.50]	[0.51]	(1.56)	(0.85)	(0.29)
Years of operation	11.9	11.8	12.0	10.5	1.30	1.20	1.40
(as of baseline survey)	[5.45]	[4.85]	[6.34]	[6.10]	(0.56)	(0.54)	(0.58)
Former employee in the	0.15	0.25	0.25	0.17	-0.04	0.06	0.06
textile industry (Yes=1)	[0.37]	[0.44]	[0.44]	[0.38]	(-0.51)	(0.63)	(0.68)
Chagga (Yes=1)	0.15	0.25	0.32	0.31	-0.16	-0.06	0.01
	[0.37]	[0.44]	[0.48]	[0.47]	(-1.62)	(-0.41)	(0.31)
Panel B: Management Scores [0-27]							
Baseline score	11.69	10.33	10.21	9.69	2.00*	0.64	0.52
	[3.53]	[2.39]	[3.88]	[3.33]	(1.861)	(0.735)	(0.466)
Soon after the training	17.69	16.75	14.54	12.45	5.24***	4.30**	2.09
programs	[3.94]	[4.65]	[5.14]	[4.89]	(3.281)	(2.295)	(1.227)
1.5 years after the	20.31	19.74	19.84	17.00	3.31***	2.74**	2.84***
programs	[2.96]	[2.77]	[2.60]	[3.89]	(3.003)	(2.520)	(2.803)
3 years after the programs	16.44	16.92	15.56	12.59	3.85***	4.33***	2.97**
	[3.10]	[3.03]	[3.68]	[3.88]	(3.416)	(3.806)	(2.445)
Panel C: Value Added [USD]							
Baseline value	14,473	13,551	12,895	12,838	1,635	713	57
(mean of 2008 and 2009)	[10,964]	[12,171]	[13,916]	[8,744]	(0.538)	(0.406)	(0.027)
In year 2011	18,092	23,667	20,909	22,605	-4,513	1,062	-1,696
	[16,148]	[23,504]	[16,144]	[16,048]	(-0.327)	(0.758)	(-0.605)
In year 2012	17,380	12,059	16,445	12,574	4,806	-515	3,871
	[14,978]	[8,975]	[27,478]	[13,014]	(0.874)	(-0.362)	(0.606)
In year 2013	18,914	12,460	13,275	12,535	6,379**	-75	740
	[14,214]	[7,898]	[15,168]	[9,285]	(1.984)	(-0.058)	(0.592)
Panel D: Profit [USD]							
Baseline value	9,098	6,872	9,614	8,856	242	-1,984	758
(mean of 2008 and 2009)	[7,874]	[13,068]	[11,501]	[10,076]	(0.669)	(-0.606)	(0.481)
In year 2011	11,050	18,982	13,489	14,257	-3,207	4,725	-768
	[13,144]	[21,936]	[13,521]	[15,196]	(-0.469)	(0.572)	(-0.827)
In year 2012	11,487	6,791	12,920	8,078	3,409	-1,287	4,842
	[12,327]	[8,057]	[26,627]	[9,786]	(0.881)	(-0.394)	(0.328)
In year 2013	12,646	6,985	10,787	7,357	5,289**	-372	3,430
	[11,194]	[8,447]	[14,263]	[5,969]	(1.968)	(-0.458)	(0.585)
Number of entrepreneurs	26	24	28	29			

Notes: Numbers in square brackets in columns (1) - (4) are standard deviations. The baseline values of the value-added and profit are those of the average of 2008 and 2009. The value-added and profit are presented in PPP-adjusted USD using "PPP conversion factor, GDP (LCU per international $)", available at World Bank DATABANK. Columns (5) to (7) display *t*-values of test of the equality of means (i.e., *t*-test of null hypothesis that mean values are the same in the two groups). The asterisks ***, **, and * indicate the statistical significance level at 1 percent, 5 percent, and 10 percent, respectively.

Table 3-2: Decomposition of the Management Practices Scores by Treatment Status

	TREATMENT STATUS			
	Group TT Mean [Std.] (1)	Group TC Mean [Std.] (2)	Group CT Mean [Std.] (3)	Group CC Mean [Std.] (4)
PANEL A: KAIZEN PRACTICES				
Baseline scores	5.92	5.04	5.36	5.14
	[2.13]	[2.12]	[1.95]	[1.82]
Soon after the	8.04	8.00	7.32	5.93
Programs	[2.41]	[2.54]	[2.39]	[2.56]
1.5 years after	9.31	8.91	9.35	7.38
the programs	[2.40]	[2.59]	[2.10]	[2.24]
3 years after the	7.00	7.00	6.44	5.41
Programs	[2.22]	[2.19]	[2.65]	[2.22]
PANEL B: *t* – TEST ALONG SURVEYS				
1^{st} – Baseline Survey	2.12***	2.96***	1.96***	0.79
(*t*-value)	(3.361)	(4.383)	(3.362)	(1.354)
2^{nd} – 1^{st} Survey	1.27*	0.91	2.03***	1.45**
(*t*-value)	(1.904)	(1.228)	(3.376)	(2.296)
3^{rd} – 2^{nd} Survey	-2.31***	-1.91***	-2.91***	-1.97***
(*t*-value)	(-3.603)	(-2.759)	(-4.554)	(-3.364)
PANEL C: NON-KAIZEN PRACTICES				
Baseline scores	5.77	5.29	4.86	4.55
	[2.00]	[1.65]	[2.74]	[2.67]
Soon after the	9.65	8.75	7.21	6.52
Programs	[1.81]	[2.56]	[3.18]	[3.12]
1.5 years after	11.00	10.83	10.50	9.62
the programs	[1.20]	[1.07]	[1.36]	[2.37]
3 years after the	9.44	9.92	9.12	7.19
Programs	[1.64]	[1.47]	[1.64]	[2.62]
PANEL D: *t* – TEST ALONG SURVEYS				
1^{st} – Baseline Survey	3.88***	3.46***	2.35***	1.97**
(*t*-value)	(7.334)	(5.565)	(2.962)	(2.583)
2^{nd} – 1^{st} Survey	1.35***	2.08***	3.29***	3.10***
(*t*-value)	(3.170)	(3.673)	(5.034)	(4.261)
3^{rd} – 2^{nd} Survey	-1.56***	-0.91**	-1.38***	-2.43***
(*t*-value)	(-3.914)	(-2.277)	(-3.427)	(-3.704)
Number of entrepreneurs	26	24	28	29

Notes: In this table, columns (1) to (4) of Panel A and Panel C display the means of the *Kaizen* practices scores (i.e., the sum of quality control and production management practices scores) and non-*Kaizen* practices scores (i.e., the sum of marketing, recordkeeping, and planning practices scores) by Group, respectively. Columns (1) to (4) of Panel B and Panel D display the results of the *t*-test of null hypothesis that mean scores of the *Kaizen* and non-*Kaizen* practices scores between surveys are the same by each group, respectively. Numbers in square brackets are standard deviations. Numbers in parentheses are *t*-values of test of the equality of means. The asterisks ***, **, and * indicate the 1 percent, 5 percent, and 10 percent level of statistical significance, respectively.

Table 3-3: Medium-run Impact of Management Training on the Adoption of Management, *Kaizen*, and non-*Kaizen* Practices

	Management Practices Scores		*Kaizen* Practices Scores		non-*Kaizen* Practices Scores	
	ITT	TOT	ITT	TOT	ITT	TOT
	(1)	(2)	(3)	(4)	(5)	(6)
Both training dummy *B* (Yes=1)	2.707*	2.702*	1.347	1.395	1.382*	1.322*
	(1.971)	(1.877)	(1.646)	(1.621)	(1.923)	(1.787)
Either training dummy *E* (Yes=1)	3.059**	3.070**	1.186*	1.191*	1.938***	1.937***
	(2.466)	(2.447)	(1.712)	(1.719)	(2.982)	(2.979)
Age of entrepreneur (years)	0.029	0.043	0.020	0.023	0.039	0.052
	(0.054)	(0.085)	(0.049)	(0.059)	(0.179)	(0.250)
Age square (years)	0.000	0.000	-0.000	-0.000	-0.000	-0.000
	(0.025)	(0.003)	(-0.016)	(-0.023)	(-0.068)	(-0.123)
Sex of entrepreneur (Female=1)	1.299	1.184	0.302	0.260	0.829	0.753
	(1.149)	(1.060)	(0.374)	(0.330)	(1.415)	(1.303)
Education of entrepreneur (years of schooling)	0.478***	0.473***	0.171	0.166*	0.269***	0.272***
	(2.709)	(2.810)	(1.653)	(1.682)	(3.038)	(3.191)
Parents' experience in the same business (Yes=1)	0.691	0.742	0.544	0.558	0.134	0.178
	(0.715)	(0.793)	(0.952)	(1.020)	(0.267)	(0.362)
Any prior training experience (Yes=1)	0.257	0.273	-0.049	-0.049	0.138	0.158
	(0.257)	(0.289)	(-0.082)	(-0.088)	(0.257)	(0.308)
Years of business operation	0.111	0.102	0.039	0.036	0.069	0.063
	(1.278)	(1.167)	(0.753)	(0.705)	(1.504)	(1.383)
Former employee in the textile industry (Yes=1)	-0.054	0.013	-0.298	-0.279	0.439	0.482
	(-0.040)	(0.010)	(-0.393)	(-0.390)	(0.624)	(0.714)
Chagga (Yes=1)	-0.136	-0.123	0.076	0.071	-0.223	-0.205
	(-0.138)	(-0.132)	(0.123)	(0.123)	(-0.431)	(-0.416)
Kaizen/non-*Kaizen*/Overall Scores in the past (Y_P)	0.223	0.200	0.114	0.102	0.426**	0.393**
	(1.635)	(1.377)	(0.938)	(0.831)	(2.582)	(2.308)
Constant	-1.404	-1.181	0.733	0.892	-3.308	-3.289
	(-0.110)	(-0.096)	(0.077)	(0.099)	(-0.587)	(-0.610)
First-stage *F*-statistics		377.52		431.24		322.06
R-squared	0.279	0.258	0.124	0.109	0.406	0.384
Number of enterprises	107	107	107	107	107	107

Notes: The dependent variable in columns (1) and (2) is the overall management practices scores (i.e., the sum of the *Kaizen* and non-*Kaizen* practices scores). The dependent variable in columns (3) and (4) is the *Kaizen* practices scores (i.e., the sum of quality control and production management practices scores) whereas in columns (5) and (6) the dependent variable is the non-*Kaizen* practices scores (i.e., marketing, recordkeeping, and planning practices scores). For the intention-to-treat (ITT) effects, the reported estimates are the coefficients of the dummy variable taking 1 if the enterprise was assigned Group TT (both training programs) or Group TC/CT (either training programs). For the treatment effects on the treated (TOT), the reported estimates are the coefficients of the dummy variable taking 1 if the enterprise complied with the assigned treatment. In order to estimate TOT, we use instrumental variable approach by instrumenting actual participation status with the random invitation status. The robust *t*-statistics and *z*-statistics for the ITT and TOT estimation are in parentheses, respectively. The asterisks ***, **, and * indicate the statistical significance level at 1 percent, 5 percent, and 10 percent, respectively.

Table 3-4: Medium-run Impact of Management Training on Business Performance

	VALUE ADDED		PROFIT	
	ITT	TOT	ITT	TOT
	(1)	(2)	(3)	(4)
Both training dummy *B*	2,710.689*	3,107.364**	2,062.191	2,380.133*
(Yes=1)	(1.941)	(2.094)	(1.590)	(1.758)
Either training dummy *E*	-102.960	-187.997	78.330	47.448
(Yes=1)	(-0.108)	(-0.206)	(0.081)	(0.051)
Age of entrepreneur	521.741	478.443	173.137	133.709
(years)	(0.647)	(0.638)	(0.244)	(0.206)
Age square (years)	-4.194	-3.802	-0.828	-0.480
	(-0.507)	(-0.496)	(-0.114)	(-0.072)
Sex of entrepreneur	2,932.219**	3,057.560**	3,126.412**	3,204.334***
(Female=1)	(2.158)	(2.333)	(2.449)	(2.634)
Education of entrepreneur	-213.031	-234.391	-166.598	-175.113
(years of schooling)	(-1.415)	(-1.613)	(-1.242)	(-1.393)
Parents' experience in the	317.442	266.215	491.054	440.396
same business (Yes=1)	(0.436)	(0.386)	(0.642)	(0.623)
Any prior training	-1,122.129	-1,107.621	-1,162.193	-1,146.417
experience (Yes=1)	(-1.141)	(-1.194)	(-1.169)	(-1.228)
Years of business operation	-32.281	-28.952	-52.912	-48.431
	(-0.438)	(-0.421)	(-0.726)	(-0.721)
Former employee in the	1,061.205	931.821	935.480	831.076
textile industry (Yes=1)	(1.070)	(1.033)	(0.911)	(0.897)
Chagga (Yes=1)	-62.943	-176.791	-216.666	-268.379
	(-0.059)	(-0.180)	(-0.199)	(-0.267)
Value added/Profit	1.431***	1.439***	0.804***	0.801***
in the past (Y_P)	(12.303)	(12.941)	(9.283)	(9.777)
Constant	-12,970.279	-11,666.018	-4,972.649	-3,838.887
	(-0.689)	(-0.667)	(-0.298)	(-0.253)
First-stage *F*-statistics		436.13		328.07
R-squared	0.899	0.896	0.860	0.861
Number of enterprises	107	107	107	107

Notes: The dependent variable in columns (1) and (2) is the value added (i.e., sales revenue minus material costs, subcontracting costs, utility costs, and transportation costs). The dependent variable in columns (1) and (2) is the profit (i.e., sales revenue minus material costs, subcontracting costs, utility costs, transportation costs, and labor costs). The value added and profit are in USD and are adjusted by using the World Bank GDP Deflator. The baseline value added and profit (i.e., values in the past) are those of the mean values of 2008 and 2010. For the intention-to-treat (ITT) effects, the reported estimates are the coefficients of the dummy variable taking 1 if the enterprise was assigned Group TT (both training programs) or Group TC/CT (either training program). For the treatment effects on the treated (TOT), the reported estimates are the coefficients of the dummy variable taking 1 if the enterprise complied with the assigned treatment. In order to estimate TOT, we use instrumental variable approach by instrumenting actual participation status with the random invitation status. The robust *t*-statistics and *z*-statistics for the ITT and TOT are in parentheses, respectively. The asterisks ***, **, and * indicate the statistical significance level at 1 percent, 5 percent, and 10 percent, respectively.

Table 4-1: Basic Characteristics of Public Offices, Managers, and Frontline Workers

	Full Samples		Government Offices		Semi-autonomous Offices		Test of equality of means				
	OM Mean [Std.] (1)	FW Mean [Std.] (2)	OM Mean [Std.] (3)	FW Mean [Std.] (4)	OM Mean [Std.] (5)	FW Mean [Std.] (6)	(1) - (2) (*t*-value) (7)	(3) - (4) (*t*-value) (8)	(5) - (6) (*t*-value) (9)	(3) - (5) (*t*-value) (10)	(4) - (6) (*t*-value) (11)
Panel A: Office Characteristics											
Office size	10.37		11.00		10.22					0.78	
(number of workers)	[8.17]		[8.47]		[8.21]					(0.17)	
Proportion of	0.60		0.57		0.61					-0.04	
old-cohort workers	[0.15]		[0.10]		[0.16]					(-0.99)	
Panel B: Individual Characteristics											
Age	45.74	41.45	49.11	43.02	44.92	40.43	4.29	6.09	4.49	4.19	2.59
(expressed in years)	[8.44]	[9.42]	[9.44]	[9.59]	[8.11]	[9.22]	(2.25)**	(1.21)	(1.83)*	(0.85)	(1.04)
Old-cohort	0.72	0.47	0.44	0.53	0.78	0.43	0.25	-0.09	0.35	-0.35	0.10
(Yes = 1)	[0.46	[0.50]	[0.53]	[0.50]	[0.42]	[0.50]	(3.55)***	(-0.48)	(4.87)***	(-1.89)*	(1.29)
Gender	0.76	0.62	0.78	0.63	0.76	0.61	0.14	0.15	0.15	0.02	0.02
(Male = 1)	[0.43]	[0.49]	[0.44]	[0.49]	[0.44]	[0.49]	(2.22)**	(0.96)	(2.04)**	(0.14)	(0.39)
Years of schooling	17.59	16.89	17.11	16.94	17.70	16.86	0.70	0.17	0.84	-0.59	0.08
(in years)	[1.48]	[1.80]	[0.93]	[2.06]	[1.58]	[1.63]	(2.11)**	(0.44)	(2.88)***	(-1.57)	(0.26)
Postgraduate	0.63	0.50	0.56	0.64	0.65	0.45	0.13	0.08	0.20	-0.09	0.19
education (Yes = 1)	[0.49]	[0.50]	[0.53]	[0.50]	[0.48]	[0.50]	(1.70)*	(-0.20)	(2.44)**	(-0.51)	(1.95)
Total years of working	19.62	15.56	21.22	18.23	19.24	13.84	4.06	2.99	5.40	1.98	4.39
experience	[9.28]	[10.07]	[11.50]	[10.76]	[8.80]	[9.27]	(1.87)*	(0.48)	(2.09)**	(0.34)	(1.65)
Tenure (years on the	14.15	11.06	12.78	9.52	14.49	10.34	3.09	3.26	4.15	-1.71	-0.82
current job)	[7.31]	[7.61]	[11.31]	[4.19]	[6.15]	[8.11]	(2.01)**	(0.79)	(2.21)**	(-0.36)	(-0.56)
Management training	0.72	0.42	0.78	0.49	0.70	0.38	0.30	0.29	0.32	0.08	0.11
(Yes = 1)	[0.46]	[0.50]	[0.44]	[0.51]	[0.46]	[0.49]	(4.24)***	(1.89)*	(4.05)***	(0.49)	(1.43)
Leadership training	0.76	0.27	0.67	0.27	0.78	0.28	0.49	0.40	0.50	-0.11	0.01
(Yes = 1)	[0.43]	[0.45]	[0.50]	[0.45]	[0.42]	[0.45]	(7.51)***	(2.36)**	(7.13)***	(-0.68)	(-0.17)
Recordkeeping	0.89	0.78	0.89	0.78	0.89	0.79	0.11	0.11	0.10	0.00	-0.01
practices (Yes = 1)	[0.31]	[0.41]	[0.33]	[0.42]	[0.31]	[0.41]	(2.25)**	(0.99)	(1.91)*	(0.00)	(-0.21)
Number of Observations	46	125	9	49	37	76					

Notes: OM and FW represents office manager and frontline worker in the sample office, respectively. Column (1) and (2) reports the characteristics of public offices as well as individual characteristics of OM and FW based on their full sample, respectively. While column (3) and (4) display the characteristics of government offices, their managers, and frontline workers, column (5) and (6) report in the characteristics of semi-autonomous offices and their corresponding managers and frontline workers. The standard deviations are in square brackets. In columns (7) to (10), only *t*-values are shown. They are in parentheses and shown up to two digits with two decimal places. The asterisks ***, **, and * indicate the 1 percent, 5 percent, and 10 percent level of statistical significance, respectively.

Table 4-2: Descriptive Statistics of Extrinsic Motivation in the Public Offices

	FULL SAMPLES		GOVERNMENT OFFICES		SEMI-AUTONOMOUS OFFICES		TEST OF EQUALITY OF MEANS			
	OM Mean [Std.] (1)	FW Mean [Std.] (2)	OM Mean [Std.] (3)	FW Mean [Std.] (4)	OM Mean [Std.] (5)	FW Mean [Std.] (6)	(3) - (4) (*t*-value) (7)	(5) - (6) (*t*-value) (8)	(3) - (5) (*t*-value) (9)	(4) - (6) (*t*-value) (10)
Monthly salary (after tax)	2.28	1.49	1.62	1.45	2.45	1.54	0.17	0.91	-0.83	-0.09
(expressed in TZS mil.)	[1.10]	[0.80]	[0.86]	[0.79]	[1.10]	[0.83]	(0.60)	(0.40)	(-0.81)	(-0.31)
Salary sufficient for	0.37	0.19	0.22	0.18	0.41	0.20	0.04	0.21	-0.19	-0.02
the work (Yes = 1)	[0.49]	[0.40]	[0.44]	[0.39]	[0.50]	[0.40]	(0.26)	(2.48)***	(-1.19)	(-0.24)
Monthly allowances	0.77	0.46	0.51	0.48	0.83	0.44	0.03	0.39	-0.32	0.04
(expressed in TZS mil.)	[0.47]	[0.34]	[0.24]	[0.37]	[0.49]	[0.33]	(0.49)	(1.00)	(-0.90)	(0.08)
Allowances sufficient for	0.26	0.23	0.11	0.25	0.30	0.22	-0.25	0.08	-0.19	0.03
the work (Yes = 1)	[0.44]	[0.42]	[0.33]	[0.43]	[0.46]	[0.42]	(-1.16)	(0.94)	(-1.59)	(0.33)
Health insurance	0.87	0.91	1.00	0.92	0.84	0.91	0.08	-0.07	0.16	0.01
covered (Yes = 1)	[0.34]	[0.28]	[0.00]	[0.28]	[0.37]	[0.29]	(52.27)***	(-1.12)	(42.97)***	(0.26)
Number of Observations	46	125	9	49	37	76				

Notes: We requested our respondents to provide information about monthly salary (after tax) and allowances they receive. Then we asked the question about respondent's opinion about sufficiency of salary and allowances received based on the amount of work they do. We didn't ask them to compare the amount they receive with the amount they would otherwise desire to receive. Specifically, we ask the questions "Is the salary sufficient for the work you do" and "Is the average monthly allowances sufficient for the work you do? OM and FW represents office manager *j* and frontline worker *e* in the office *i*, respectively. Column (1) and (2) reports the descriptive statistics of extrinsic motivation of OM and FW based on their full samples. While column (3) and (4) displays the mean values of extrinsic motivation of OM and FW in government offices, column (5) and (6) reports the mean values of similar variables for OM and FW in the semi-autonomous offices, respectively. The corresponding standard deviations are in square brackets. In columns (7) to (10), only *t*-values are shown. They are in parentheses and shown up to two digits with two decimal places. The asterisks ***, **, and * indicate the 1 percent, 5 percent, and 10 percent level of statistical significance, respectively.

Table 4-3: Description of Office Formal Meetings, Mission, Target, and Annual Office Performance Targets Realized

	OFFICE MANAGERS	AVERAGE FRONTLINE WORKERS	MEAN DIFFERENCE BETWEEN (1) AND (2)
	Mean [Std.] (1)	Mean [Std.] (2)	*t*-value for Ho: (1) - (2) = 0 (3)
Office mission clearly described (Yes=1)	0.52 [0.51]	0.23 [0.27]	3.29*** (0.29)
Office target clearly described (Yes=1)	0.41 [0.50]	0.20 [0.26]	2.90*** (0.21)
Number of office formal meetings (monthly)	5.65 [3.37]	2.17 [1.01]	7.65*** (3.48)
High performance targets achieved in 2012/13 (Yes=1)	0.41 [0.50]	0.38 [0.36]	0.34 (0.03)
High performance targets achieved in 2013/14 (Yes=1)	0.50 [0.51]	0.44 [0.33]	0.62 (0.06)
High performance targets achieved in 2014/15 (Yes=1)	0.52 [0.51]	0.55 [0.33]	-0.36 (-0.03)
Number of Observations	46	46	

Notes: Prior to the field survey we collected the formal documents showing the mission statement and target for each office in our sample. We use this information during the interviews to evaluate how the office mission (or target) was described by our sample managers and frontline workers. Concretely speaking, we specify a dummy variable taking 1 if the office mission (or office target) was clearly described, 0 otherwise. High performance targets achieved is a dummy variable which takes 1 if the respondent reports that the annual office performance targets were achieved by at least 81 percent and the answer to a follow-up question "are you really sure about the percentage of performance targets achieved?" is "definitely sure", 0 otherwise. Column (1) and (2) reports the mean value of the variable of interest by the office manager and average frontline worker in the sample public office, respectively. Standard deviations in columns (1) and (2) are in square brackets. In column (2) we constructed office-level variable of interest for the average frontline worker by simple arithmetic mean of responses of the individual frontline workers interviewed in each office. We use $\frac{1}{2}(e_1 + e_2)$ or $\frac{1}{3}(e_1 + e_2 + e_3)$ to construct the office-level variable by the average frontline workers depending on where there are two or three workers in the office. Column (3) reports the two-way *t*-test for the mean difference between (1) and (2); that is, Ho: (1) - (2) = 0. The numbers in parentheses in columns (3) are mean difference between (1) and (2). The asterisks ***, **, and * indicate the 1 percent, 5 percent, and 10 percent level of significance, respectively.

Table 4-4: The Factors Correlated with Manager's and Frontline Worker's Description of Office Mission and Target

	MANAGERS				FRONTLINE WORKERS			
	Clearly described the office mission (Yes = 1) PROBIT (1)	Clearly described the office mission (Yes = 1) PROBIT (2)	Clearly described the office target (Yes = 1) PROBIT (3)	Clearly described the office target (Yes = 1) PROBIT (4)	Clearly described office mission (Yes = 1) PROBIT (5)	Clearly described office mission (Yes = 1) PROBIT (6)	Clearly described office target (Yes = 1) PROBIT (7)	Clearly described office target (Yes = 1) PROBIT (8)
Panel A: Office Characteristics								
Office size	-0.003	-0.007	-0.007	-0.004		0.003		0.004
(number of workers)	(-0.337)	(-0.599)	(-1.014)	(-0.488)		(0.252)		(0.459)
Proportion of	-0.415	-0.350	-0.736**	-0.753*		-0.749*		-0.790*
old cohort workers	(-0.887)	(-0.793)	(-2.033)	(-1.762)		(-1.691)		(-1.710)
Semi-autonomous	-0.063	-0.040	0.465	0.461		0.121		0.174
office (Yes=1)	(-0.401)	(-0.262)	(1.531)	(1.535)		(0.813)		(1.087)
Panel B: Managers' Characteristics								
Management	0.014	0.027	0.082	0.060		0.032		0.065*
training (Yes=1)	(1.087)	(1.181)	(0.597)	(0.455)		(1.230)		(1.734)
Leadership	0.122*	0.115	0.327**	0.335*		0.181*		0.078
training (Yes=1)	(1.751)	(1.474)	(2.283)	(1.873)		(1.725)		(1.525)
Recordkeeping	0.126*	0.041	0.414***	0.390**		0.154		0.305
practices (Yes=1)	(1.692)	(1.209)	(2.671)	(2.257)		(0.858)		(1.306)
Postgraduate	0.069	0.136	0.450***	0.392**		0.108		0.267
education (Yes=1)	(1.326)	(1.579)	(3.196)	(2.439)		(1.508)		(1.203)
Old-cohort	-0.420**	-0.414**	-0.167*	-0.132*		-0.102		-0.059
(Yes = 1)	(-2.172)	(-2.072)	(-1.703)	(-1.860)		(-1.543)		(-1.277)
Gender	-0.116	-0.167	0.295*	0.269		-0.145		-0.104
(Male=1)	(-0.726)	(-1.021)	(1.949)	(1.605)		(-1.007)		(-0.648)
Panel C: Workers' (Average) Characteristics								
Recordkeeping		0.199		0.003	0.007**	0.105*	0.032**	0.131*
practices (Yes=1)		(1.168)		(1.011)	(2.069)	(1.749)	(2.354)	(1.751)
Postgraduate		0.033		0.064	0.068*	0.038	0.034**	0.139**
education (Yes=1)		(1.224)		(1.419)	(1.867)	(1.274)	(2.438)	(1.976)

(continued)

Table 4-4 *(continued)*

	MANAGERS				FRONTLINE WORKERS			
	Clearly described the office mission (Yes = 1) PROBIT (1)	Clearly described the office mission (Yes = 1) PROBIT (2)	Clearly described the office target (Yes = 1) PROBIT (3)	Clearly described the office target (Yes = 1) PROBIT (4)	Clearly described office mission (Yes = 1) PROBIT (5)	Clearly described office mission (Yes = 1) PROBIT (6)	Clearly described office target (Yes = 1) PROBIT (7)	Clearly described office target (Yes = 1) PROBIT (8)
Old-cohort		-0.239		-0.158	-0.011	-0.042	-0.051*	-0.321**
(Yes = 1)		(-1.501)		(-1.137)	(-1.135)	(-1.284)	(-1.675)	(-2.061)
Gender		0.231		0.182	0.005	0.025	0.013	-0.039
(Male=1)		(0.858)		(0.760)	(0.064)	(0.175)	(0.170)	(-0.244)
Constant	-1.039	-1.300	-4.247***	-5.180**	-0.554	-1.723	-0.579	-2.267
	(-0.873)	(-0.959)	(-2.824)	(-2.460)	(-1.552)	(-0.989)	(-1.548)	(-1.617)
Log-likelihood value	-27.289	-25.946	-22.281	-21.550	-70.618	-22.833	-67.149	-25.700
Office Fixed Effects(O-FE)	No	No	No	No	Yes	No	Yes	No
Number of Observations	46	46	46	46	125	125	125	125
Number of Offices					46	46	46	46

Notes: The dependent variable in columns (1) to (4) and columns (5) and (8) represent the manager's clear description of office mission and targets, respectively. It is a dummy variable which takes 1 if the office manager (frontline worker) described the office mission or target clearly, 0 otherwise. The reported estimates in all columns are the marginal effects of PROBIT model. In columns (5) and (7) we apply the office fixed effects model to control for the office unobserved characteristics. The robust *z*-statistics in parentheses. The asterisks ***, **, and * indicate the 1 percent, 5 percent, and 10 percent level of statistical significance, respectively.

Table 4-5: The Factors Associated with the Number of Office Formal Meetings and Workplace Communication Satisfaction

	OFFICE FORMAL MEETINGS			WORKPLACE COMMUNICATION SATISFACTION		
	Number of office formal meetings reported by the Office Manager	Number of office formal meetings reported by the Average Frontline Worker	Difference between Managers and Average frontline worker in the number of office formal meetings, |(1) - (2)|	Manager satisfied with the workplace communication practices (Yes = 1)	Frontline worker satisfied with the workplace communication practices (Yes = 1)	Frontline worker satisfied with the workplace communication practices (Yes = 1)
	OLS	OLS	OLS	PROBIT	PROBIT	PROBIT
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Office Characteristics						
Office size	0.041	-0.010	0.051*	-0.009		-0.006*
(number of workers)	(1.529)	(-1.534)	(1.722)	(-1.393)		(-1.691)
Proportion of	6.006***	-2.409**	8.415**	-0.219*		-0.345
old cohort workers	(3.027)	(-2.231)	(2.572)	(-1.685)		(-0.738)
Semi-autonomous	0.037	-0.427	0.464	0.169		0.159
office (Yes = 1)	(0.033)	(-1.108)	(0.401)	(1.530)		(0.985)
Panel B: Managers' Characteristics						
Management	-0.365	0.037	-0.402	0.125		0.199
training (Yes = 1)	(-1.287)	(0.109)	(-1.351)	(1.127)		(1.509)
Leadership	-1.254*	0.144	-1.398**	0.219**		0.079*
training (Yes = 1)	(-1.956)	(0.684)	(-2.136)	(2.165)		(1.842)
Recordkeeping	-1.837*	0.307	-2.144*	0.104*		0.277
practices (Yes =)	(-1.744)	(0.552)	(-1.691)	(1.676)		(1.283)
Postgraduate	0.494	-0.157	0.651	0.386		0.377*
education (Yes = 1)	(0.228)	(-0.269)	(0.308)	(1.599)		(1.889)
Old-cohort	0.729*	-0.943	1.672**	0.345		-0.043
(Yes = 1)	(1.851)	(-1.306)	(2.104)	(1.518)		(-1.206)
Gender (Male = 1)	0.825	-0.161	0.986	0.014		-0.258
	(0.507)	(-0.469)	(0.640)	(0.117)		(-1.632)
Panel C: Workers' (Average) Characteristics						
Recordkeeping	0.581	-1.103**	1.684		0.245***	0.061**
practices (Yes = 1)	(0.438)	(-2.104)	(1.394)		(4.095)	(2.350)
Postgraduate	-1.280	0.231	-1.511		0.056*	0.059
education (Yes = 1)	(-1.119)	(0.869)	(-0.923)		(1.875)	(1.440)

(continued)

Table 4-5 *(continued)*

	OFFICE FORMAL MEETINGS			WORKPLACE COMMUNICATION SATISFACTION		
	Number of office formal meetings reported by the Office Manager	Number of office formal meetings reported by the Average Frontline Worker	Difference between Managers and Average frontline worker in the number of office formal meetings, |(1) - (2)|	Manager satisfied with the workplace communication practices (Yes = 1)	Frontline worker satisfied with the workplace communication practices (Yes = 1)	Frontline worker satisfied with the workplace communication practices (Yes = 1)
	OLS	OLS	OLS	PROBIT	PROBIT	PROBIT
	(1)	(2)	(3)	(4)	(5)	(6)
Old-cohort	0.595	-0.320	0.915		-0.081	-0.333
(Yes = 1)	(0.336)	(-1.273)	(1.156)		(-1.247)	(-1.120)
Gender	-2.025	0.177	-2.202		-0.061	-0.035
(Male = 1)	(-1.336)	(0.484)	(-1.602)		(-0.915)	(-0.222)
Constant	0.115	2.073*	-1.957	0.906	0.296	-0.504
	(0.027)	(1.836)	(-0.479)	(0.634)	(0.804)	(-0.317)
R-squared	0.284	0.376	0.236		-51.443	-24.461
Log likelihood				-17.931	-51.443	-24.461
Office Fixed Effects(O-FE)	No	No	No	No	Yes	No
Number of Observations	46	46	46	46	125	125
Number of Offices	46	46	46	46	46	46

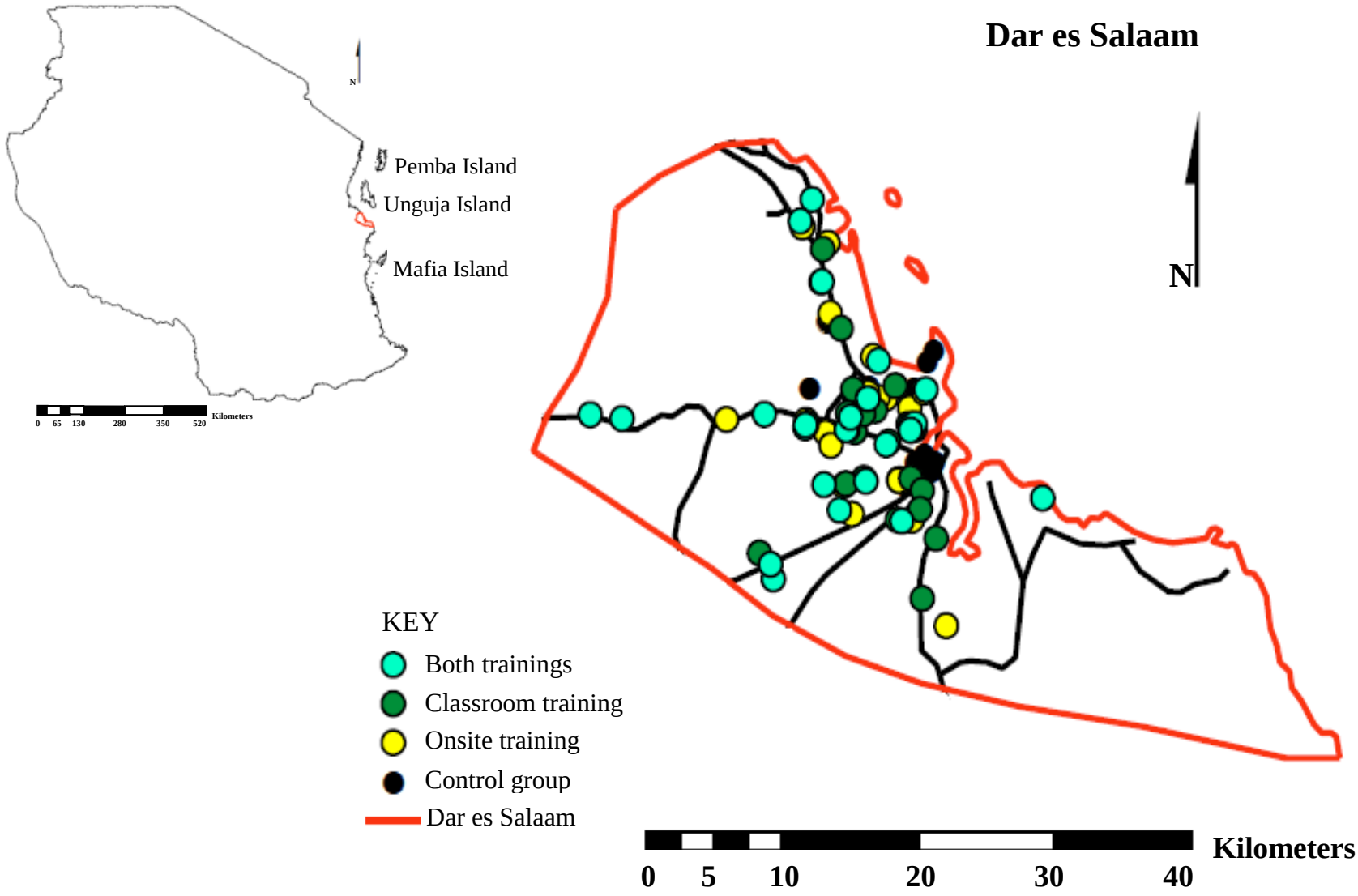
Notes: The dependent variable in columns (1) and (2) represents the office manager's and average frontline worker's reported number of office formal meetings in a span of one month, respectively. In column (3), the dependent variable is the difference, expressed in absolute terms, between the office manager and average frontline worker in terms of their reported number of office formal meetings in a span of one month (i.e., the absolute difference in terms of their reported number of office formal meetings = |(1) – (2)|). The dependent variable in columns (4) to (6) is the respondent's (i.e., manager and frontline worker) satisfaction with the workplace communication practices. It is dummy variable which takes 1 if the office manager (frontline worker) reports that s/he is satisfied with the office communication practices, 0 otherwise. While we apply OLS in columns (1) to (3), we apply PROBIT with marginal effects in columns (4) to (6). In column (5) we apply the office fixed effects model to control for the unobserved characteristics. The numbers in parentheses in columns (1) to (3) and columns (4) to (6) are robust *t*-statistics and *z*-statistics, respectively. The asterisks ***, **, and * indicate the 1 percent, 5 percent, and 10 percent level of statistical significance, respectively.

Table 4-6: The Factors Associated with the Office Performance in 2014/15

	MANAGERS		FRONTLINE WORKERS	
	High office performance targets achieved in 2014/15 (Yes = 1) PROBIT (1)	High office performance targets achieved in 2014/15 (Yes = 1) PROBIT (2)	High office performance targets achieved in 2014/15 (Yes = 1) PROBIT (3)	High office performance targets achieved in 2014/15 (Yes = 1) PROBIT (4)
Panel A: Office Characteristics				
Office size	0.009*	0.013*		0.002
(number of workers)	(1.828)	(1.714)		(1.192)
Proportion of	-0.523*	-0.669*		-0.198
old cohort workers	(-1.811)	(-1.840)		(-1.424)
Semi-autonomous	-0.132	-0.135		0.082
office (Yes=1)	(-0.814)	(-0.854)		(0.459)
Panel B: Managers' Characteristics				
Management	0.135	0.082		0.215
training (Yes=1)	(1.385)	(1.552)		(1.409)
Leadership	0.084*	0.011		0.117*
training (Yes=1)	(1.940)	(1.063)		(1.687)
Recordkeeping	0.212	0.179		0.182
practices (Yes=1)	(1.142)	(0.975)		(1.184)
Postgraduate	0.241	0.141		0.029
education (Yes=1)	(1.074)	(1.636)		(1.143)
Old-cohort	-0.184*	-0.184*		-0.233*
(Yes = 1)	(-1.850)	(-1.910)		(-1.801)
Gender	-0.239	-0.243		0.099
(Male = 1)	(-1.550)	(-1.593)		(0.580)
Panel C: Workers' (Average) Characteristics				
Recordkeeping		0.043	0.009**	0.119*
practices (Yes=1)		(1.191)	(2.086)	(1.642)
Postgraduate		0.026	0.021	0.133
education (Yes=1)		(1.165)	(1.228)	(1.089)
Old-cohort		-0.253	-0.025**	-0.421***
(Yes = 1)		(-1.632)	(-2.269)	(-2.751)
Gender		-0.292	-0.010	-0.236
(Male = 1)		(-1.139)	(-0.110)	(-1.458)
Constant	0.098	-0.049	0.094	-0.052
	(0.079)	(-0.035)	(0.283)	(-0.032)
Log-likelihood value	-27.671	-25.590	-85.595	-25.994
Office Fixed Effects	No	No	Yes	No
Number of Observations	46	46	125	125
Number of Offices	46	46	46	46

Notes: The high annual performance capture the office performance targets if they were reported to be achieved by a least 81 percent (i.e., high performance targets achieved is a dummy variable which takes 1 if the respondent reports that the annual office performance targets were achieved by at least 81 percent and the answer to a follow-up question "are you really sure about the percentage of performance targets achieved?" is "definitely sure", 0 otherwise). The reported estimates in all columns are the marginal effects of PROBIT model. In column (3), we apply PROBIT with Office-Fixed Effects to control for the unobserved office characteristics. While in columns (1) and (2) in Panel C we use workers' average characteristics, in columns (3) and (4) we use workers' individual characteristics. The *z*-statistics in parentheses. The asterisks ***, **, and * indicate the 1 percent, 5 percent, and 10 percent level of statistical significance, respectively.

Figure 3-1: Location of Sample Manufacturing Enterprises in the Garment Industrial Cluster, Dar es Salaam, Tanzania



Source: Baseline survey data, 2010

Figure 3-2: Program Implementation Timeline

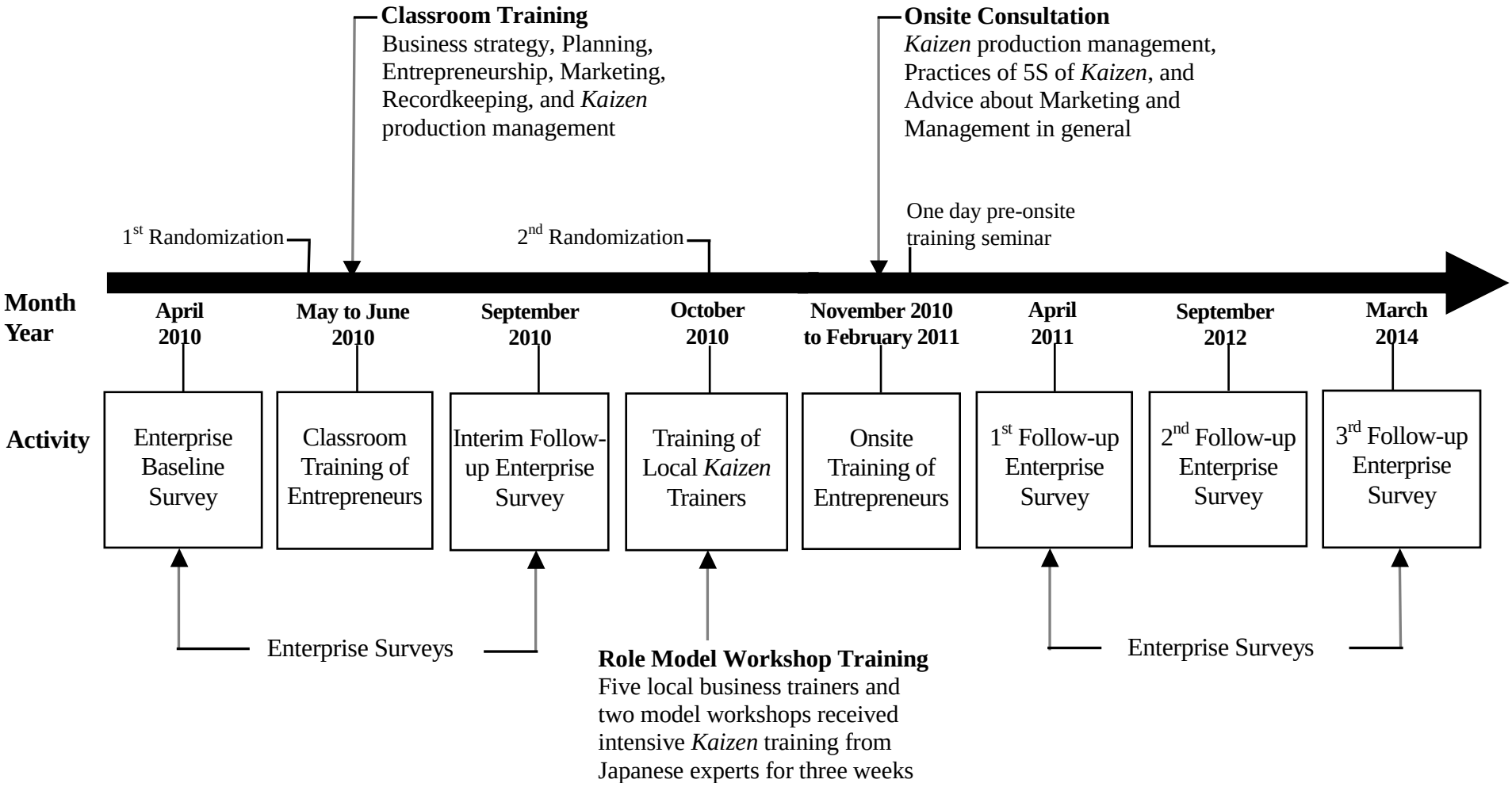
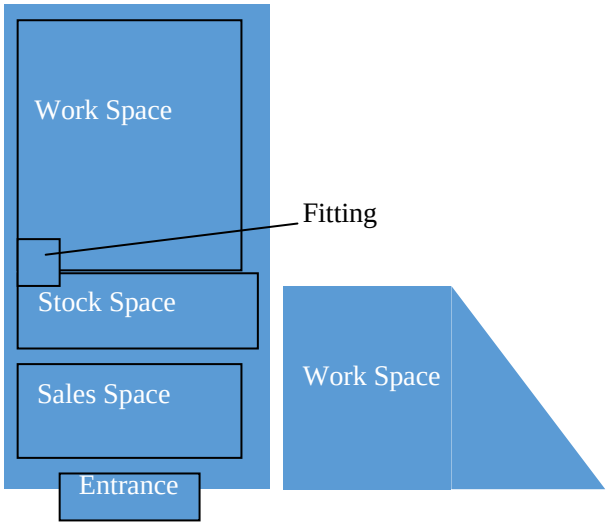


Figure 3-3: Transformation of Storage and Space Usage of the Role Model Workshop

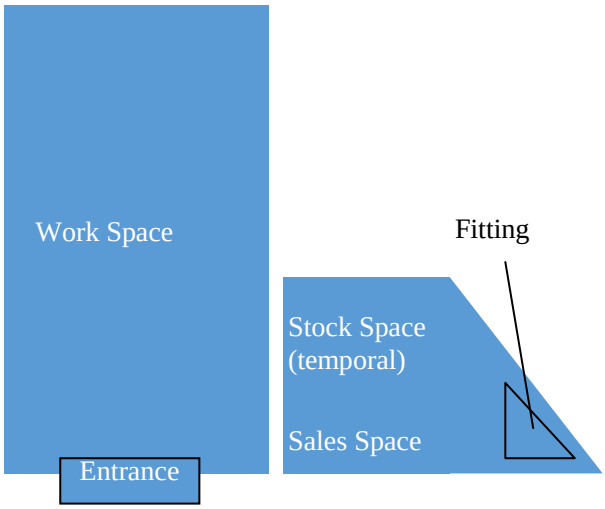
3-3A: Picture of storage before onsite *Kaizen* training

3-3B: Picture of storage after onsite *Kaizen* training



3-3C: Layout of space before onsite *Kaizen*

3-3D: Picture of space before onsite *Kaizen*

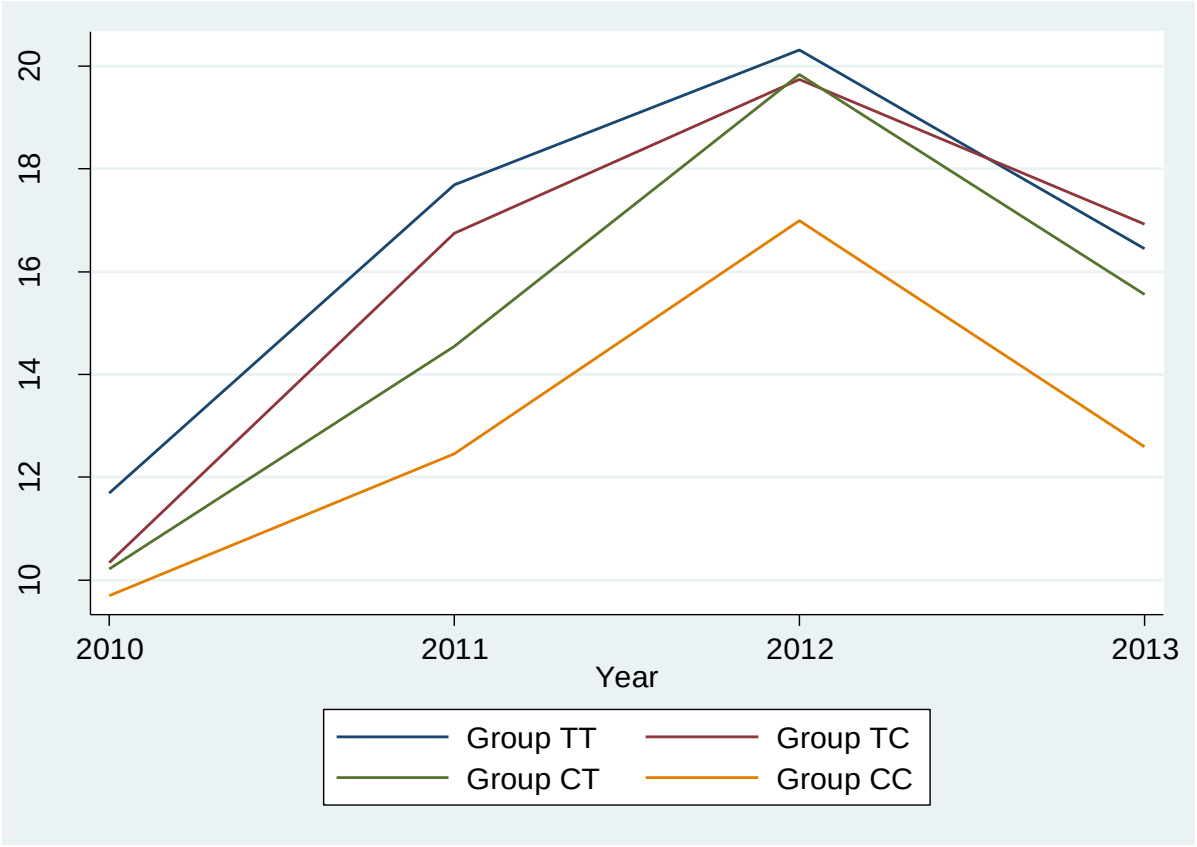


3-3E: Layout of space after onsite *Kaizen* training

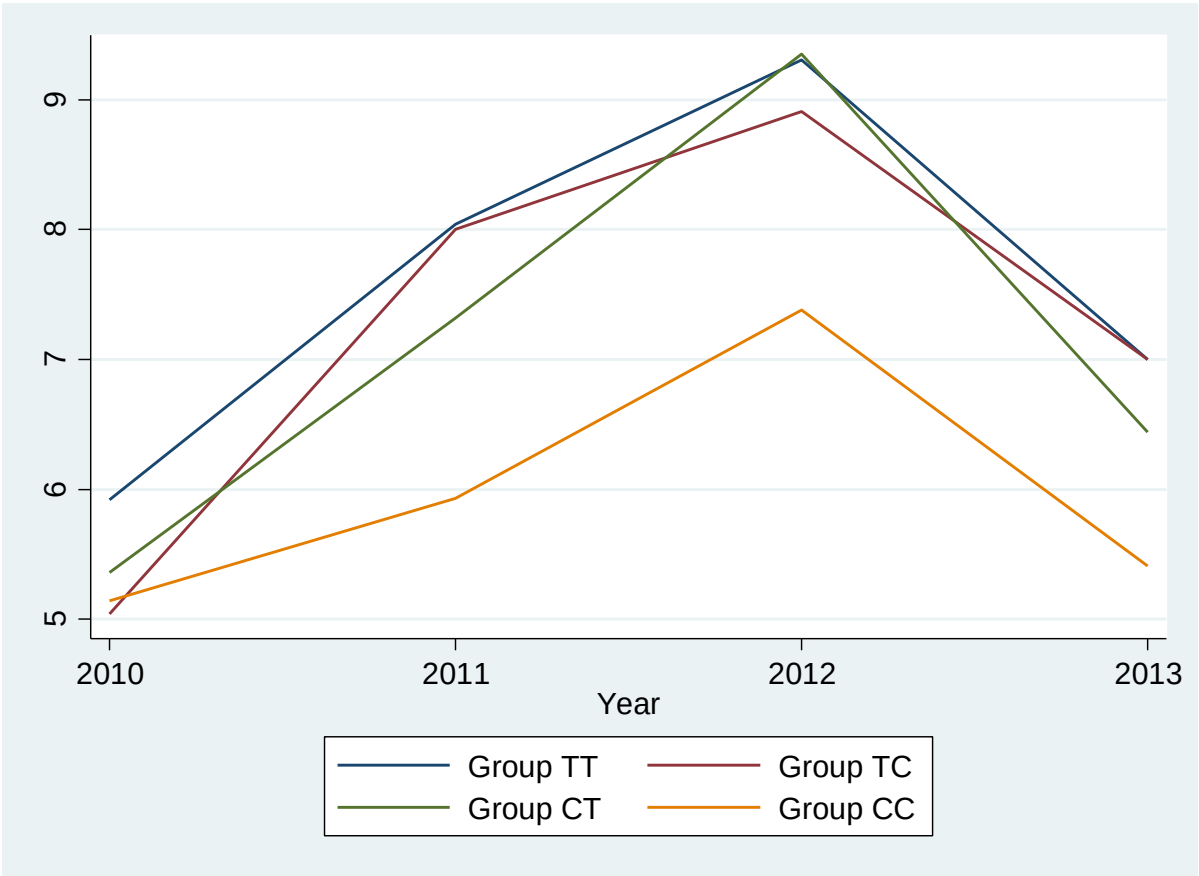
3-3F: Picture of space after onsite *Kaizen* training

Source: Field survey, 2010

Figure 3-4: Changes in Management Practices Scores by Treatment Status

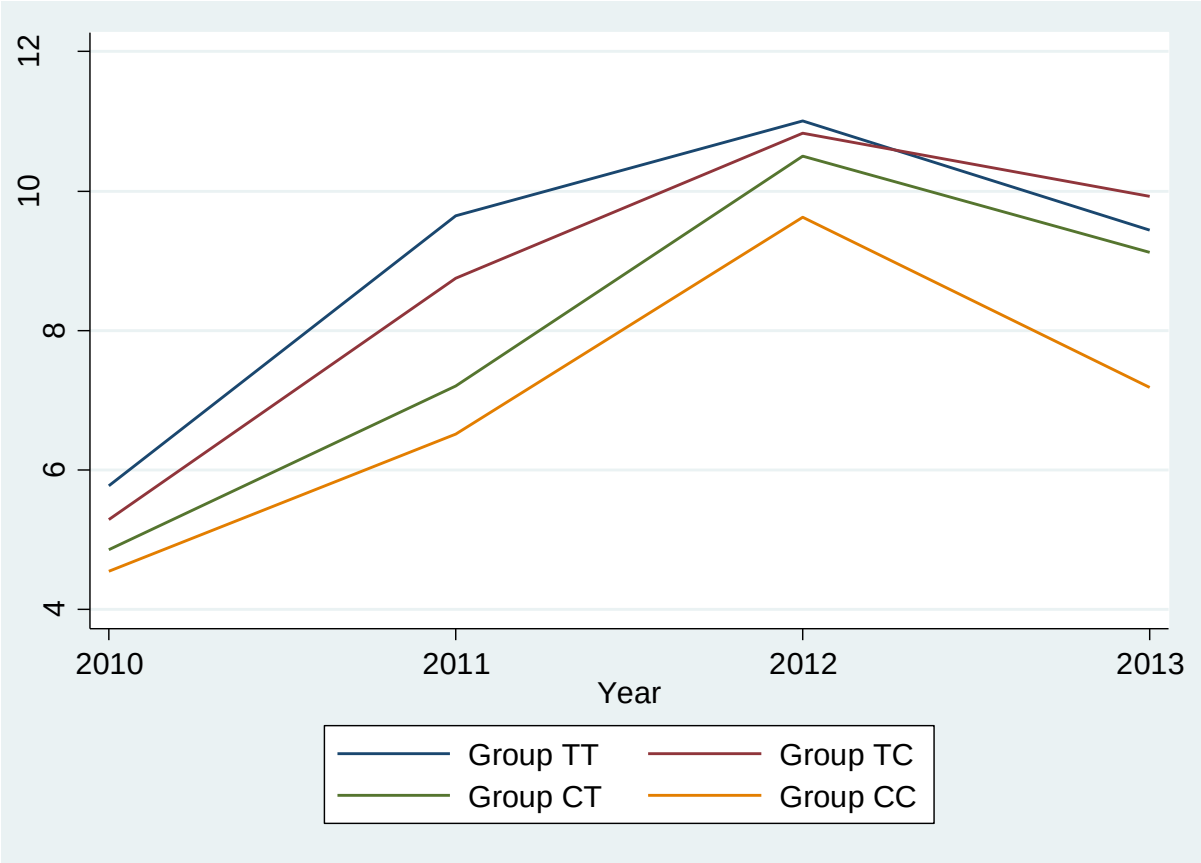


Panel 3-4A: Overall Management Practice Scores (0 – 27)



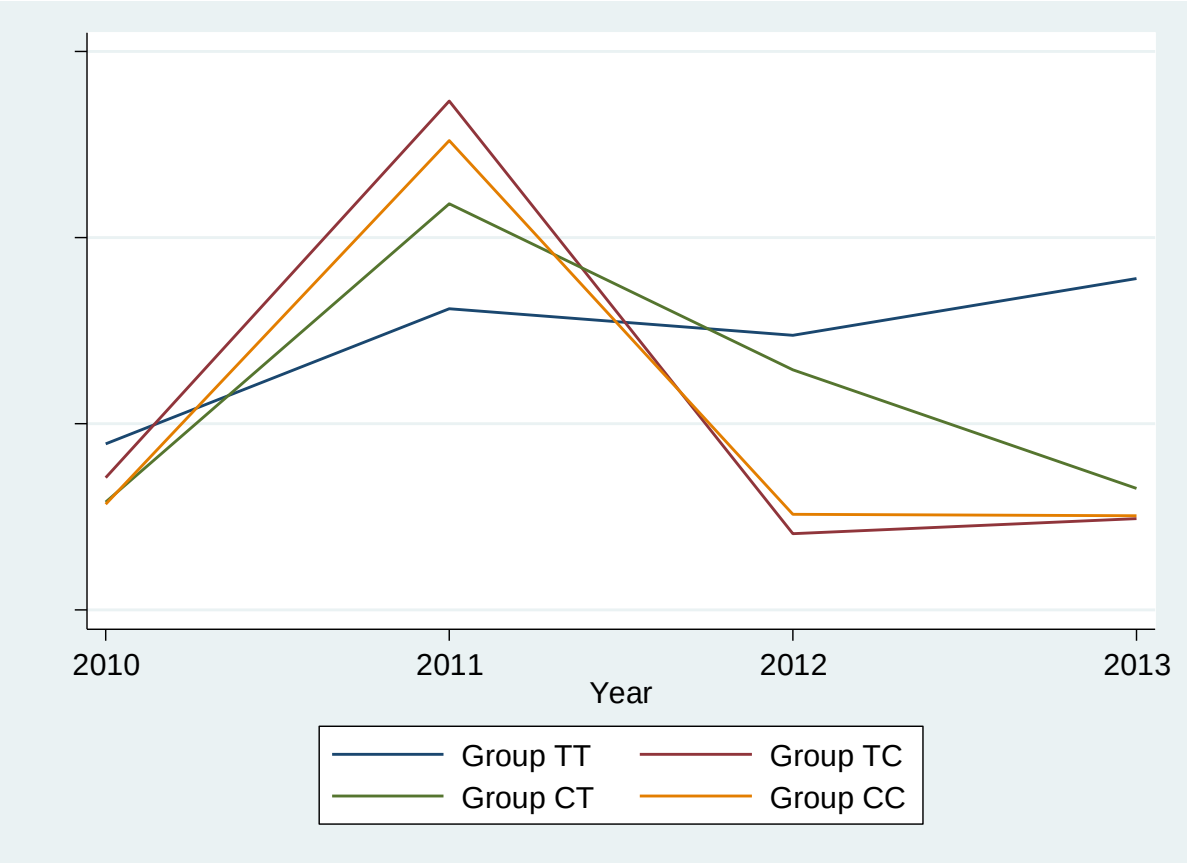
Panel 3-4B: *Kaizen* Practice Scores (0 – 15)

Figure 3-4: (*Continues*)

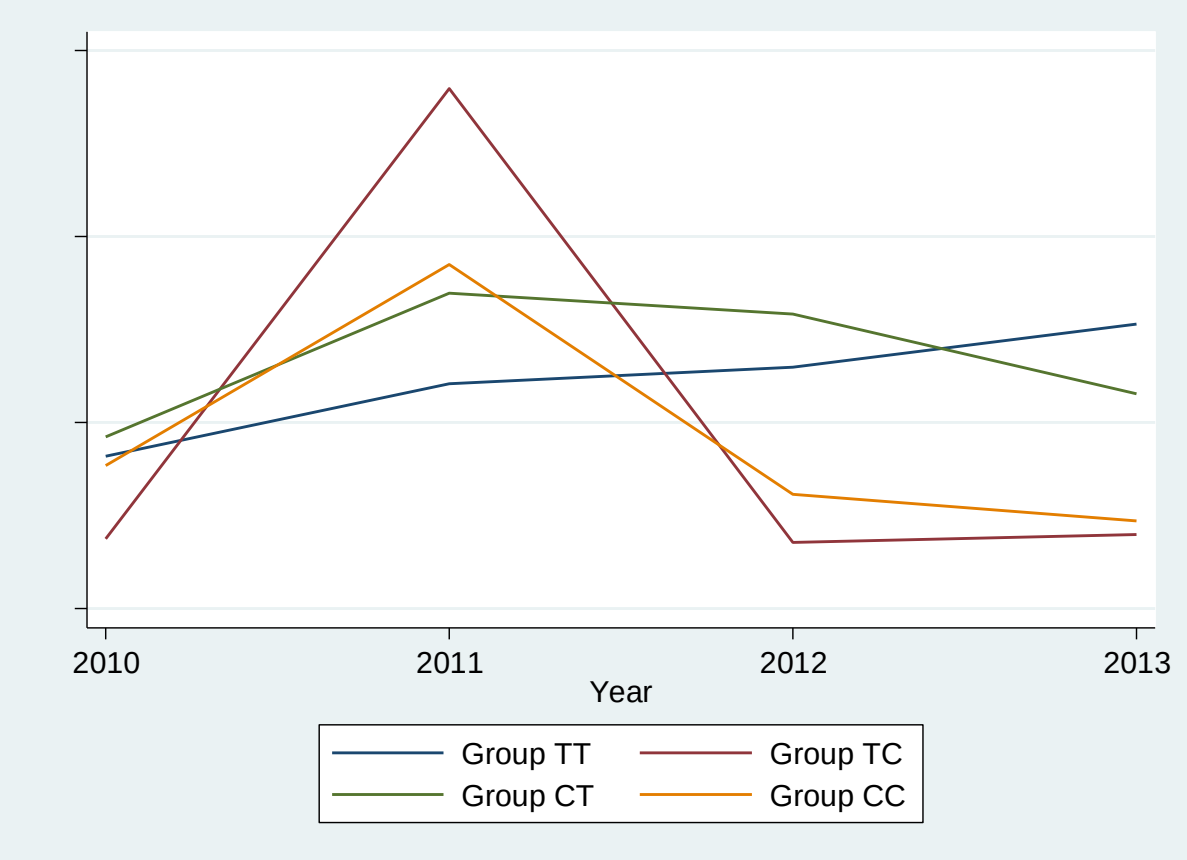


Panel 3-4C: non-*Kaizen* Practice Scores (0 – 12)

Figure 3-5: Dynamics of Business Performance by Treatment Status

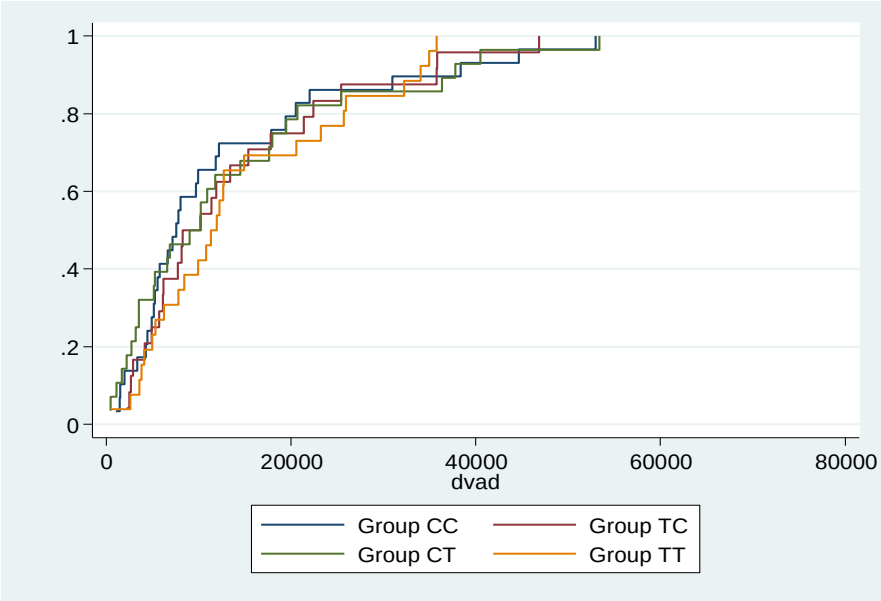


Panel 3-5A: Real Value Added (USD)

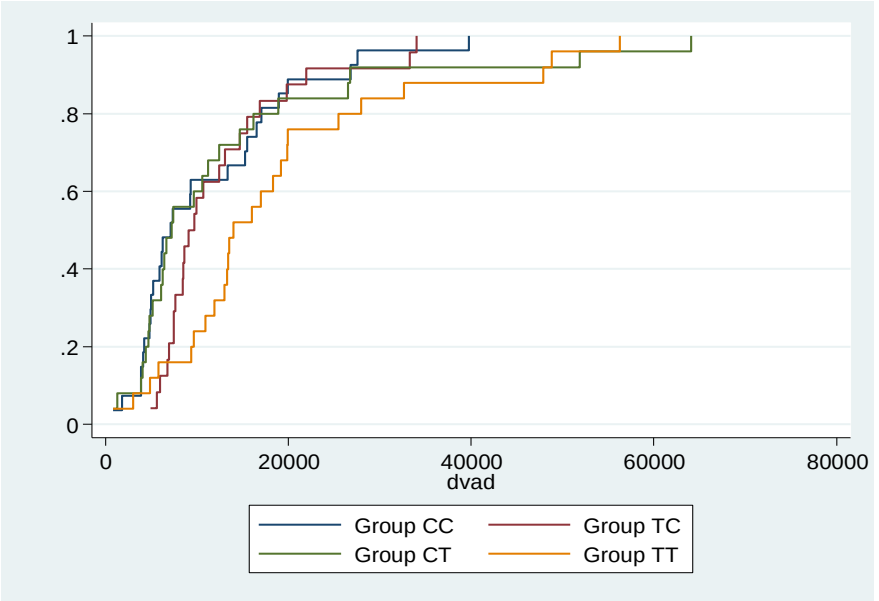


Panel 3-5B: Real Profit (USD)

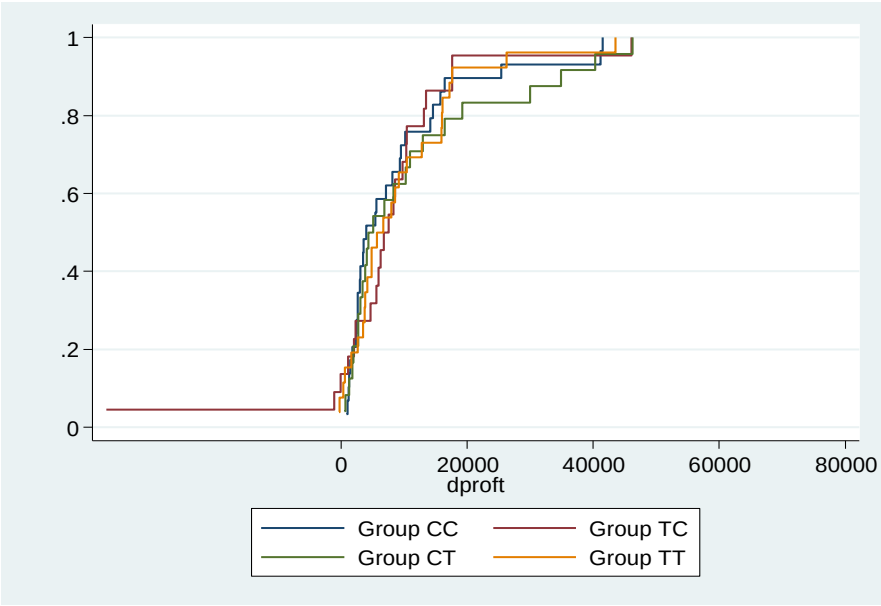
Figure 3-6: Cumulative Distribution Function (CDF) of Value Added and Profit by Treatment Status



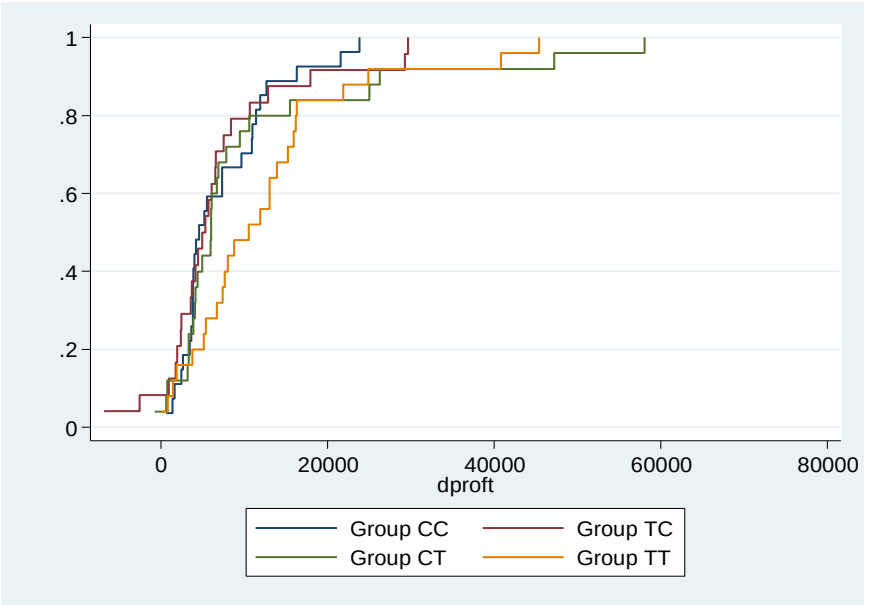
Panel 3-6A: Value added at the baseline survey (2009)



Panel 3-6B: Value added at the fourth follow-up survey (2013)



Panel 3-6C: Profit at the baseline survey (2009)



Panel 3-6D: Profit at the fourth follow-up survey (2013)

Figure 4-1: Illustrated Example of an Internal Memo for a Call of Office Formal Meeting in a Sample Public Office

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Appendix Table 3-1: The Baseline and Endline Adoption Rates (%) of Management Practices by Treatment Status

	BASELINE	ENDLINE				
	FULL SAMPLE	FULL SAMPLE	Group TT	Group TC	Group CT	Group CC
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: *Kaizen* Practices Scores (max 15) in which the entrepreneur:						
(1) Assigns any workers to inspect the quality of the products before sales	11	1	0	0	0	1
(2) Keeps records of quality defects	23	38	20	6	9	3
(3) Records customers' complaints about the products sold	48	46	21	10	9	6
(4) Instructs the worker the way of preventing the defect	10	8	1	1	3	3
(5) Has a designated place for all tools	35	34	9	11	8	6
(6) Has labels in the storage of tools so that workers can easily find them	3	19	6	6	4	3
(7) Has a designated place for raw material storage	81	88	23	22	22	21
(8) Separately stores raw materials from the scrap	80	84	42	15	20	7
(9) Has no scrap cloths around the floor	13	56	15	16	16	9
(10) Daily removes scraps and cleans the floor of the workplace	89	98	32	23	24	19
(11) Does machine maintenance at least once a week	32	26	16	5	3	2
(12) Regularly holds a meeting in which all the production workers participate	30	53	10	15	18	10
(13) Has a designated area for all the production activities within the workshop	32	22	7	6	4	5
(14) Has a flowchart indicating the sequence of activities in the production process	8	5	2	0	2	1
(15) Completely knows the sequence and duration of each of the production activities	87	72	10	20	23	19
Panel B: non-*Kaizen* Practices Scores (max 15) in which the entrepreneur:						
(1) Had any expenditure for advertisement in the last 3 months[†]	10	15	3	6	4	2
(2) Has any signboards in front of the workshop	42	60	10	17	21	12
(3) Distributes complimentary cards or calendar	28	56	15	15	15	11
(4) Issues invoices or receipts with workshop's name or phone number	37	62	10	17	24	11
(5) Preserves business documents (e.g., receipts or invoices) when making a purchase	50	93	15	24	35	19
(6) Separates business and household expenses	66	82	23	23	20	16
(7) Keeps record of sales	90	94	25	24	25	20
(8) Keeps record of material purchase	74	94	35	24	23	12
(9) Can clearly describe the characteristics of their customers	44	86	11	33	21	21
(10) Can clearly describe the strength of own firm compared with his(her) competitor(s)	25	94	13	23	33	25
(11) Has clear sales target or profit target in this year	49	67	10	19	26	12
(12) Has clear plan for growth of the enterprise in five years from now	30	93	23	23	25	22
Number of Observation	107	107	26	24	28	29

Notes: Each item of the management practice score carries the same weight. Thus, the total management practices scores, which is the sum of the *Kaizen* and non-*Kaizen* management practices, equals 27.

Appendix Table 3-2: *ex-ante* Correlates of *Kaizen* and non-*Kaizen* Practices Scores and Business Performance (Value Added and Profit) (OLS)

	VALUE ADDED						PROFIT					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Kaizen Practices	1,387.3***	69.052			699.6	-144.336	973.3***	49.056			537.4	-130.764
Scores	(3.605)	(0.462)			(1.428)	(-0.767)	(3.041)	(0.337)			(1.192)	(-0.673)
non-*Kaizen*			1,636.4***	324.039**	1,203.2***	405.790*			1,095.6***	251.812*	762.8*	328.131
Practices Scores			(6.085)	(2.058)	(3.099)	(1.903)			(4.261)	(1.768)	(1.945)	(1.624)
Age of entrepreneur	-1,235.6	370.570	-1,017.1	410.503	-1,022.4	419.904	-1,847.0	46.144	-1,707.7	77.645	-1,711.8	88.496
(years)	(-0.792)	(0.409)	(-0.575)	(0.456)	(-0.619)	(0.461)	(-1.254)	(0.061)	(-1.039)	(0.104)	(-1.102)	(0.117)
Age square (years)	10.191	-2.766	7.593	-3.334	7.707	-3.421	16.924	0.375	15.262	-0.058	15.350	-0.164
	(0.624)	(-0.296)	(0.418)	(-0.357)	(0.450)	(-0.362)	(1.110)	(0.048)	(0.910)	(-0.007)	(0.959)	(-0.021)
Sex of entrepreneur	4,199.7	3,416.19**	2,232.3	2,894.19**	2,479.5	2,847.04*	3,107.9	3,517.44**	1,827.4	3,084.15**	2,017.3	3,044.89**
(Female=1)	(1.494)	(2.265)	(0.736)	(2.025)	(0.869)	(1.972)	(1.230)	(2.573)	(0.696)	(2.365)	(0.813)	(2.316)
Entrepreneur's	694.6	-175.880	383.5	-251.292	408.5	-260.139	639.1*	-137.454	438.5	-200.801	457.7	-209.001
years of schooling	(1.613)	(-1.129)	(0.892)	(-1.506)	(0.971)	(-1.521)	(1.730)	(-0.992)	(1.199)	(-1.355)	(1.270)	(-1.364)
Parents' experience in	-3,840.7*	230.182	-3,076.8	243.011	-3,386.4	326.176	-2,234.5	402.089	-1,708.6	434.295	-1,946.3	503.980
same business (Yes=1)	(-1.708)	(0.302)	(-1.362)	(0.323)	(-1.507)	(0.411)	(-1.112)	(0.514)	(-0.842)	(0.555)	(-0.968)	(0.620)
Any prior training	422.8	-961.999	-639.6	-1,171.006	-406.4	-1,222.21	10.1	-1,030.99	-694.7	-1,202.06	-515.6	-1,248.45
experience (Yes=1)	(0.151)	(-1.030)	(-0.237)	(-1.235)	(-0.147)	(-1.262)	(0.004)	(-1.085)	(-0.270)	(-1.254)	(-0.194)	(-1.281)
Years of business	387.3**	-23.815	317.2*	-38.529	319.2*	-41.014	258.0*	-43.371	213.3	-57.563	214.8	-59.436
Operation	(2.125)	(-0.299)	(1.695)	(-0.468)	(1.807)	(-0.485)	(1.697)	(-0.583)	(1.358)	(-0.737)	(1.439)	(-0.744)
Formertextile-employee	-949.6	1,026.032	-1,592.5	885.472	-1,374.6	854.935	-454.7	925.748	-891.4	829.551	-724.1	798.331
industry(Yes=1)	(-0.362)	(0.995)	(-0.588)	(0.867)	(-0.525)	(0.830)	(-0.174)	(0.879)	(-0.334)	(0.793)	(-0.276)	(0.756)
Chagga (Yes=1)	3,424.4	-533.918	3,755.7	-386.843	3,674.0	-394.076	2,759.6	-549.262	2,980.7	-449.894	2,917.9	-453.560
	(1.201)	(-0.542)	(1.359)	(-0.387)	(1.314)	(-0.396)	(1.086)	(-0.547)	(1.180)	(-0.439)	(1.145)	(-0.441)
Value added/Profit		1.440***		1.411***		1.419***		0.806***		0.794***		0.799***
in the past (Y_P)		(11.603)		(10.772)		(11.317)		(8.860)		(8.566)		(8.920)
Constant	24,791.6	-9,828.049	21,421.6	-10,937.847	20,229.6	-10,880.084	39,190.5	-2,218.683	37,213.7	-3,117.503	36,298.2	-3,117.325
	(0.676)	(-0.468)	(0.511)	(-0.520)	(0.521)	(-0.516)	(1.130)	(-0.126)	(0.953)	(-0.178)	(0.993)	(-0.178)
R-squared	0.240	0.891	0.265	0.895	0.280	0.895	0.185	0.854	0.196	0.858	0.208	0.858
Number of enterprises	107	107	107	107	107	107	107	107	107	107	107	107

Notes: The dependent variable in columns (1) to (6) and columns (7) to (12) is the value added (i.e., sales revenue minus material costs, subcontracting costs, utility costs, and transportation costs) and the profit (i.e., sales revenue minus material costs, subcontracting costs, utility costs, transportation costs, and labor costs), respectively. The value added and profit are in USD and are adjusted by using the World Bank GDP Deflator. Numbers in parentheses are robust *t*-statistics. The asterisks ***, **, and * indicate the statistical significance level at 1 percent, 5 percent, and 10 percent, respectively.

Appendix Table 3-3: *ex-ante* Correlates of Management Practices Scores, Business Performance (Value Added and Profit), and Attrition (OLS)

	VALUE ADDED		PROFIT		ATTRITION
	(1)	(2)	(3)	(4)	(5)
Management Practices Scores	945.066***	124.121	647.245***	94.068	
	(5.519)	(1.518)	(4.339)	(1.230)	
Age of entrepreneur (years)	-1,052.676	386.299	-1,725.348	57.199	-0.007
	(-0.659)	(0.429)	(-1.140)	(0.076)	(-0.291)
Age square (years)	8.071	-3.019	15.513	0.200	0.000
	(0.486)	(-0.325)	(0.995)	(0.026)	(0.341)
Sex of entrepreneur (Female=1)	2,767.904	3,161.935**	2,146.397	3,305.269**	-0.081
	(0.969)	(2.152)	(0.837)	(2.464)	(-0.980)
Entrepreneur's years of schooling	452.935	-211.304	477.612	-167.129	0.003
	(1.078)	(-1.328)	(1.340)	(-1.188)	(0.459)
Parents' experience in same business (Yes=1)	-3,515.454	183.756	-2,004.138	381.371	0.003
	(-1.608)	(0.246)	(-1.011)	(0.492)	(0.051)
Any prior training experience (Yes=1)	-242.716	-1,043.040	-442.288	-1,097.880	-0.041
	(-0.090)	(-1.114)	(-0.173)	(-1.154)	(-0.909)
Years of business operation	328.933*	-30.239	219.207	-50.000	0.004
	(1.924)	(-0.380)	(1.503)	(-0.665)	(0.696)
Former employee in the textile industry(Yes=1)	-1,269.398	969.028	-676.978	890.940	0.079
	(-0.490)	(0.949)	(-0.261)	(0.852)	(1.517)
Chagga (Yes=1)	3,622.271	-449.103	2,894.747	-493.679	-0.020
	(1.299)	(-0.453)	(1.151)	(-0.490)	(-0.465)
Value added/Profit in the past (Y_P)		1.419***		0.797***	
		(10.861)		(8.528)	
Group TT					0.081
					(1.025)
Group TC					-0.091
					(-1.605)
Group CT					-0.034
					(-0.494)
Constant	20,594.038	-10,470.093	36,461.407	-2,703.426	
	(0.547)	(-0.499)	(1.019)	(-0.154)	
R-squared	0.278	0.893	0.207	0.856	0.100
Mean of Attrition Rate					0.056
Standard Deviation					[0.231]
Number of enterprises	107	107	107	107	107

Notes: The dependent variable in columns (1) and (2) and columns (3) and (4) is the value added (i.e., sales revenue minus material costs, subcontracting costs, utility costs, and transportation costs) and profit (i.e., sales revenue minus material costs, subcontracting costs, utility costs, transportation costs, and labor costs), respectively. The value added and profit are in USD and are adjusted by using the World Bank GDP Deflator. Numbers in parentheses are robust *t*-statistics. In column (5), the dummy dependent variable, ATTRITION, takes 1 if an enterprise did not operate by the time of our third follow-up survey, otherwise 0. Group TT, Group TC, and Group CT refers to the beneficiaries of classroom and onsite training components (completely-treated entrepreneurs), classroom training component only (partially-treated entrepreneurs), and onsite training component only (partially-treated entrepreneurs), respectively. The asterisks ***, **, and * indicate the statistical significance level at 1 percent, 5 percent, and 10 percent, respectively.

Appendix Table 3-4: Short-run Impact of Management Training on the Adoption of Management Practices and Business Performance

	SHORT-RUN IMPACT ON THE ADOPTION OF MANAGEMENT PRACTICES						SHORT-RUN IMPACT ON BUSINESS PERFORMANCE			
	Management Practices Scores		*Kaizen* Practices Scores		non-*Kaizen* Practices Scores		Value added		Profit	
	ITT	TOT	ITT	TOT	ITT	TOT	ITT	TOT	ITT	TOT
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Both training dummy *B*	4.283***	4.553***	1.801***	1.879***	2.482***	2.675***	1,372.506	1,469.775	1,127.681	1,203.435
(Yes=1)	(3.421)	(3.704)	(2.719)	(2.797)	(3.432)	(3.820)	(0.824)	(0.867)	(0.761)	(0.802)
Either training dummy *E*	2.410**	2.378**	1.322**	1.327**	1.088	1.051	685.660	670.822	539.761	517.095
(Yes=1)	(2.047)	(2.070)	(2.248)	(2.319)	(1.535)	(1.518)	(0.427)	(0.434)	(0.360)	(0.358)
Age of entrepreneur	-1.227**	-1.271**	-0.643**	-0.646**	-0.585*	-0.626**	-123.693	-141.957	-147.020	-164.323
(years)	(-2.290)	(-2.564)	(-2.141)	(-2.331)	(-1.889)	(-2.165)	(-0.133)	(-0.162)	(-0.185)	(-0.218)
Age square (years)	0.013**	0.013**	0.007**	0.007**	0.006*	0.006**	0.804	0.985	1.082	1.255
	(2.246)	(2.511)	(2.190)	(2.377)	(1.784)	(2.051)	(0.079)	(0.103)	(0.123)	(0.151)
Sex of entrepreneur	1.442	1.424	0.235	0.189	1.208	1.234	-3,774.648	-3,770.26*	-3,109.390	-3,100.116
(Female=1)	(0.915)	(0.948)	(0.276)	(0.236)	(1.255)	(1.350)	(-1.609)	(-1.652)	(-1.425)	(-1.459)
Education of entrepreneur	0.316**	0.299**	0.082	0.075	0.234***	0.224***	251.014	245.170	141.487	136.629
(years of schooling)	(2.040)	(2.052)	(0.869)	(0.844)	(2.761)	(2.793)	(1.039)	(1.079)	(0.643)	(0.661)
Parents' experience in the	-0.540	-0.528	-0.279	-0.259	-0.261	-0.269	-336.041	-336.339	-154.601	-157.033
same business (Yes=1)	(-0.596)	(-0.632)	(-0.601)	(-0.601)	(-0.480)	(-0.536)	(-0.267)	(-0.278)	(-0.132)	(-0.140)
Any prior training	0.308	0.309	0.086	0.080	0.222	0.229	-125.234	-123.153	-588.857	-585.998
experience (Yes=1)	(0.290)	(0.312)	(0.151)	(0.150)	(0.354)	(0.391)	(-0.099)	(-0.103)	(-0.515)	(-0.541)
Years of business operation	0.227***	0.225***	0.095**	0.093**	0.132***	0.132***	227.530*	227.435*	164.928	165.093
	(3.020)	(3.136)	(2.301)	(2.372)	(2.813)	(2.961)	(1.782)	(1.885)	(1.552)	(1.643)
Former employee in the	1.443	1.418	1.454**	1.462**	-0.011	-0.044	-940.060	-953.353	-608.132	-619.325
textile industry (Yes=1)	(1.088)	(1.139)	(2.330)	(2.492)	(-0.013)	(-0.058)	(-0.540)	(-0.595)	(-0.373)	(-0.414)
Chagga (Yes=1)	1.077	1.005	0.617	0.597	0.461	0.408	3,248.50**	3,222.6**	2,182.892	2,160.245*
	(0.937)	(0.927)	(1.130)	(1.158)	(0.673)	(0.635)	(2.204)	(2.341)	(1.659)	(1.761)
Constant	33.696***	35.065***	18.096***	18.332***	15.600**	16.733**	5,276.291	5,808.535	6,375.742	6,866.364
	(2.794)	(3.142)	(2.740)	(3.008)	(2.233)	(2.557)	(0.268)	(0.313)	(0.378)	(0.430)
First-stage *F*-statistics		465.77		331.12		376.99		460.82		381.01
R-squared	0.268	0.291	0.228	0.240	0.279	0.301	0.172	0.171	0.120	0.121
Number of enterprises	107	107	107	107	107	107	107	107	107	107

Notes: The dependent variable in columns (1) and (2), columns (3) and (4), and columns (5) and (6) is the overall management, *Kaizen*, and non-*Kaizen* practices adopted by the entrepreneurs one year after the training intervention, respectively. The dependent variable in columns (7) and (8) and columns (9) and (1) is the value added profit recorded by the entrepreneurs one year after the management training program had ended, respectively. The value added and profit are in USD and are adjusted by using the World Bank GDP Deflator. For the intention-to-treat (ITT) effects, the reported estimates are the coefficients of the dummy variable taking 1 if the enterprise was assigned Group TT (both training programs) or Group TC/CT (either training programs). For the treatment effects on the treated (TOT), the reported estimates are the coefficients of the dummy variable taking 1 if the enterprise complied with the assigned treatment. To estimate TOT, we instrument the actual participation status with the random invitation status. The robust *t*-statistics and *z*-statistics for the ITT and TOT estimation are in parentheses, respectively. The asterisks ***, **, and * indicate the statistical significance level at 1 percent, 5 percent, and 10 percent, respectively.

Appendix Table 3-5: Number of the Entrepreneurs they interact with Each Other

	Group TT	Group TC	Group CT	Group CC	Total
	Mean [Std.] (1)	Mean [Std.] (2)	Mean [Std.] (3)	Mean [Std.] (4)	Mean [Std.] (5)
Panel A: Baseline Survey					
Number of sample entrepreneurs you know in person	35.3 [19.5]	39.3 [12.7]	27.2 [21.6]	20.9 [13.7]	29.5 [19.0]
Number of entrepreneurs in the Group	26	24	28	29	107
Panel B: Interim Follow-up Survey (Sept. 2010)					
Number of sample entrepreneurs you know in person	38.6 [20.4]	39.1 [15.7]	30.4 [20.5]	18.6 [12.1]	29.0 [18.7]
Number of sample entrepreneurs you have talked to about *Kaizen*	21.2 [14.2]	22.2 [11.2]	10.2 [11.9]	5.2 [6.1]	14.2 [13.4]
Number of entrepreneurs in the Group	26	24	28	29	107
Panel C: First Follow-up Survey (Apr. 2011)					
Number of sample entrepreneurs you know in person	45.6 [17.2]	45.3 [15.7]	37.1 [21.8]	23.0 [15.2]	34.8 [20.2]
Number of sample entrepreneurs you have talked to about *Kaizen*	29.5 [16.5]	29.5 [15.5]	16.9 [19.1]	9.7 [12.8]	19.4 [17.9]
Number of sample entrepreneurs whose conversation with you about *Kaizen* has led to a change in your business	27.7 [17.3]	27.8 [15.9]	16.7 [19.3]	9.3 [12.3]	18.5 [17.8]
Number of sample enterprises you have visited	16.3 [12.8]	15.6 [12.5]	12.6 [15.1]	7.3 [9.7]	12.0 [12.8]
Number of sample enterprises from which you have copied something	15.3 [13.1]	15.3 [12.4]	12.6 [15.0]	7.3 [9.7]	11.8 [12.7]
Number of entrepreneurs in the Group	26	24	28	29	107
Panel D: Second Follow-up Survey (Sept. 2012)					
Number of sample entrepreneurs you know in person	46.1 [17.0]	46.2 [15.6]	38.0 [20.9]	24.8 [13.8]	35.9 [19.3]
Number of sample entrepreneurs you have talked to about *Kaizen*	28.1 [17.3]	29.5 [15.5]	15.6 [17.0]	9.9 [12.5]	20.5 [18.3]
Number of sample entrepreneurs whose conversation with you about *Kaizen* has led to a change in your business	25.7 [17.6]	26.9 [16.3]	16.2 [18.3]	8.2 [12.1]	18.9 [16.7]
Number of sample enterprises you have visited	14.4 [13.2]	13.9 [12.3]	10.7 [13.7]	6.8 [9.5]	11.5 [12.1]
Number of sample enterprises from which you have copied something	12.9 [11.1]	13.2 [11.3]	10.5 [14.6]	5.3 [8.1]	9.7 [11.6]
Number of entrepreneurs in the Group	26	24	28	29	107
Panel E: Third Follow-up Survey (Mar. 2014)					
Number of sample entrepreneurs you know in person	52.7 [17.4]	50.2 [13.7]	45.2 [19.3]	26.1 [22.7]	40.3 [20.6]
Number of sample entrepreneurs you have talked to about *Kaizen*	30.8 [21.4]	27.0 [20.4]	15.6 [15.4]	5.3 [11.0]	18.6 [19.4]
Number of sample entrepreneurs whose conversation with you about *Kaizen* has led to a change in your business	25.6 [22.5]	22.7 [19.8]	11.1 [14.0]	4.7 [9.9]	15.1 [18.4]
Number of sample enterprises you have visited	12.6 [12.5]	12.1 [13.0]	8.4 [8.1]	6.3 [7.2]	9.7 [10.6]
Number of sample entrepreneurs who have visited your enterprise	9.7 [14.0]	8.6 [10.5]	5.2 [6.0]	4.7 [7.6]	6.9 [10.1]
Number of sample entrepreneurs who have visited and copied something from your enterprise	8.7 [14.0]	6.4 [9.6]	3.9 [4.5]	3.9 [6.6]	5.7 [9.5]
Number of entrepreneurs in the Group	26	24	28	29	107

Notes: In this Table, irrespective of the treatment status, an entrepreneur reports the number of sample entrepreneurs s/he interacts with. Group TT, Group TC, Group CT, and Group CC denotes the entrepreneurs who received both the classroom and onsite training components, the classroom training only, the onsite training only, and the control group, respectively. The numbers in square brackets are standard deviations.

Appendix Table 3-6: Treated and Untreated Entrepreneur's Interactive Communication with the Treated Entrepreneurs

	Group TT	Group TC	Group CT	Group CC
	Mean [Std.] (1)	Mean [Std.] (2)	Mean [Std.] (3)	Mean [Std.] (4)
Panel A: Interim Follow-up Survey (Sept. 2010)				
Number of sample participants you have talked to about *Kaizen*	18.7 [12.1]	19.7 [11.3]	9.0 [11.6]	3.7 [7.6]
Number of entrepreneurs in the Group	26	24	28	29
Panel B: First Follow-up Survey (Apr. 2011)				
Number of sample participants you have talked to about *Kaizen*	25.9 [12.7]	26.1 [12.8]	13.9 [11.9]	7.6 [10.2]
Number of sample participants whose conversation with you about *Kaizen* has led to a change in your business	25.2 [13.7]	24.9 [13.5]	13.8 [10.1]	7.1 [9.6]
Number of sample participant's enterprises you have visited	13.7 [10.8]	12.7 [10.4]	10.1 [12.0]	5.2 [7.7]
Number of sample participant's enterprises from which you have copied something	12.8 [9.7]	13.2 [9.5]	10.7 [11.1]	5.3 [7.8]
Number of entrepreneurs in the Group	26	24	28	29
Panel C: Second Follow-up Survey (Sept. 2012)				
Number of sample participants you have talked to about *Kaizen*	24.6 [13.3]	26.0 [12.9]	12.7 [12.3]	9.7 [9.7]
Number of sample participants whose conversation with you about *Kaizen* has led to a change in your business	23.2 [14.3]	24.1 [13.6]	13.9 [12.0]	8.0 [9.3]
Number of sample participant's enterprises you have visited	12.9 [10.9]	12.0 [10.5]	8.9 [11.9]	5.8 [7.6]
Number of sample participant's enterprises from which you have copied something	11.0 [9.4]	10.9 [9.3]	8.6 [10.9]	5.2 [7.7]
Number of entrepreneurs in the Group	26	24	28	29
Panel D: Third Follow-up Survey (Mar. 2014)				
Number of sample participants you have talked to about *Kaizen*	25.1 [16.6]	22.6 [16.2]	11.5 [12.1]	5.1 [11.0]
Number of sample participants whose conversation with you about *Kaizen* has led to a change in your business	21.0 [16.8]	18.8 [16.3]	8.0 [9.6]	4.2 [8.3]
Number of sample participant's enterprises you have visited	10.2 [9.9]	9.6 [10.1]	5.8 [8.8]	5.1 [6.3]
Number of sample participants who have visited your enterprise	7.7 [10.7]	6.7 [9.5]	3.7 [2.9]	3.7 [6.2]
Number of sample participants who have visited and copied something from your enterprise	6.9 [10.8]	4.9 [9.3]	2.4 [3.7]	3.0 [5.3]
Number of entrepreneurs in the Group	26	24	28	29

Notes: In columns (1) to (3) and column (4), a training participant and non-training participant reports the number of sample training participants s/he interacts with, respectively. Group TT, Group TC, Group CT, Group CC denotes the entrepreneurs who received both the classroom and onsite training components, the classroom training only, the onsite training only, and the control group, respectively. The numbers in square brackets are standard deviations.

Appendix Table 3-7: Treated Entrepreneur's Interactive Communication and Social Networking with the Untreated Entrepreneurs

	Group TT	Group TC	Group CT	Total
	Mean [Std.] (1)	Mean [Std.] (2)	Mean [Std.] (3)	Mean [Std.] (4)
Panel A: Interim Follow-up Survey (Sept. 2010)				
Number of sample non-participants you have talked to about *Kaizen*	2.4 [2.3]	2.1 [1.9]	1.2 [1.9]	1.4 [1.8]
Number of enterprises in the Group	26	24	28	78
Panel B: First Follow-up Survey (Apr. 2011)				
Number of sample non-participants you have talked to about *Kaizen*	3.4 [3.7]	3.3 [3.5]	2.5 [3.2]	2.7 [3.2]
Number of sample non-participants whose conversation with you about *Kaizen* has led to a change in your business	2.3 [2.6]	2.4 [2.6]	2.4 [2.4]	2.1 [2.5]
Number of sample non-participant's enterprises you have visited	2.5 [2.0]	2.6 [2.3]	2.3 [1.8]	2.2 [1.7]
Number of sample non-participant's enterprises from which you have copied something	1.9 [1.7]	1.7 [2.0]	1.5 [2.0]	1.6 [2.1]
Number of entrepreneurs in the Group	26	24	28	78
Panel C: Second Follow-up Survey (Sept. 2012)				
Number of sample non-participants you have talked to about *Kaizen*	3.5 [3.6]	3.4 [3.4]	2.9 [3.2]	3.2 [3.3]
Number of sample non-participants whose conversation with you about *Kaizen* has led to a change in your business	2.6 [2.6]	2.8 [2.7]	2.3 [2.3]	2.5 [2.5]
Number of sample non-participant's enterprises you have visited	1.6 [1.7]	2.0 [1.9]	1.8 [1.6]	1.8 [1.9]
Number of sample non-participant's enterprises from which you have copied something	1.9 [1.8]	2.2 [2.2]	1.9 [2.0]	2.1 [2.2]
Number of entrepreneurs in the Group	26	24	28	78
Panel D: Third Follow-up Survey (Mar. 2014)				
Number of sample non-participants you have talked to about *Kaizen*	4.8 [5.2]	4.2 [4.9]	3.6 [4.1]	3.7 [4.3]
Number of sample non-participants whose conversation with you about *Kaizen* has led to a change in your business	4.3 [5.4]	3.7 [4.8]	3.0 [4.2]	3.1 [4.2]
Number of sample non-participant's enterprises you have visited	2.4 [3.2]	2.4 [2.9]	2.3 [2.6]	2.3 [2.6]
Number of sample non-participants who have visited your enterprise	1.9 [3.5]	1.7 [2.8]	1.5 [2.5]	1.5 [2.4]
Number of sample non-participants who have visited and copied something from your enterprise	1.7 [3.5]	1.4 [2.8]	1.3 [2.5]	1.3 [2.4]
Number of enterprises in the Group	26	24	28	78

Notes: In this Table, a training participant reports the number of non-training participants s/he interacts with. Group TT, Group TC, Group CT, and Group CC denotes the entrepreneurs who received both the classroom and onsite training components, the classroom training only, the onsite training only, and the control group, respectively. The numbers in square brackets are standard deviations.

Appendix Table 3-8: The Treated, Untreated, and Model Entrepreneurs' Communication

	From treated to the role model entrepreneurs	From untreated to the role model entrepreneurs	Total sample entrepreneurs to the role model entrepreneurs
	Mean [Std.] (1)	Mean [Std.] (2)	Mean [Std.] (3)
Panel A: Interim Follow-up Survey (Sept. 2010)			
Number of role model entrepreneurs you have talked to about *Kaizen*	1.2 [0.4]	1.0 [0.0]	1.2 [0.4]
Number of entrepreneurs in the Group	78	29	107
Panel B: First Follow-up Survey (Apr. 2011)			
Number of role model entrepreneurs you have talked to about *Kaizen*	1.2 [0.7]	0.8 [0.8]	1.2 [0.8]
Number of role model entrepreneurs whose conversation with you about *Kaizen* has led to a change in your business	1.2 [0.7]	0.8 [0.8]	1.1 [0.7]
Number of role model enterprises you visited their premises	0.7 [0.8]	0.8 [0.8]	0.7 [0.8]
Number of role model enterprises from which you have copied something	0.4 [0.7]	0.6 [0.7]	0.5 [0.7]
Number of entrepreneurs in the Group	78	29	107
Panel C: Second Follow-up Survey (Sept. 2012)			
Number of role model entrepreneurs you have talked to about *Kaizen*	1.4 [0.6]	1.7 [0.5]	1.5 [0.6]
Number of role model entrepreneurs whose conversation with you about *Kaizen* has led to a change in your business	1.4 [0.6]	1.7 [0.5]	1.4 [0.5]
Number of role model enterprises you visited their premises	0.9 [0.8]	1.6 [0.6]	1.3 [2.4]
Number of role model enterprises from which you have copied something	0.7 [0.8]	1.5 [0.7]	0.9 [0.8]
Number of entrepreneurs in the Group	78	29	107
Panel D: Third Follow-up Survey (Mar. 2014)			
Number of role model entrepreneurs you have talked to about *Kaizen*	0.6 [0.7]	0.1 [0.3]	0.5 [0.7]
Number of role model entrepreneurs whose conversation with you about *Kaizen* has led to a change in your business	0.5 [0.7]	0.1 [0.3]	0.4 [0.6]
Number of role model enterprises you have visited	0.2 [0.4]	0.8 [0.1]	0.2 [0.4]
Number of role model entrepreneurs who have visited your enterprise	0.1 [0.3]	0.0 [0.2]	0.1 [0.3]
Number of role model entrepreneurs who have visited and copied something from your enterprise	0.1 [0.3]	0.0 [0.2]	0.1 [0.3]
Number of entrepreneurs in the Group	78	29	107

Notes: In this Table, both participant and non-participant to the training reports the average number of interactions with the role model entrepreneurs. The numbers in square brackets are standard deviations.

Appendix Table 3-9: Pairwise Correlations between Entrepreneur's Communication and Outcome Variables by Treatment Status of Entrepreneurs

	Communication Variables			Outcome Variables		
	Talked	Visited	Known	Management Scores	Value Added	Profit
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Group TT (N = 26)						
Talked	1.000					
Visited	0.623***	1.000				
Known	0.734***	0.385*	1.000			
Management Scores	0.192	0.203	0.132	1.000		
Value Added	0.268	0.208	0.468**	0.323	1.000	
Profit	0.278	0.201	0.440**	0.320	0.970***	1.000
Panel B: Group TC (N = 24)						
Talked	1.000					
Visited	0.594***	1.000				
Known	0.669***	0.453***	1.000			
Management Scores	0.075	0.155	0.179	1.000		
Value Added	0.326**	0.140	0.424***	0.289*	1.000	
Profit	0.354**	0.101	0.370**	0.245	0.907***	1.000
Panel C: Group CT (N = 28)						
Talked	1.000					
Visited	0.533***	1.000				
Known	0.616***	0.438***	1.000			
Management Scores	0.2391	0.1332	0.276*	1.000		
Value Added	0.282**	0.109	0.148	0.469***	1.000	
Profit	0.208	0.186	0.115	0.409***	0.893***	1.000
Panel D: Group CC (N = 29)						
Talked	1.000					
Visited	0.522***	1.000				
Known	0.608***	0.712***	1.000			
Management Scores	0.449**	0.368	0.383**	1.000		
Value Added	0.201	0.510***	0.284*	0.445**	1.000	
Profit	0.316*	0.405**	0.254	0.386**	0.927***	1.000
Panel E: Full Sample (N = 107)						
Talked	1.000					
Visited	0.565***	1.000				
Known	0.636***	0.514***	1.000			
Management Scores	0.376***	0.277***	0.443***	1.000		
Value Added	0.278***	0.221**	0.216**	0.445***	1.0000	
Profit	0.250**	0.185	0.165*	0.363***	0.878***	1.000

Notes: The matrix reports the pairwise correlation coefficients between the communication variables (e.g., talked to, visited to, and known) and the outcome variables (i.e., the management practices scores, value added, and profit) for each group. The value added (i.e., sales revenue minus material costs, subcontracting costs, utility costs, and transportation costs) and profit (i.e., sales revenue minus material costs, subcontracting costs, utility costs, transportation costs, and labor costs) expressed in USD and are adjusted by using the World Bank GDP Deflator. The variables "TALKED", "VISITED", and "KNOWN" capture the communication networks, *Z*, as defined by the number of entrepreneurs with whom (s)he talked to about the training program, the number of entrepreneurs with whom (s)he visited their workshop, and the number of entrepreneurs whom the entrepreneur knew in person (or just by name), respectively. The asterisks ***, **, and * indicate the statistical significance level at 1 percent, 5 percent, and 10 percent, respectively.

Appendix Table 3-10: Correlates of Communication and Management Scores (OLS)

	Management Scores					
	Talked		Visited		Known	
	(1)	(2)	(3)	(4)	(5)	(6)
Talked/Visited/Known	0.056***	0.051***	0.064	0.066	0.058***	0.052***
	(3.090)	(2.867)	(1.470)	(1.592)	(3.234)	(2.808)
Age of entrepreneur	-0.126	-0.003	-0.373	-0.201	-0.140	-0.049
(years)	(-0.269)	(-0.007)	(-0.776)	(-0.443)	(-0.258)	(-0.096)
Age square (years)	0.001	-0.000	0.004	0.002	0.001	0.000
	(0.246)	(-0.018)	(0.754)	(0.413)	(0.258)	(0.089)
Sex of entrepreneur	2.616**	2.272*	2.997**	2.488**	2.365**	2.146*
(Female=1)	(2.299)	(1.943)	(2.532)	(2.048)	(2.083)	(1.833)
Education of entrepreneur	0.304**	0.278**	0.306**	0.269**	0.257*	0.242*
(years of schooling)	(2.428)	(2.289)	(2.453)	(2.255)	(1.978)	(1.946)
Parents' experience in the	-0.187	0.011	-0.597	-0.286	-0.686	-0.495
same business (Yes=1)	(-0.243)	(0.015)	(-0.759)	(-0.388)	(-0.916)	(-0.696)
Any prior training	0.432	0.203	0.719	0.406	0.258	0.106
experience (Yes=1)	(0.597)	(0.285)	(1.003)	(0.591)	(0.344)	(0.145)
Years of business	0.133*	0.133*	0.140*	0.135*	0.130	0.132*
operation	(1.706)	(1.769)	(1.719)	(1.736)	(1.607)	(1.673)
Former employee in the	-0.013	0.116	0.363	0.467	0.306	0.393
textile industry (Yes=1)	(-0.015)	(0.137)	(0.396)	(0.530)	(0.357)	(0.463)
Chagga (Yes=1)	-0.318	-0.385	-0.413	-0.483	-0.421	-0.468
	(-0.419)	(-0.528)	(-0.526)	(-0.653)	(-0.562)	(-0.642)
Management		0.155		0.196*		0.124
scores in the past		(1.535)		(1.866)		(1.190)
Constant	10.318	5.239	16.265	9.440	10.199	6.362
	(0.976)	(0.516)	(1.477)	(0.880)	(0.814)	(0.542)
R-squared	0.297	0.322	0.255	0.295	0.312	0.327
Number of enterprises	101	101	101	101	101	101

Notes: The dependent variable in columns (1) to (6) is the management practice scores. The variables "Talked", "Visited", and "Known" capture the communication networks, *Z*, as defined by the number of entrepreneurs with whom s/he talked to about the training program, the number of entrepreneurs with whom (s)he visited their workshop, and the number of entrepreneurs whom the entrepreneur knew in person (or just by name), respectively. The robust *t*-statistics are in parentheses, respectively. The asterisks ***, **, and * indicate the statistical significance at 1 percent, 5 percent, and 10 percent, respectively.

Appendix Table 3-11: Correlates of Communication and Business Performance (OLS)

	VALUE ADDED						PROFIT					
	TALKED		VISITED		KNOWN		TALKED		VISITED		KNOWN	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Talked/Visited/Known	131.419*	55.184*	175.734	50.387	67.636	29.101	106.886	47.223*	32.602	34.519	38.639	22.241
	(1.815)	(1.925)	(1.148)	(1.096)	(0.952)	(0.968)	(1.600)	(1.733)	(0.268)	(0.801)	(0.583)	(0.791)
Age of entrepreneur	-1,135.02	659.343	-1,740.58	441.696	-1,371.24	580.957	-1,792.38	304.786	-2,178.56	142.205	-2,032.91	237.099
(years)	(-0.644)	(0.782)	(-0.906)	(0.486)	(-0.718)	(0.638)	(-1.072)	(0.418)	(-1.240)	(0.185)	(-1.137)	(0.303)
Age square (years)	8.760	-5.725	14.835	-3.524	11.198	-4.876	16.096	-2.251	19.938	-0.596	18.535	-1.524
	(0.494)	(-0.664)	(0.762)	(-0.376)	(0.584)	(-0.524)	(0.962)	(-0.303)	(1.118)	(-0.075)	(1.034)	(-0.191)
Sex of entrepreneur	4,228.8	3,088.8**	5,027.4	3,492.6**	4,651.0	3,237.9**	2,941.1	3,226.6**	3,977.0	3,609.6***	3,524.6	3,404.9**
(Female=1)	(1.312)	(2.203)	(1.580)	(2.479)	(1.412)	(2.300)	(1.071)	(2.509)	(1.464)	(2.741)	(1.283)	(2.631)
Entrepreneur' education	733.068	-220.176	727.711	-220.430	708.467	-240.434	674.773	-181.489	711.857*	-183.221	675.400	-196.699
(years of schooling)	(1.547)	(-1.286)	(1.521)	(-1.341)	(1.441)	(-1.335)	(1.629)	(-1.186)	(1.706)	(-1.236)	(1.559)	(-1.227)
Parents' experience in	-3,055.98	643.034	-3,967.77	247.903	-4,256.33	179.712	-1,490.22	800.728	-2,432.62	455.033	-2,474.07	397.373
same business (Yes=1)	(-1.127)	(0.753)	(-1.562)	(0.304)	(-1.659)	(0.228)	(-0.594)	(0.887)	(-1.058)	(0.536)	(-1.086)	(0.483)
Any prior training	-11.946	-1,312.73	679.564	-1,050.41	70.758	-1,297.90	-285.929	-1,331.77	197.077	-1,119.451	-101.924	-1,300.55
experience (Yes=1)	(-0.004)	(-1.316)	(0.223)	(-1.099)	(0.024)	(-1.246)	(-0.105)	(-1.314)	(0.069)	(-1.130)	(-0.037)	(-1.248)
Years of business	458.819*	-71.634	462.123*	-63.729	496.565*	-61.533	308.734	-91.382	360.874*	-82.588	350.163	-80.906
operation	(1.907)	(-0.758)	(1.906)	(-0.614)	(1.908)	(-0.588)	(1.510)	(-1.001)	(1.739)	(-0.833)	(1.612)	(-0.809)
Former employee in	-1,546.91	352.898	-713.267	752.173	-602.956	758.583	-856.927	343.879	12.978	701.396	-41.914	695.968
textile industry(Yes=1)	(-0.586)	(0.379)	(-0.243)	(0.719)	(-0.207)	(0.728)	(-0.338)	(0.359)	(0.004)	(0.644)	(-0.015)	(0.646)
Chagga (Yes=1)	3,624.477	-456.720	3,413.246	-582.040	3,360.943	-603.007	3,021.838	-490.156	2,804.322	-618.346	2,802.534	-619.815
	(1.287)	(-0.459)	(1.203)	(-0.558)	(1.174)	(-0.575)	(1.171)	(-0.475)	(1.064)	(-0.581)	(1.068)	(-0.582)
Value added		1.420***		1.430***		1.433***		0.798***		0.808***		0.806***
in the past (Y_P)		(11.968)		(11.869)		(12.091)		(9.238)		(9.257)		(9.392)
Constant	28,813.1	-15,518.3	43,371.9	-10,311.7	33,892.6	-13,900.5	41,988.1	-7,408.2	51,185.8	-3,509.0	47,394.7	-5,971.3
	(0.686)	(-0.791)	(0.952)	(-0.489)	(0.744)	(-0.655)	(1.051)	(-0.433)	(1.231)	(-0.195)	(1.110)	(-0.326)
R-squared	0.199	0.893	0.183	0.888	0.173	0.888	0.164	0.858	0.131	0.852	0.135	0.853
Number of enterprises	101	101	101	101	101	101	101	101	101	101	101	101

Notes: The dependent variable in columns (1) to (6) and columns (7) to (12) is the value added and profit, respectively. The value added and profit are in USD and are adjusted by using the World Bank GDP Deflator. The independent variables "TALKED", "VISITED", and "KNOWN" capture the enterpreneur's communication networks as defined by the number of entrepreneurs with whom s/he talked to about the training program, the number of entrepreneurs with whom (s)he visited their workshop, and the number of entrepreneurs whom the entrepreneur knew in person (or just by name), respectively. The robust *t*-statistics are in parentheses, respectively. The asterisks ***, **, and * indicate the statistical significance at 1 percent, 5 percent, and 10 percent, respectively.

Appendix Table 3-12: Entrepreneur's Communication Network and Management Practices

	TALKED		VISITED		KNOWN	
	ITT	TOT	ITT	TOT	ITT	TOT
	(1)	(2)	(3)	(4)	(5)	(6)
Both training dummy *B*	2.449*	2.326	3.230**	3.680**	1.977	1.372
(Yes=1)	(1.776)	(1.290)	(2.301)	(2.338)	(0.807)	(0.296)
Either training dummy *E*	3.400***	3.603***	3.583***	3.760***	2.534	2.940
(Yes=1)	(3.300)	(3.152)	(3.066)	(2.847)	(1.458)	(1.273)
Both training (Yes=1)	0.034	0.041	0.028	0.005	0.036	0.049
x Communication *Z*	(0.981)	(0.981)	(0.379)	(0.067)	(0.908)	(0.659)
Either training (Yes=1)	0.022	0.017	0.044	0.045	0.037	0.029
x Communication *Z*	(0.925)	(0.684)	(0.905)	(1.034)	(1.173)	(0.701)
Control (Yes = 1) x	0.125***	0.126***	0.147*	0.160**	0.038	0.038
communication (1 - *B* - *E*)*Z*	(3.432)	(3.526)	(1.729)	(1.970)	(1.345)	(1.366)
Age of entrepreneur (years)	0.134	0.181	-0.033	-0.036	0.077	0.116
	(0.260)	(0.364)	(-0.064)	(-0.073)	(0.140)	(0.225)
Age square (years)	-0.001	-0.002	0.000	0.000	-0.001	-0.001
	(-0.271)	(-0.370)	(0.059)	(0.076)	(-0.147)	(-0.225)
Sex of entrepreneur	1.977*	1.801*	1.921*	1.811*	1.853*	1.713*
(Female=1)	(1.857)	(1.723)	(1.783)	(1.694)	(1.738)	(1.648)
Education of entrepreneur	0.264*	0.264*	0.293**	0.289**	0.278**	0.275**
(years of schooling)	(1.905)	(1.953)	(2.264)	(2.370)	(2.019)	(2.010)
Parents' experience in the	-0.010	0.021	-0.044	-0.025	-0.266	-0.173
same business (Yes=1)	(-0.014)	(0.030)	(-0.061)	(-0.036)	(-0.372)	(-0.239)
Any prior training	0.064	0.089	0.217	0.199	0.071	0.097
experience (Yes=1)	(0.085)	(0.125)	(0.309)	(0.298)	(0.094)	(0.133)
Years of business operation	0.115	0.106	0.113	0.107	0.114	0.104
	(1.580)	(1.498)	(1.554)	(1.535)	(1.524)	(1.459)
Former employee in the	-0.308	-0.222	0.113	0.254	0.137	0.174
textile industry (Yes=1)	(-0.357)	(-0.272)	(0.128)	(0.303)	(0.157)	(0.210)
Chagga (Yes=1)	-0.321	-0.291	-0.363	-0.305	-0.310	-0.274
	(-0.444)	(-0.432)	(-0.490)	(-0.436)	(-0.424)	(-0.405)
Overall Management Practices	0.110	0.077	0.130	0.093	0.097	0.074
Scores in the past (Y_P)	(1.235)	(0.709)	(1.440)	(0.835)	(1.027)	(0.644)
Constant	1.552	1.148	4.468	5.135	2.766	2.320
	(0.131)	(0.100)	(0.373)	(0.457)	(0.218)	(0.190)
First-stage *F* statistics		176.71		217.02		234.43
R-squared	0.407	0.365	0.391	0.357	0.391	0.355
Number of enterprises	107	107	107	107	107	107

Notes: The dependent variable in columns (1) to (6) is the overall management practices scores (i.e., the sum of the *Kaizen* and non-*Kaizen* management practices scores). For the intention-to-treat (ITT) effects, the reported estimates are the coefficients of dummy variable taking 1 if the enterprise was assigned Group TT (both training programs) or Group TC/CT (either training program). For the treatment effects on the treated (TOT), the reported estimates are the coefficients of the dummy variable taking 1 if the enterprise complied with the assigned treatment. To estimate the TOT, we use the instrumental variable approach by instrumenting the actual participation status with the random invitation status. The variables "TALKED", "VISITED", and "KNOWN" capture the communication networks, *Z*, as defined by the number of entrepreneurs with whom s/he talked to about the training program, the number of entrepreneurs with whom (s)he visited their workshop, and the number of entrepreneurs whom the entrepreneur knew in person (or just by name), respectively. The robust *t*-statistics and *z*-statistics for the ITT and TOT are in parentheses, respectively. The asterisks ***, **, and * indicate the statistical significance at 1 percent, 5 percent, and 10 percent, respectively.

Appendix Table 3-13: Correlates of Entrepreneur's Communication Network on the Adoption of *Kaizen* and non-*Kaizen* Practices

	TALKED				VISITED				KNOWN			
	Kaizen		non-*Kaizen*		*Kaizen*		non-*Kaizen*		*Kaizen*		non-*Kaizen*	
	ITT	TOT	ITT	TOT	ITT	TOT	ITT	TOT	ITT	TOT	ITT	TOT
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Both training dummy *B*	0.493	0.668	1.863**	1.534	0.972	1.214	2.191***	2.364***	-0.157	-0.202	1.947	1.451
(Yes=1)	(0.507)	(0.547)	(2.462)	(1.485)	(0.923)	(1.046)	(3.211)	(3.313)	(-0.087)	(-0.063)	(1.559)	(0.571)
Either training dummy *E*	1.074	1.051	2.271***	2.462***	1.127	1.157	2.402***	2.513***	0.536	0.575	1.960***	2.241**
(Yes=1)	(1.344)	(1.273)	(4.864)	(4.806)	(1.224)	(1.180)	(4.676)	(4.555)	(0.386)	(0.348)	(2.749)	(2.215)
Both training (Yes=1)	0.028	0.023	0.007	0.018	0.034	0.022	-0.003	-0.014	0.026	0.028	0.011	0.022
x Communication *Z*	(1.177)	(0.858)	(0.433)	(0.804)	(0.632)	(0.377)	(-0.115)	(-0.533)	(0.923)	(0.542)	(0.601)	(0.519)
Either training (Yes=1)	0.008	0.010	0.014	0.007	0.022	0.025	0.025	0.024	0.013	0.011	0.023*	0.018
x Communication *Z*	(0.482)	(0.589)	(1.223)	(0.570)	(0.580)	(0.728)	(1.379)	(1.642)	(0.517)	(0.387)	(1.890)	(0.993)
Control (Yes = 1) x	0.026	0.026	0.098***	0.099***	0.046	0.052	0.105**	0.114**	0.000	0.000	0.036**	0.038**
communication (1-*B*-*E*)*Z*	(0.981)	(1.063)	(5.723)	(5.695)	(0.845)	(1.020)	(2.062)	(2.335)	(0.023)	(0.027)	(2.152)	(2.262)
Age of entrepreneur (years)	0.136	0.131	0.014	0.066	0.040	0.037	-0.070	-0.069	0.129	0.136	-0.034	-0.006
	(0.317)	(0.329)	(0.094)	(0.400)	(0.093)	(0.091)	(-0.473)	(-0.504)	(0.293)	(0.336)	(-0.216)	(-0.034)
Age square (years)	-0.001	-0.001	-0.000	-0.001	-0.001	-0.000	0.001	0.001	-0.001	-0.001	0.000	0.000
	(-0.339)	(-0.351)	(-0.080)	(-0.375)	(-0.115)	(-0.112)	(0.520)	(0.576)	(-0.316)	(-0.358)	(0.255)	(0.087)
Sex of entrepreneur	0.447	0.404	1.498***	1.384***	0.446	0.411	1.469***	1.402***	0.458	0.425	1.377***	1.291***
(Female=1)	(0.530)	(0.502)	(2.961)	(2.781)	(0.531)	(0.502)	(2.644)	(2.623)	(0.547)	(0.530)	(2.783)	(2.680)
Education of entrepreneur	0.087	0.081	0.176***	0.186***	0.082	0.076	0.212***	0.217***	0.094	0.091	0.186***	0.189***
(years of schooling)	(0.895)	(0.867)	(2.675)	(2.795)	(0.933)	(0.921)	(3.076)	(3.335)	(0.980)	(0.963)	(2.785)	(2.827)
Parents' experience in the	0.336	0.342	-0.315	-0.286	0.317	0.311	-0.339	-0.307	0.234	0.249	-0.461	-0.394
same business (Yes=1)	(0.615)	(0.669)	(-0.878)	(-0.842)	(0.597)	(0.614)	(-0.860)	(-0.819)	(0.461)	(0.499)	(-1.212)	(-0.994)
Any prior training	-0.186	-0.201	0.229	0.280	-0.158	-0.162	0.377	0.368	-0.175	-0.170	0.234	0.264
experience (Yes=1)	(-0.337)	(-0.396)	(0.578)	(0.707)	(-0.293)	(-0.325)	(0.964)	(0.993)	(-0.304)	(-0.320)	(0.593)	(0.663)
Years of business operation	0.043	0.041	0.073**	0.067**	0.038	0.038	0.075**	0.070**	0.040	0.039	0.074**	0.067**
	(0.853)	(0.863)	(2.081)	(2.004)	(0.790)	(0.824)	(2.002)	(2.009)	(0.781)	(0.801)	(2.210)	(2.087)
Former employee in the	-0.328	-0.291	0.022	0.045	-0.242	-0.183	0.330	0.397	-0.182	-0.165	0.303	0.307
textile industry (Yes=1)	(-0.533)	(-0.513)	(0.046)	(0.102)	(-0.398)	(-0.318)	(0.694)	(0.875)	(-0.298)	(-0.287)	(0.657)	(0.703)
Chagga (Yes=1)	-0.059	-0.047	-0.280	-0.266	-0.082	-0.065	-0.297	-0.261	-0.073	-0.063	-0.259	-0.235
	(-0.104)	(-0.090)	(-0.813)	(-0.822)	(-0.143)	(-0.122)	(-0.821)	(-0.772)	(-0.130)	(-0.122)	(-0.710)	(-0.694)

(continued)

Appendix Table 3-13 *(continued)*

	TALKED				VISITED				KNOWN			
	Kaizen		non-*Kaizen*		*Kaizen*		non-*Kaizen*		*Kaizen*		non-*Kaizen*	
	ITT	TOT	ITT	TOT	ITT	TOT	ITT	TOT	ITT	TOT	ITT	TOT
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Kaizen/non-*Kaizen* Practices	0.147	0.135	0.115	0.059	0.170	0.154	0.109	0.059	0.144	0.139	0.091	0.043
Scores in the past (Y_P)	(1.314)	(1.173)	(1.214)	(0.552)	(1.459)	(1.286)	(1.147)	(0.563)	(1.274)	(1.170)	(0.927)	(0.388)
Constant	-0.529	-0.195	1.408	0.684	1.529	1.749	2.727	3.120	-0.238	-0.302	2.284	2.054
	(-0.054)	(-0.021)	(0.350)	(0.162)	(0.153)	(0.189)	(0.705)	(0.865)	(-0.023)	(-0.032)	(0.577)	(0.467)
First-stage *F* statistics		198.35		151.94		214.94		224.14		223.68		230.02
R-squared	0.145	0.123	0.578	0.542	0.143	0.123	0.546	0.527	0.139	0.127	0.557	0.526
Number of enterprises	107	107	107	107	107	107	107	107	107	107	107	107

Notes: The dependent variable in columns (1), (2), (5), (6), (9), and (10) is the *Kaizen* management practices scores (i.e., the sum of the production and quality control practices scores). The dependent variable in columns (3), (4), (7), (8), (11), and (12) is the non-*Kaizen* management practices scores (i.e., the sum of the marketing, recordkeeping, and planning practices scores). For the intention-to-treat (ITT) effects, the reported estimates are the coefficients of the dummy variable taking 1 if the enterprise was assigned Group TT (both training programs) or Group TC/CT (either training program). For the treatment effects on the treated (TOT), the reported estimates are the coefficients of dummy variable taking 1 if the enterprise complied with the assigned treatment. To estimate the TOT, we use the instrumental variable approach by instrumenting the actual participation status with the random invitation status. The variables "TALKED", "VISITED", and "KNOWN" capture the communication networks, *Z*, as defined by the number of entrepreneurs with whom s/he talked to about the training program, the number of entrepreneurs with whom (s)he visited their workshop, and the number of entrepreneurs whom the entrepreneur knew in person (or just by name), respectively. The robust *t*-statistics and *z*-statistics for the ITT and TOT are in parentheses, respectively. The asterisks ***, **, and * indicate the statistical significance at 1 percent, 5 percent, and 10 percent, respectively.

Appendix Table 3-14: Correlates of Communication Network on the Business Performance (Value Added and Profit)

	TALKED				VISITED				KNOWN			
	VALUE ADDED		PROFIT		VALUE ADDED		PROFIT		VALUE ADDED		PROFIT	
	ITT (1)	TOT (2)	ITT (3)	TOT (4)	ITT (5)	TOT (6)	ITT (7)	TOT (8)	ITT (9)	TOT (10)	ITT (11)	TOT (12)
Both training dummy *B*	1,885.2	3,853.9	1,293.5	1,534.2	2,315.9	3,874.9**	1,785.1	2,083.2	-2,017.9	5,354.2	-2,816.7	-1,133.1
(Yes=1)	(1.003)	(1.571)	(0.710)	(0.780)	(1.398)	(2.016)	(1.078)	(1.193)	(-0.648)	(0.916)	(-0.988)	(-0.314)
Either training dummy *E*	-1,432.2	-2,094.4*	-1,416.8	-1,424.3	-1,347.9	-2,156.9*	-1,854.7	-1,846.2	-3,244.7*	-6,287.3**	-3,258.8*	-4,097.4**
(Yes=1)	(-1.196)	(-1.720)	(-1.113)	(-1.140)	(-1.182)	(-1.800)	(-1.563)	(-1.615)	(-1.931)	(-2.429)	(-1.981)	(-2.074)
Both training (Yes=1)	30.726	-21.626	22.684	22.911	2.995	-100.729	-42.809	-48.918	72.502	-63.442	69.652	40.466
x Communication *Z*	(0.554)	(-0.370)	(0.453)	(0.470)	(0.044)	(-1.425)	(-0.787)	(-0.776)	(1.060)	(-0.614)	(1.143)	(0.645)
Either training (Yes=1)	62.835**	88.511***	64.056**	62.571**	76.248	128.724**	97.761*	91.012*	47.761	110.921**	46.346	62.487
x Communication *Z*	(2.232)	(2.728)	(2.066)	(2.234)	(1.445)	(2.249)	(1.857)	(1.901)	(1.486)	(2.040)	(1.479)	(1.620)
Control (Yes = 1) x	-12.742	-7.178	-38.375	-36.511	-51.055	-59.271	-114.395	-114.468	-40.704	-38.599	-50.772	-50.482
communication (1-*B*-*E*)*Z*	(-0.280)	(-0.174)	(-0.832)	(-0.864)	(-0.317)	(-0.401)	(-0.726)	(-0.792)	(-0.906)	(-0.900)	(-1.161)	(-1.238)
Age of entrepreneur	618.438	378.309	237.683	187.387	560.585	360.483	207.410	126.342	885.363	592.277	552.583	454.100
(years)	(0.764)	(0.527)	(0.317)	(0.283)	(0.690)	(0.507)	(0.287)	(0.197)	(1.120)	(0.783)	(0.756)	(0.696)
Age square (years)	-5.271	-2.850	-1.537	-1.073	-4.712	-2.853	-1.293	-0.579	-7.970	-5.022	-4.733	-3.780
	(-0.639)	(-0.387)	(-0.202)	(-0.159)	(-0.565)	(-0.389)	(-0.175)	(-0.088)	(-0.992)	(-0.642)	(-0.639)	(-0.568)
Sex of entrepreneur	2,942**	3,282***	3,132**	3,279***	3,294**	3,848***	3,660***	3,869***	2,922**	3,369***	3,136***	3,414***
(Female=1)	(2.282)	(2.636)	(2.584)	(2.860)	(2.470)	(2.979)	(2.827)	(3.138)	(2.356)	(2.755)	(2.651)	(3.021)
Education of entrepreneur	-244.925	-292.608*	-184.343	-190.324	-284.79*	-304.45**	-240.209*	-238.71*	-203.907	-264.517	-142.825	-154.358
(years of schooling)	(-1.648)	(-1.900)	(-1.378)	(-1.532)	(-1.842)	(-2.030)	(-1.721)	(-1.841)	(-1.226)	(-1.441)	(-0.948)	(-1.071)
Parents' experience in the	586.818	560.460	825.680	756.864	90.200	-329.301	164.567	64.262	244.041	-266.827	488.012	269.915
same business (Yes=1)	(0.752)	(0.744)	(0.967)	(0.980)	(0.116)	(-0.474)	(0.200)	(0.089)	(0.329)	(-0.371)	(0.607)	(0.387)
Any prior training	-1,285.2	-1,365.7	-1,299.1	-1,261.6	-1,043.0	-1,047.8	-1,016.1	-1,072.2	-1,106.6	-1,285.4	-1,104.7	-1,107.3
experience (Yes=1)	(-1.270)	(-1.421)	(-1.246)	(-1.305)	(-1.050)	(-1.144)	(-1.002)	(-1.156)	(-1.085)	(-1.282)	(-1.076)	(-1.153)
Years of business	-68.467	-57.148	-90.443	-83.714	-62.128	-33.361	-71.924	-68.145	-92.284	-62.384	-115.738	-101.282
operation	(-0.773)	(-0.721)	(-1.020)	(-1.051)	(-0.662)	(-0.409)	(-0.787)	(-0.825)	(-1.027)	(-0.784)	(-1.273)	(-1.267)
Former employee in the	671.841	575.468	681.144	545.486	990.730	1,106.303	1,095.581	929.589	918.018	1,150.849	853.103	786.732
textile industry (Yes=1)	(0.720)	(0.670)	(0.716)	(0.641)	(0.990)	(1.166)	(1.017)	(0.962)	(0.931)	(1.185)	(0.858)	(0.843)
Chagga (Yes=1)	-54.815	-84.603	-184.687	-231.055	37.320	226.421	30.445	4.918	-286.363	-387.901	-436.968	-489.829
	(-0.052)	(-0.088)	(-0.170)	(-0.234)	(0.036)	(0.237)	(0.028)	(0.005)	(-0.272)	(-0.399)	(-0.406)	(-0.506)

(continued)

Appendix Table 3-14 *(continued)*

	TALKED				VISITED				KNOWN			
	VALUE ADDED		PROFIT		VALUE ADDED		PROFIT		VALUE ADDED		PROFIT	
	ITT (1)	TOT (2)	ITT (3)	TOT (4)	ITT (5)	TOT (6)	ITT (7)	TOT (8)	ITT (9)	TOT (10)	ITT (11)	TOT (12)
Value added/Profit in the past (Y_P)	1.410*** (11.950)	1.417*** (12.910)	0.795*** (9.129)	0.793*** (9.860)	1.426*** (12.485)	1.412*** (13.251)	0.807*** (9.498)	0.802*** (10.095)	1.426*** (13.049)	1.463*** (14.506)	0.807*** (9.917)	0.812*** (11.160)
Constant	-13,919.0 (-0.743)	-7,950.3 (-0.481)	-5,417.9 (-0.307)	-4,164.4 (-0.270)	-12,183.8 (-0.644)	-7,191.4 (-0.434)	-4,055.5 (-0.238)	-1,912.7 (-0.128)	-19,507.9 (-1.071)	-12,357.1 (-0.710)	-11,992.8 (-0.705)	-9,666.6 (-0.640)
First-stage *F* statistics		204.23		211.86		215.98		201.58		204.29		218.27
R-squared	0.900	0.897	0.864	0.865	0.898	0.897	0.864	0.865	0.901	0.890	0.866	0.866
Number of enterprises	107	107	107	107	107	107	107	107	107	107	107	107

Notes: The dependent variable in columns (1), (2), (5), (6), (9), and (10) is the value added (i.e., sales revenue minus material costs, subcontracting costs, utility costs, and transportation costs). The dependent variable in columns (3), (4), (7), (8), (11), and (12) is the profit (i.e., sales revenue minus material costs, subcontracting costs, utility costs, transportation costs, and labor costs). The value added and profit are in USD and are adjusted by using the World Bank GDP Deflator. The baseline value added and profit (i.e., values in the past) are those of the mean values of 2008 and 2010. For the intention-to-treat (ITT) effects, the reported estimates are the coefficients of the dummy variable taking 1 if the enterprise was assigned Group TT (both training programs) or Group TC/CT (either training programs). For the treatment effects on the treated (TOT), the reported estimates are the coefficients of the dummy variable taking 1 if the enterprise complied with the assigned treatment. To estimate the TOT, we use the instrumental variable approach by instrumenting the actual participation status with the random invitation status. The variables "TALKED", "VISITED", and "KNOWN" capture the communication networks, *Z*, as defined by the number of entrepreneurs with whom s/he talked to about the training program, the number of entrepreneurs with whom (s)he visited their workshop, and the number of entrepreneurs whom the entrepreneur knew in person (or just by name), respectively. The robust *t*-statistics and *z*-statistics for the ITT and TOT are in parentheses, respectively. The asterisks ***, **, and * indicate the statistical significance at 1 percent, 5 percent, and 10 percent, respectively.