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ABSTRACT

How do we inspire innovation and growth in the informal manufacturing industry in the developing world? We investigate relieving both physical capital and human capital constraints among informal woodworkers in Nairobi, Kenya. WorkShop, a tool library project in Nairobi, offered a group of woodworkers a high-intensity treatment consisting of five-weeks of training and access to shared, industrial-grade woodworking tools. Another group was provided with a low-intensity treatment, consisting of a digital training application. We find that the high-intensity treatment creates large and significant increases in innovation outcomes such as the number of new designs, and the likelihood of purchasing new tools. More modest improvements result from the digital app alone. Overall, we find that simultaneous relief of both physical and human capital can spur innovation, however results in financial outcomes, such as firm profits, are inconclusive.

Keywords: innovation, training, entrepreneurship, SMEs

1 Introduction

A common feature of many developing economies is a high number of low-capital, low employee small enterprises in similar industries. This is visible, for example, along the outskirts of Nairobi where entire stretches of roadside are lined by fundi's stalls – many small enterprises making rustic furniture with hand tools, few employees, and limited space and scale. Though it appears that aggregate demand for the goods provided by this industry would allow for scale, consolidation and growth, these small enterprises appear to continue operating at small scale with limited capital and producing goods of moderate quality at high labor cost. This phenomenon is not limited to furniture makers in Kenya. One can see similar dynamics, for instance, in Indian shopping centers, where many tailor stalls co-exist, offering the same services and operating at small scales. In theory, clusters of similar small businesses provide a number of benefits that could help firms scale production. Clusters create pools of specialized workers, allow for proximity to suppliers, and make it possible for small firms to access trade networks (Schmitz and Nadvi, 1999). Clusters also make it easier for firms to differentiate by specializing in specific aspects of production, but this specialization is uncommon is African clusters (McCormick, 1998).

Why do small, clustered firms in developing countries grow slowly or not at all? Most experimental research falls within two areas, access to capital in terms of loans or grants, and improved human capital through training programs. In randomized controlled trials in Sri Lanka and Mexico, capital grants to small enterprises were very effective. The marginal return to capital in these studies for male-owned enterprises ranged from 60% to 250%, with larger effects on more capital-constrained businesses. (McKenzie and Woodruff, 2008 ; de Mel et al., 2008). Even 5 years post-grant, treated Sri Lankan businesses had significantly higher profits relative to control groups and were more likely to have survived (de Mel et al., 2012). Further evidence of the effects of relieving capital constraints are supported by Blattman et al., 2014 and Fafchamps et al., 2014. This need for capital is only partially ameliorated by microfinance. While there are some positive effects on firms who use and have access to microfinance, this impact is often modest. Even where banks are present, the availability of microfinance to very small firms is limited because of collateral requirements and other barriers (Armendariz and Morduch, 2007 ; Banerjee et al., 2014). Lack of necessary skills may also limit small business growth. Experiments testing the effects of teaching business skills to entrepreneurs have generally shown moderate changes in adoption of business practices but uncertain effects on business outcomes (Karlan and Valdivia, 2010 ; Drexler et al., 2011 ; Blattman and Ralston, 2015). The effects of non-financial skills training have been more positive, with experiments showing large increases in participant wages after a variety of

practical job skills training (Attanasio et al., 2011; Card et al., 2011).

While capital grants and training can have positive benefits on small enterprises, they are costly interventions. In this study, we assess more cost effective approaches to ameliorate physical and human capital constraints. Cash grants may cause small enterprises to grow by furnishing investment (e.g., machines) or working capital (e.g., raw materials). Investment in machinery causes a non-linear change in production capacity, however, and the limited scale of small enterprises may not allow them to utilize new machinery at capacity. If so, shared machinery may be more efficiently utilized, and cheaper per user, if offered on a shared basis to many entrepreneurs. Additionally, technology based training might be more cost effective, but the impact is not well-established. To explore the impacts of access to shared physical capital (coupled with training) and low-cost human capital development interventions, we opened and operated a tool library in the informal furniture district in Nairobi, Kenya. The tool library, aptly named "WorkShop", was inspired by the tool libraries that gained popularity in the United States in the 1970s, many of which became important community spaces and hubs for local volunteering and collaboration (Johnson, 2014). The WorkShop project offered capital in the form of access to quality, industrial grade tools, as well as skills in the form of training classes from a five-week curriculum on business practices, technical skills and customer management. The offer was made to ˜100 woodworkers in Nairobi. WorkShop also developed a companion "Fundimentals" application which digitized much of the training curriculum. The digital application was distributed to another group of ˜1,200 informal craftsman in Nairobi to assess the impact of a light-touch skills upgrading application alone.

We find small and marginally significant increases of the application on innovation outcomes, specifically the number of new designs created and the likelihood of having purchased a new tool in the past three months. We also find large and significant changes in these indicators for the high-intensity WorkShop treatment. Taking into account the low take-up of the WorkShop treatment, our treatment-on-treated estimates show increases by more than five times in the number of new designs, and a 72% increase in the likelihood of purchasing new tools. These large effects, however did not translate into financial outcomes for these informal firms – neither profits nor productivity increased.

2   Tool libraries

The tool libraries that gained popularity in the United States in the 1970s inspired this project. These libraries allow library patrons to rent tools and instructional material for free or on a rental basis, and some offer classes. There are also a variety of community

organizations and cooperatives that provide a similar model. Some of these, especially those focused on manufacturing, share some of the functions of WorkShop. One very successful example is the Akamba Handicraft Cooperative in Kenya, which not only rents tools, but also coordinates bulk purchases of raw materials, provides work space, and has expanded into significant international sales (Couture, 2003). This Co-Op was not the result of a development program, but arose organically from within the community. Organizations like Akamba, however, are the exception, not the rule. Of fundis informally interviewed in Nairobi, who specialized in a wide variety of different products, almost none were members of any organization. In the past there have been some experiments with shared facilities in Kenya. For instance, the International Labor Organization created a shared facility targeted at Kenyan leather manufactures. It is believed that this project was not financially sustainable due to insufficient research on willingness to pay and perhaps inappropriate technology[1]. Another relevant project is Gearbox, which recently launched in Nairobi. Gearbox provides tools and space for entrepreneurs to learn technological skills and create new designs. While seemingly similar to WorkShop, Gearbox is targeted at a very different demographic, primarily focused at middle to high income, very technical audiences. According to their founder, Gearbox is designed for inventors creating prototypes, but doesn't provide tools or facilities for actual manufacturing (Hersman 2013). In contrast, WorkShop provides support for normal business production in addition to prototyping, and is aimed at products with a much lower level of technological sophistication, and lower income proprietors.

3 Study design

3.1 Location and sample selection

We chose to locate the WorkShop facility on Ngong Road in Nairobi, one of the largest clusters of informal furniture manufacturers in Nairobi. We made an effort to locate all workshop owners in Ngong and Kawangware (a neighborhood near Ngong Road) as those locations are near enough to the WorkShop facility such that owners could benefit from access to physical capital on WorkShop's premises. Given that carpenters in other areas are unlikely to travel to WorkShop's premises, we focused on informal workers – who are worse off economically than owners – with the aim of providing human capital interventions to randomly selected workers. In total we identified 208 workshop owners and 1,294 informal workers specializing in carpentry, distributed across the following areas.

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[1]Personal interview with stakeholder.

Table 1: Distribution of Locations

Location	Frequency	Percent
Ngong	422	28
Gikomba	336	22
Mathare	273	18
Kawangware	175	12
Outer Ring	140	9
Starehe	42	3
Githurai	37	2
Satellite	37	2
Burma	34	2
Jogoo Road	6	0

3.2 Intervention description

WorkShop Nairobi, located along Nairobi's Ngong Road furniture making district, is a workshop designed with the aim of creating access to wood-working machinery and tools that many craftsmen cannot access due to the limitations of capital and space. It is fitted out with essential wood-working machines including a bench saw, miter (chop) saw, band saw, drill press and planer/thicknesser. It also has a stock of hand-held power tools and other tools such as hammers, chisels, squares and clamps. Depending on the nature of the work being done, access can be given to up to eight craftsmen at a time. WorkShop seeks to address the barriers in the industry to quality furniture manufacturing, with two key contributors being access to machinery and tools and a space to work from. In addition to this customer knowledge, business management and innovation are also lacking.

For the purposes of this study, WorkShop offered a high-intensity intervention (noted as "WorkShop access") which consists of a combined training and access to physical capital on WorkShop's premises. Those receiving WorkShop access received five weeks of in-person training delivered onsite by a vocational training college. Each week consisted of a four-hour session of practical training and a two-hour theoretical session, with week five consisting of eight hours practical training to deliver a finished project. In addition to this, participants get 28 hours of free access to the workshop weekly to use for their furniture making needs. Practical training covered the correct use of machines, joinery practices, finishing techniques and hands-on project work. Theoretical training covered customer service, design & product innovation, marketing, pricing calculations and general business management.

WorkShop also offered a low intensity intervention consisting of digital training. This consists of a "Fundimentals" app designed to impact production techniques and business knowledge as well as design resources to carpenters. The app was designed and developed

in-house to function as a pocket resource to carpenters and was developed so that all content is available offline, as our target audience largely does not have access to internet / data bundles. Within our treatment group, approximately 50% have only primary school education and more than 60% did not finish high school. Therefore, we also embedded a Swahili audio translation of each section into the app. The "Fundimentals" app consists of the following sections:

- DESIGN: Example images of popular furniture design; from mid-century to Scandinavian, antique, rustic and modern. Images can be searched by design type or by furniture type. Fundis also have the ability to upload their own design portfolio images to this section.

- TIMBER SELECTION: Listing of the most common types of timber found in the Kenyan woodworking industry, their characteristics and suitable uses.

- MANUFACTURING: Explanation of common woodworking machines and power tools, their uses and safety instructions. Explanation of different wood finishes and instruction on technique. Tutorials on joinery techniques.

- BUSINESS: A section dealing with knowing your customer, dealing with issues, marketing your products, how to price and innovate new designs.

- PRICING CALCULATOR: A pricing calculator that allows the fundi to list the cost of all raw materials line by line, then add labor costs and generate a sell price. Currently this calculation is performed mentally or on paper by the fundi and is not stored anywhere. The app has capacity to store each furniture quotation.

- FURNITURE TUTORIALS: Practical tutorials on how to make pieces of furniture; including materials needed, man hours and the process to manufacture to completion. +/- 30 tutorials offered in app.

The app was offered to carpenters through a variety of channels. For those with smartphones, the app was installed directly on their phone. In addition, we installed tablets running the app at internet cafe's located across the various neighborhoods in which our sample works. Carpenters without smartphones were provided free access to the app at these internet cafes. In addition, we established a Digital Training Center (DTC) near WorkShop's premises. This served as a brick-and-mortar resource where fundis had access to a tablet version of the app as well as internet access to view furniture making video tutorials, design videos, TED talks and woodworking websites. The DTC also housed a 400 page comprehensive woodworking

manual and hard copies of all furniture tutorials found in the app. Out of the 560 carpenters offered access to the app (whether on their smartphone or in the DTC), 118 report using it.

3.3 Baseline survey

Baseline data collection began on July 13, 2016 and was completed on August 10, 2016. Participants in the baseline survey came from two main areas: those in the Western side of Nairobi (628 craftsmen) and those on the Eastern side (861 craftsmen). The baseline survey consisted of five sections. In the first section, we screened respondents to ensure they met the criteria to participate in the study. Study participants satisfied at least one of the following two criteria: (i) had carpentry as their primary occupation (some of the craftsmen in the area focus on metal working, or upholstery) or (ii) must be the owner of a furniture shop and have fewer than five full-time employees. The second section collected contact information so that we could re-contact the respondent at endline. The third section collected data on the value and types of tools owned (if any), which was our measurement of assets. The fourth section collected data on various attitudes having to do with business practices, such as propensities for innovation or risk-seeking (see Table 2). The fifth section collected data on educational attainment.

Data integrity was maintained through the following checks:

- High Frequency Checks: this entailed continuous monitoring of data coming into the server to check for missing observations and inconsistencies in responses. A standardized project-specific .do file was created and run regularly (at least weekly) on incoming data to check for errors. If any errors were detected or discrepancies arose, corrective action was taken to resolve these issues. Further, these checks informed the content of refresher training for field officers.

- Back Checks: these checks consisted of revisiting respondents that were earlier surveyed and asking them time-invariant questions from the baseline survey. Responses in the back-check survey were matched with baseline responses to monitor the reliability and quality of the data collected

- Random Spot Checks and Field Observations: field officers were supervised by project leads, who regularly assist with field officers to observe the manner in which questions are asked to respondents. Specifically, project leads observed if questions were asked as per the protocol discussed during the training, such as probing respondents with hints. This ensured consistency of questioning across field officers. Continual feedback

was relayed to field officers on areas that needed improvement. Additionally, senior project management made random visits to the field.

Table 2: Variation in Dimensions of Hetereogeneity

Variable	Obs.	Mean	Std. Dev.	Min.	Max
Baseline assets (KSH)	1496	14572	35873	0	716250
Completed high school (indicator)	1502	0.38	0.49	0	1
Technical education (indicator)	1502	0.08	0.28	0	1
College education (indicator)	1502	0.04	0.20	0	1
Attitudinal questions:[a]					
Even when my business is going well, I keep my eyes open in case I find a way to improve it.	1502	4.20	0.65	1	5
When I face a difficult problem, I can usually find some solution.	1502	3.98	0.81	1	5
Sometimes I agree to something but then I realize I can't provide it in full or on time, so the customer just has to wait.	1502	4.00	0.93	1	5
I will not try something new unless I am 100% certain it will succeed.	1502	3.40	1.21	1	5
Sometimes to make money you have to risk losing some.	1502	4.23	0.78	1	5
I don't worry about what my economic situation will be in the future – I just plan week to week based on what comes up.	1502	3.50	1.15	1	5
If I want to do something, I just do it – I don't need to think about it a lot or discuss with others.	1502	2.93	1.28	1	5
I can usually get people to see my point of view, even if they may not understand at first.	1502	3.80	0.90	1	5
I am always talking to people and trying to meet new people – you never know when someone will be able to help you later.	1502	4.28	0.73	1	5
My business provides about the same as others/is doing about the same as others, so there's no need to make it better.	1502	2.24	1.24	1	5

[a] Attitudinal questions are answered on a 5 point Likert scale, with 1 indicating Strongly Disagree and 5 indicating Strongly Agree.

3.4 Randomization and take up

A total of 1,489 study participants were randomized into the following groups:

- WorkShop Access: workshop owners working near WorkShop premises offered Work-Shop's high-intensity intervention (N = 97)

- WorkShop Control: workshop owners working near WorkShop premises *not* offered WorkShop's high-intensity intervention (N = 98)

- App: owners and workers working at a distance from WorkShop premises offered the low-intensity intervention through the app on a phone or at an internet cafe (N = 397)

- App Control: owners and workers working at a distance from WorkShop premises *not* offered the low-intensity intervention through the app on a phone or at an internet cafe (N = 464)

- DTC: owners and workers working near WorkShop premises offered the low-intensity intervention through the app on a phone or at the DTC (N = 216)

- DTC Control: owners and workers working near WorkShop premises *not* offered the low-intensity intervention through the app on a phone or at the DTC (N = 217)

Take up of the high-intensity treatment was low: only 17 of the 97 craftsmen initially offered WorkShop elected to partake. This sample makes up our analysis group in the high-intensity treatment.[2] We did not track usage of the app in the App and DTC groups and thus present only intent-to-treat analysis.

At baseline we see relatively few differences between treatment and control carpenters as shown in Table 3. It appears control carpenters offered WorkShop access had higher tool values at baseline (significant at the 5% level) but we do not observe any other significant differences between treatment and control participants. This indicates that randomization was successful at balancing characteristics between treatment and control groups.

3.5 Endline surveys and outcomes

We conducted two rounds of endline surveys. The first round of endline was conducted in waves from November 3, 2016 to January 20, 2017. Due to space constraints in the

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[2]Because of low-takeup, we had extra capacity in the high-intensity treatment groups and began offering access to additional carpenters (including non-owners). Ultimately our WorkShop access study group consisted of 166 owners and 32 non-owners. However, due to the different characteristics of owners and non-owners we focus analysis on the 97 initial owners, as per our initial design.

Table 3: Balance Check

Treatment Comparison	WS Treat vs. WS Control			App Treat vs. App Control		
Baseline variable	Mean	Mean	p-value	Mean	Mean	p-value
Value of tools (KES)	19863.44	25286.34	0.00***	8115.94	7291.54	0.14
Completed Class 8	0.89	0.87	0.63	0.89	0.87	0.37
No. employees in shop	2.68	2.34	0.32			
Owner hrs spent on shop	57.59	58.98	0.73			
Fundi hrs spent on carpentry				58.14	58.62	0.72
Course value (KES)				143736.01	123957.41	0.40
Observations	104	94	198	560	642	1202

Notes: This table reports the baseline values of variables across treatment group, with p-value from a t-test for the equality of means. WS indicates WorkShop. All those assigned to WorkShop treatment were owners of their own shop, and none of those assigned to App treatment were owners of their own shop. The variables for no. of employees in shop and owner hours spent on shop are applicable only to owners, while the variables for Fundi hours spent on carpentry, and course value are applicable only to Fundis, thus explaining the missing values of these variables. Completed Class 8 is an indicator variable. Course value is the reported value of a 60 hour carpentry and business skills training course. No. employees in shop is topcoded at 90th percentile and bottomcoded at 10th percentile. * $p < .10$, ** $p < .05$, *** $p < .01$.

WorkShop facilities, we offered WorkShop access to carpenters in two waves. The first wave had access to WorkShop for six weeks beginning in September. The second had access to WorkShop for six weeks beginning in November. We surveyed most respondents 1-2 weeks after they completed their WorkShop training course. During this endline, we also surveyed the WorkShop control respondents for that wave. The total number of craftsmen surveyed in this round of endline was 262.

The second endline took place from April 3, 2017 to June 29, 2017. We began surveying those on the East side of Nairobi who were in the App treatment arm. In May, we began surveying those on the West side, including those who were in the high-intensity WorkShop access treatment arm. In this round of endline, we set out to survey all study participants (N = 1489), and successfully completed 1400 surveys, a 94% followup rate. As Table 4 demonstrates, attrition in the survey was not correlated with treatment status. This paper presents the results of the second endline only.

The endline survey consisted of 12 sections. The first section collected data on hours worked and number of employees. The second collected data on the types of furniture produced. If the respondent was a shop owner, for each type of furniture, we asked about the cost of raw materials, hours of labor required, number sold, piece-rate compensation

Table 4: Attrition by Treatment Status

Treatment Comparison	WS Treat vs. WS Control			App Treat vs. App Control		
	Mean	Mean	p-value	Mean	Mean	p-value
Attrited	0.01	0.04	0.15	0.07	0.06	0.22
Observations	105	98	203	605	681	1286

Notes: This table reports attrition across treatment groups, with p-value from a t-test for the equality of means. Attrited is an indicator variable that takes a value of 1 if the respondent did not complete a second-round endline survey, 0 if otherwise.

for a craftsmen to produce this type of furniture, and the average selling price of this type of furniture. If the respondent was not a shop owner, we asked how many hours it takes the respondent to produce each type of furniture and how much they get paid to produce each type of furniture. These data allowed us to built a productivity index for shop owners, which consisted of the relative productivity per type of furniture, defined as [pieces / hour] / [average sample pieces / hour], weighted by share of specific furniture type. The third section collected data on all other revenue sources and other costs in order to calculate profits. The fourth section collected data on value of tools owned, which allowed us to construct a measure of investment in capital goods. The fifth section asked about new types of furniture designs created. The sixth section asked about marketing practices, the seventh about job history, the eighth about types of tools rented. The ninth section asked about usage of the app. The tenth section asked questions to determine the structure of knowledge transfers between those given WorkShop access and those not. The eleventh section asked questions about attitudes related to the furniture production business. The final section asked knowledge based questions to determine the level of knowledge about business practices and furniture production practices.

Our endline survey was designed to measure the following outcomes. Bolded outcomes are primary outcomes, non-bold outcomes are secondary outcomes.

- Production:

    - Volumes by type of product (#)

    - **Productivity (index**: relative productivity per type of furniture, defined as [pieces / hour] / [average sample pieces / hour], weighted by share of specific furniture type)

    - **New designs created (#)**

- Enterprise outcomes:

  - Enterprise revenues (KES)

  - Enterprise marginal expenses (KES)

  - **Enterprise profits (KES)**

  - **Investment in capital goods for existing or new workshop (KES)**

  - Employees (#)

- Labor:

  - **Hours worked (#)**

  - **Wages (if applicable) (KES / hour)**

  - Job change in recent past (binary)

- Knowledge and practices:

  - **Adoption of practices included in training (sum of binary outcomes)**

4   Effect of high-intensity "WorkShop" treatment

To assess the impact of the high-intensity treatment, which combines access to physical capital in the form of sophisticated tools, intensive training and marketing support through market days, we estimate:

$$y_i = \alpha + \beta_1 WorkShop_i + \varepsilon_i \tag{1}$$

where $WorkShop$ is an indicator of whether the individual was offered the chance to participate in the WorkShop program and y is one of the outcomes mentioned above. In this specification we restrict to the sample of 166 workshop owners for whom we have endline data for. β_1 represents the intent-to-treat (ITT) effect of the WorkShop program, or the average effect of the offer to participate. Given that there was low take up (only 17 of 97 owners offered the WorkShop program elected to participate) we also estimate a treatment-on-the-treated specification:

$$y_i = \alpha + \beta_2 (Participated_i = WorkShop_i) + \varepsilon_i \tag{2}$$

This is a two stage least squares specification where $Participated$ is an indicator variable for whether the individual actually participated in the WorkShop program, which is

instrumented by the indicator for an offer to participate. β_2 represents the treatment-on-the-treated (TOT) effect of the WorkShop program, or the average effect on those that actually participated in the program.

Table 5: WS - Owners - ITT - Main Outcomes

	(1) Owner productivity index (pieces/hour)	(2) No. of new designs	(3) Profit (KES/month)	(4) Bought new tools	(5) Owner hrs spent on biz.	(6) Acquired knowledge - score
ITT WorkShop Treatment Effect	37.17	1.14***	−2093	0.16**	−2.20	1.10***
	(26.95)	(0.26)	(8234)	(0.07)	(2.61)	(0.23)
Control Mean	59.77***	0.70***	14904**	0.22***	55.60***	4.56***
	(19.05)	(0.13)	(5928)	(0.05)	(1.43)	(0.18)
Observations	163	166	165	166	164	166

Heteroskedasticity-robust standard errors in parentheses. * $p < .10$, ** $p < .05$, *** $p < .01$.

Notes: This table reports intent-to-treat analysis for primary outcomes on WorkShop treatment status for those who owned a shop at baseline. Outcome variables described here. (1) The owner productivity index is defined at the enterprise-level as the sum of a productivity index for each type of furniture produced by the enterprise. For each type of furniture, this furniture-level productivity index is calculated as the number of units of that piece of furniture produced per hour in that enterprise, divided by the mean number number of units of that piece of furniture produced per hour in our sample. In calculating the sum of these productivity indexes for each furniture type, the productivity index for each furniture type is weighted by the proportion it represents of the enterprise's total furniture production. (2) No. of new designs comprises new designs for making a piece of furniture used during the last three months. (3) Monthly profit is calculated as total monthly revenues (from sale of furniture and other sources of furniture business) minus total monthly costs (including cost of raw materials and other recurring furniture business expenses). (4) Bought new tools is an indicator for having bought new tools in the past three months. (5) Owner hours spent on business is calculated as hours spent by a shop-owner on their furniture business in the last week. (6) Acquired knowledge score is calculated by summing the correct responses to questions about tool use and business practices.

Table 6: WS - Owners - TOT - Main Outcomes

	(1) Owner productivity index (pieces/hour)	(2) No. of new designs	(3) Profit (KES/month)	(4) Bought new tools	(5) Owner hrs spent on biz.	(6) Acquired knowledge - score
TOT WorkShop Treatment Effect	181.46	5.15***	−9476	0.72**	−10.24	4.98***
	(136.67)	(1.63)	(36846)	(0.36)	(12.29)	(1.30)
Control Mean	59.77***	0.70***	14904**	0.23***	55.60***	4.56***
	(18.93)	(0.12)	(5892)	(0.05)	(1.42)	(0.18)
Observations	163	166	165	166	164	166

Heteroskedasticity-robust standard errors in parentheses. * $p < .10$, ** $p < .05$, *** $p < .01$.

Notes: This table reports treatment-on-treated analysis for primary outcomes on WorkShop treatment status for those who owned a shop at baseline. Outcome variables described here. (1) The owner productivity index is defined at the enterprise-level as the sum of a productivity index for each type of furniture produced by the enterprise. For each type of furniture, this furniture-level productivity index is calculated as the number of units of that piece of furniture produced per hour in that enterprise, divided by the mean number number of units of that piece of furniture produced per hour in our sample. In calculating the sum of these productivity indexes for each furniture type, the productivity index for each furniture type is weighted by the proportion it represents of the enterprise's total furniture production. (2) No. of new designs comprises new designs for making a piece of furniture used during the last three months. (3) Monthly profit is calculated as total monthly revenues (from sale of furniture and other sources of furniture business) minus total monthly costs (including cost of raw materials and other recurring furniture business expenses). (4) Bought new tools is an indicator for having bought new tools in the past three months. (5) Owner hours spent on business is calculated as hours spent by a shop-owner on their furniture business in the last week. (6) Acquired knowledge score is calculated by summing the correct responses to questions about tool use and business practices.

Table 5 presents the results from equation (1). We find large and significant results of WorkShop access on many of the outcome indicators. Specifically, being offered access to the WorkShop more than doubled the number of new designs that a carpenter creates, from an average of 0.7 in the control group to 1.84 in the treatment group ($p<0.01$). We also see that carpenters in the treatment group were 16 percentage points more likely to purchase a new tool compared to those in the control. 22% of control group carpenters purchased a new tool in the past three months, whereas that number increases to 38% of those in the treatment ($p<0.05$). Finally, we see a roughly 25% increase in the acquired knowledge score in the treatment group, where carpenters were able to answer about one more knowledge question correct relative to the control mean of 4.56 ($p<0.01$). Similar to the literature on other types of training programs, however, we do not see significant effects on profits, where treatment group carpenters report 2,093 KES less profit than those in the control. However, this result is not significantly different from zero. We do not observe any impacts on productivity or labor supply. Given the low take-up of the program, we turn to the TOT estimates to discuss the magnitude of these effects.

As seen in Table 6 we see substantial changes in product innovation, with treated workshops producing an average of 5 new designs ($p<0.01$). Of these new designs, nearly a third are for beds (27%), followed by sofa sets (16%), coffee tables (13%), cabinets (11%), and dining table and chair sets (9%). We also observe that treated owners are 72 percentage points more likely to have purchased new tools, an increase in over 300%. Table 7 shows that the value of these new tools purchased is KES 2,408 (~24 USD), which is well above the control mean of KES 651. We also see that owners who participated in the WorkShop program score significantly higher on questions pertaining to production practices and business practices (see Table 8). On a 13 question test where each question is worth one point, treated owners score an average of 4.9 points higher than control owners, whose average score is 4.5 out of 13 ($p<0.01$). Acquired knowledge seems to have increased across the board; knowledge on tool use increased by 3 points, and knowledge of business practices increased by 1.8 points, both 100% increases over their control group counterparts. Although we see no overall effects on productivity or profits, there is some indication that WorkShop participants expanded employment to other carpenters. Table 9 column 7 shows that treated WorkShop participants contracted nearly four times the amount of hours from outside labor, 170 hours relative to the control group of 60 hours ($p<0.10$).

Table 7: WS - Owner - TOT - Tool Investment

	(1) Value of all tools (KES)	(2) Value of non-new tools (KES)	(3) Bought new tools	(4) Value of new tools (KES)
TOT WorkShop Treatment Effect	–21201	5094	0.72**	2408**
	(15769)	(57466)	(0.36)	(1143)
Control mean	46169***	66068***	0.23***	651***
	(2212)	(6581)	(0.05)	(147)
Observations	166	166	166	166

Heteroskedasticity-robust standard errors in parentheses. * $p < .10$, ** $p < .05$, *** $p < .01$.

Notes: Outcome variables are described here. Value of all tools includes the estimated value of all power and hand tools owned. Value of non-new tools is the value of tools that were not bought in the last three months. Bought new tools is an indicator for new tools or machinery being purchased within the last three months. Value of new tools is the cost of all such new tools bought.

Table 8: WS - Owner - TOT - Adoption of Training Practices

	Acquired knowledge - score		
Knowledge type	(1) Overall	(2) Tool use	(3) Business practices
TOT WorkShop Treatment Effect	4.98***	3.10***	1.88**
	(1.30)	(0.83)	(0.84)
Control mean	4.56***	2.36***	2.20***
	(0.18)	(0.09)	(0.14)
Observations	166	166	166

Heteroskedasticity-robust standard errors in parentheses. * $p < .10$, ** $p < .05$, *** $p < .01$.

Notes: Outcome variables are described here. Respondents were asked a series of questions pertaining to business skills practices and tool use techniques that were taught in training. Each respondent received a point for a correct response to each question in each category. The overall category represents the overall score on the knowledge section of the survey.

Table 9: WS - Owner - TOT - Enterprise

	(1) Profit (KES/month)	(2) Revenue total (KES/month)	(3) Revenue from furniture (KES/month)	(4) Costs total (KES/month)	(5) Cost of furniture (KES/month)	(6) Employees	(7) Man-hours contracted
TOT WorkShop Treatment Effect	−9476	−61905	−62133	−27192	−29573	2.45	170*
	(36845)	(97720)	(97799)	(42216)	(31694)	(1.56)	(89)
Control mean	14903**	200728***	200348***	138519***	90340***	1.75***	60***
	(5892)	(15874)	(15895)	(6339)	(4957)	(0.18)	(8.83)
Observations	165	165	165	166	166	166	164

Heteroskedasticity-robust standard errors in parentheses. * $p < .10$, ** $p < .05$, *** $p < .01$.

Notes: Outcome variables are described here. Monthly profit is calculated as total monthly revenues (from sale of furniture and other sources of furniture business) minus total monthly costs (including cost of raw materials and other recurring furniture business expenses). Employees is the number of fundis employed by a shop owner on a regular basis. Man-hours contracted is the number of man-hours of labour contracted by a shop-owner in the last week.

5 Effect of low-intensity "App" treatment

Turning to the impact of the low-intensity intervention, we estimate

$$y_i = \alpha + \beta_3 App_i + \varepsilon_i \tag{3}$$

where App is an indicator that the individual had access to the WorkShop "Fundimentals" training app, but not to in-person training or WorkShop facilities. The sample for this specification includes individuals who accessed the app on their own smartphones, at internet cafes or at the WorkShop DTC. The sample is primarily comprised of non-workshop owning fundis (829) as well as 228 owners. Table 10 presents the results. The results here are mixed. The point estimates on productivity is negative, but not significantly different from zero. The number of new designs increases in a small and marginally significant way, increasing by 15% from 1.16 to 1.34 designs ($p<0.10$). The point estimates suggest that app access increases monthly income by 10% (significant at the 10% level) but, oddly, reduces knowledge - those with app access get an average 0.4 additional business and production technique knowledge questions incorrect (representing 10% of the control mean and significant at the 1% level). Five of the 13 knowledge questions are primarily responsible for the knowledge gap. These five questions test knowledge about marketing and sales strategies, pricing process, joinery types, and wood types. We are therefore unable to draw any strong conclusions about the benefits, or not, of the app to carpenters.

Additional specifications and detailed results are shown in the appendix.

Table 10: App - Pooled - ITT - Main Outcomes

	(1) Owner productivity index (pieces/hour)	(2) Fundi productivity index (KES/hour)	(3) No. of new designs	(4) Income (KES/month)	(5) Bought new tools	(6) Acquired knowledge - score
App Treatment Effect	−47.68	−18381	0.18*	2232*	0.03	−0.44***
	(37.33)	(18393)	(0.11)	(1276)	(0.03)	(0.10)
Owner			0.03	2869586	0.07	0.01
			(0.16)	(2861325)	(0.05)	(0.15)
AppXOwner			0.03	−2882714	0.03	0.20
			(0.24)	(2861758)	(0.07)	(0.22)
Control mean	121.57***	18561	1.16***	21150***	0.24***	4.87***
	(33.26)	(18393)	(0.07)	(553)	(0.02)	(0.07)
Observations	228	829	1202	1201	1202	1202

Heteroskedasticity-robust standard errors in parentheses. * $p < .10$, ** $p < .05$, *** $p < .01$.

Notes: This table contains a pooled analysis of both owners and fundis who were assigned the app treatment. Outcome variables described here. (1) The owner productivity index is defined at the enterprise-level as the sum of a productivity index for each type of furniture produced by the enterprise. For each type of furniture, this furniture-level productivity index is calculated as the number of units of that piece of furniture produced per hour in that enterprise, divided by the mean number number of units of that piece of furniture produced per hour in our sample. In calculating the sum of these productivity indexes for each furniture type, the productivity index for each furniture type is weighted by the proportion it represents of the enterprise's total furniture production. (2) Fundi productivity index is defined as the income earned per hour worked. (3) No. of new designs comprises new designs for making a piece of furniture used during the last three months. (4) Monthly income is calculated as monthly profit for owners and as four times weekly income for fundis. (5) Bought new tools is an indicator for having bought new tools in the past three months. (6) Acquired knowledge score is calculated by summing the correct responses to questions about tool use and business practices.

6   Conclusion

How do we encourage micro and small enterprises in developing countries to innovate and grow? In this study, we investigate two often cited constraints to growth, financial or physical capital and human capital. We created a high-intensity training program and access to industrial tools in the form of the WorkShop project and offered it to informal carpenters in Nairobi, Kenya. We also created a low-intensity intervention focusing only on human capital in the form of a "Fundimentals" app, which could be accessed via smartphone or internet cafes. In total, we invited 1,502 carpenters to have access to the WorkShop, the App, or neither in a randomized controlled trial to assess the effects of these interventions on innovation, productivity and business growth. We find large and significant effects of the high-intensity treatment on innovation. Despite low take-up, we find intent-to-treat effects of over 100% on the number of new designs created, and a 72% increase in the likelihood of purchasing new tools. These results are even more dramatic in our treatment-on-the-treated estimates, where WorkShop treated individuals report 5 more new designs, from a base of 0.7, and 95% report purchasing a new tool versus the control of 23%. Desipte a marked improvement in innovations, the treatment did not result in significant changes to productivity, revenues or profits. This could be the effect of the time lag necessary for innovations to result in business outcomes (endline surveys were less than a year after treatment), or that attitudes and practices are difficult to translate into profits. Low-intensity effects were mixed. We see marginally significant intent-to-treat effects on new designs and income, increases of 15% and 10%, respectively. However, we see a small decrease in knowledge, 10%. Overall, we find that a practical, hands-on training program is able to significantly, and dramatically increase makers of innovation among informal crasftsman woodworkers. More research should be done to understand how to best translate such innovation into ultimate firm outcomes.

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8   Appendix

Table 11: WS - Owner - ITT - Productivity

	(1) Total number of pieces	(2) Owner productivity index (pieces/hour)	(3) No. of new designs
ITT WorkShop Treatment Effect	−4.20*	37.17	1.14***
	(2.34)	(26.95)	(0.26)
Control mean	20.55***	59.77***	0.70***
	(1.81)	(19.05)	(0.13)
Observations	166	163	166

Heteroskedasticity-robust standard errors in parentheses. * $p < .10$, ** $p < .05$, *** $p < .01$.

Notes: Outcome variables are described here. (1) Total number of pieces is the total number of furniture pieces produced by the firm in the past 30 days. (2) The owner productivity index is defined at the enterprise-level as the sum of a productivity index for each type of furniture produced by the enterprise. For each type of furniture, this furniture-level productivity index is calculated as the number of units of that piece of furniture produced per hour in that enterprise, divided by the mean number number of units of that piece of furniture produced per hour in our sample. In calculating the sum of these productivity indexes for each furniture type, the productivity index for each furniture type is weighted by the proportion it represents of the enterprise's total furniture production. (3) No. of new designs is the number of new designs used for making a piece of furniture during the last three months.

Table 12: WS - Owner - ITT - Enterprise

	(1) Profit (KES/month)	(2) Revenue total (KES/month)	(3) Revenue from furniture (KES/month)	(4) Costs total (KES/month)	(5) Cost of furniture (KES/month)	(6) Employees	(7) Man-hours contracted
ITT WorkShop Treatment Effect	−2093.46	−13676.60	−13727.09	−6007.55	−6533.49	0.54	36.42*
	(8234.04)	(21767.16)	(21781.16)	(9311.08)	(6977.94)	(0.34)	(18.78)
Control mean	14903.71**	200728.10***	200348.35***	138518.71***	90340.00***	1.75***	59.59***
	(5927.97)	(15971.24)	(15992.01)	(6377.80)	(4986.69)	(0.18)	(8.88)
Observations	165	165	165	166	166	166	164

Heteroskedasticity-robust standard errors in parentheses. * $p < .10$, ** $p < .05$, *** $p < .01$.

Notes: Outcome variables are described here. Monthly profit is calculated as total monthly revenues (from sale of furniture and other sources of furniture business) minus total monthly costs (including cost of raw materials and other recurring furniture business expenses). Employees is the number of fundis employed by a shop owner on a regular basis. Man-hours contracted is the number of man-hours of labour contracted by a shop-owner in the last week.

Table 13: WS - Owner - ITT - Tool Investment

	(1) Value of all tools (KES)	(2) Value of non-new tools (KES)	(3) Bought new tools	(4) Value of new tools (KES)
ITT WorkShop Treatment Effect	−4683.87	1125.39	0.16**	531.89**
	(3299.89)	(12770.70)	(0.07)	(225.06)
Control mean	46168.75***	66067.88***	0.22***	651.25***
	(2225.73)	(6620.93)	(0.05)	(148.25)
Observations	166	166	166	166

Heteroskedasticity-robust standard errors in parentheses. * $p < .10$, ** $p < .05$, *** $p < .01$.

Notes: Outcome variables are described here. Value of all tools includes the estimated value of all power and hand tools owned. Value of non-new tools is the value of tools that were not bought in the last three months. Bought new tools is an indicator for new tools or machinery being purchased within the last three months. Value of new tools is the cost of all such new tools bought.

Table 14: WS - Owner - ITT - Labor

	(1) Owner hrs spent on biz.
ITT WorkShop Treatment Effect	–2.20
	(2.61)
Control mean	55.60***
	(1.43)
Observations	164

Heteroskedasticity-robust standard errors in parentheses.
* $p < .10$, ** $p < .05$, *** $p < .01$.

Notes: Outcome variables are described here. (1) Owner hours spent on business is calculated as hours spent by a shop-owner on their furniture business in the last week. (2) Job change is an indicator for whether the respondent changed their job in the past three months.

Table 15: WS - Owner - ITT - Adoption of Training Practices

	Acquired knowledge - score		
Knowledge type	(1) Overall	(2) Tool use	(3) Business practices
ITT WorkShop Treatment Effect	1.10***	0.68***	0.42**
	(0.23)	(0.16)	(0.17)
Control mean	4.56***	2.36***	2.20***
	(0.18)	(0.09)	(0.14)
Observations	166	166	166

Heteroskedasticity-robust standard errors in parentheses.   * $p < .10$,   ** $p < .05$, *** $p < .01$.

Notes: Outcome variables are described here. Respondents were asked a series of questions pertaining to business skills practices and tool use techniques that were taught in training. Each respondent received a point for a correct response to each question in each category. The overall category represents the overall score on the knowledge section of the survey.

Table 16: App - Pooled - ITT - Productivity

	(1) Total number of pieces	(2) Owner productivity index (pieces/hour)	(3) No. of new designs	(4) Fundi productivity index (KES/hour)
App Treatment Effect	−2.31	−47.68	0.18*	−18381.09
	(6.04)	(37.33)	(0.11)	(18393.38)
Owner			0.03	
			(0.16)	
AppXOwner			0.03	
			(0.24)	
Control mean	25.11***	121.57***	1.16***	18560.82
	(5.44)	(33.26)	(0.07)	(18393.36)
Observations	232	228	1202	829

Heteroskedasticity-robust standard errors in parentheses. * $p < .10$, ** $p < .05$, *** $p < .01$.

Notes: Outcome variables are described here. (1) Total number of pieces is the total number of furniture pieces produced by the firm in the past 30 days. (2) The owner productivity index is defined at the enterprise-level as the sum of a productivity index for each type of furniture produced by the enterprise. For each type of furniture, this furniture-level productivity index is calculated as the number of units of that piece of furniture produced per hour in that enterprise, divided by the mean number number of units of that piece of furniture produced per hour in our sample. In calculating the sum of these productivity indexes for each furniture type, the productivity index for each furniture type is weighted by the proportion it represents of the enterprise's total furniture production. (3) No. of new designs is the number of new designs used for making a piece of furniture during the last three months. (4) Fundi productivity index is the total their average wage per hour, calculated as their total compensation for all furniture produced in the past month, divided by the number of hours they spent producing that furniture.

Table 17: App - Pooled - ITT - Enterprise

	(1) Profit (KES/month)	(2) Revenue total (KES/month)	(3) Revenue from furniture (KES/month)	(4) Costs total (KES/month)	(5) Cost of furniture (KES/month)	(6) Employees	(7) Man-hours contracted	(8) Fundi income (KES/week)
App Treatment Effect	−6599.36	−11218.55	−11654.63	647.47**	−0.00***	0.00***	33.37	557.90*
	(6590.49)	(18317.04)	(18280.86)	(281.58)	(0.00)	(0.00)	(30.34)	(318.96)
Owner				132994.99***	88501.72***	0.42***		−5287.60***
				(5665.30)	(4173.01)	(0.10)		(138.24)
AppXOwner				−6037.94	−6248.54	0.10		−557.90*
				(8113.41)	(5984.57)	(0.16)		(318.96)
Control mean	18475.54***	184450.00***	183809.02***	1197.04***	0.00***	−0.00***	29.25***	5287.60***
	(4222.10)	(12061.50)	(12016.95)	(128.06)	(0.00)	(0.00)	(9.63)	(138.24)
Observations	231	231	231	1202	1202	1202	78	1202

Heteroskedasticity-robust standard errors in parentheses. * $p < .10$, ** $p < .05$, *** $p < .01$.

Notes: Outcome variables are described here. Monthly profit is calculated for owners only as total monthly revenues (from sale of furniture and other sources of furniture business) minus total monthly costs (including cost of raw materials and other recurring furniture business expenses). Employees is the number of fundis employed by a shop owner on a regular basis. Man-hours contracted is the number of man-hours of labour contracted by a shop-owner in the last week. Fundi income is the total amount of income earned by a Fundi in the past week.

Table 18: App - Pooled - ITT - Tool Investment

	(1) Value of all tools (KES)	(2) Value of non-new tools (KES)	(3) Bought new tools	(4) Value of new tools (KES)
App Treatment Effect	1085.81	328.78	0.03	119.52*
	(800.30)	(1092.37)	(0.03)	(63.69)
Owner	28476.81***	40707.09***	0.07	485.52***
	(1952.06)	(5037.61)	(0.05)	(132.78)
AppXOwner	−2338.00	−3219.16	0.03	−119.75
	(2960.53)	(7049.75)	(0.07)	(192.79)
Control mean	7474.01***	7716.02***	0.24***	355.71***
	(535.15)	(839.50)	(0.02)	(40.28)
Observations	1202	1202	1202	1202

Heteroskedasticity-robust standard errors in parentheses. * $p < .10$, ** $p < .05$, *** $p < .01$.

Notes: Outcome variables are described here. Value of all tools includes the estimated value of all power and hand tools owned. Value of non-new tools is the value of tools that were not bought in the last three months. Bought new tools is an indicator for new tools or machinery being purchased within the last three months. Value of new tools is the cost of all such new tools bought.

Table 19: App - Pooled - ITT - Labor

	(1) Owner hrs spent on biz.	(2) Fundi hrs spent on carpentry	(3) Job change in past 3 months	(4) Expect to own shop
App Treatment Effect	18.60	0.68	0.03**	0.13*
	(13.31)	(2.38)	(0.01)	(0.07)
Owner			−0.01	
			(0.01)	
AppXOwner			−0.03	
			(0.02)	
Control mean	51.97***	49.17***	0.02***	2.98***
	(2.53)	(1.58)	(0.01)	(0.04)
Observations	78	336	1202	970

Heteroskedasticity-robust standard errors in parentheses. * $p < .10$, ** $p < .05$, *** $p < .01$.

Notes: Outcome variables are described here. (1) Owner hours spent on business is calculated as hours spent by a shop-owner on their furniture business in the last week. (2) Fundi hours spent on carpentry is the number of hours that a Fundi spent on carpentry in the past week. (3) Job change is an indicator for whether the respondent changed their job in the past three months. (4) Expect to own shop is the response on a 5 point Likert scale (where 5 is Strongly Agree) to the statement that the Fundi expects to own a shop in the next 6 months.

Table 20: App - Pooled - ITT - Adoption of Training Practices

Knowledge type	(1) Overall	(2) Tool use	(3) Business practices
	Acquired knowledge - score		
App Treatment Effect	–0.44***	–0.06	–0.38***
	(0.10)	(0.06)	(0.07)
Owner	0.01	0.04	–0.03
	(0.15)	(0.10)	(0.10)
AppXOwner	0.20	–0.00	0.20
	(0.22)	(0.15)	(0.15)
Control mean	4.87***	2.58***	2.29***
	(0.07)	(0.04)	(0.05)
Observations	1202	1202	1202

Heteroskedasticity-robust standard errors in parentheses. * $p < .10$, ** $p < .05$, *** $p < .01$.

Notes: Outcome variables are described here. Respondents were asked a series of questions pertaining to business skills practices and tool use techniques that were taught in training. Each respondent received a point for a correct response to each question in each category. The overall category represents the overall score on the knowledge section of the survey.

Table 21: WS - Owner - TOT - Productivity

	(1) Total number of pieces	(2) Owner productivity index (pieces/hour)	(3) No. of new designs
TOT WorkShop Treatment Effect	−19.02*	181.46	5.15***
	(10.79)	(136.67)	(1.63)
Control mean	20.55***	59.77***	0.70***
	(1.80)	(18.93)	(0.12)
Observations	166	163	166

Heteroskedasticity-robust standard errors in parentheses. * $p < .10$, ** $p < .05$, *** $p < .01$.

Notes: Outcome variables are described here. (1) Total number of pieces is the total number of furniture pieces produced by the firm in the past 30 days. (2) The owner productivity index is defined at the enterprise-level as the sum of a productivity index for each type of furniture produced by the enterprise. For each type of furniture, this furniture-level productivity index is calculated as the number of units of that piece of furniture produced per hour in that enterprise, divided by the mean number number of units of that piece of furniture produced per hour in our sample. In calculating the sum of these productivity indexes for each furniture type, the productivity index for each furniture type is weighted by the proportion it represents of the enterprise's total furniture production. (3) No. of new designs is the number of new designs used for making a piece of furniture during the last three months.

Table 22: WS - Owner - TOT - Labor

	(1) Owner hrs spent on biz.
TOT WorkShop Treatment Effect	−10.24
	(12.29)
Control mean	55.60***
	(1.42)
Observations	164

Heteroskedasticity-robust standard errors in parentheses.
* $p < .10$, ** $p < .05$, *** $p < .01$.

Notes: Outcome variables are described here. (1) Owner hours spent on business is calculated as hours spent by a shop-owner on their furniture business in the last week. (2) Job change is an indicator for whether the respondent changed their job in the past three months.

Table 23: WS - Fundi - ITT - Productivity

	(1) Fundi productivity index (KES/hour)	(2) No. of new designs
ITT WorkShop Treatment Effect	−41.07*	1.65***
	(23.80)	(0.51)
Control mean	171.37***	0.57**
	(21.57)	(0.23)
Observations	28	32

Heteroskedasticity-robust standard errors in parentheses. * $p < .10$, ** $p < .05$, *** $p < .01$.

Notes: Outcome variables are described here.(1) Fundi productivity index is the total their average wage per hour, calculated as their total compensation for all furniture produced in the past month, divided by the number of hours they spent producing that furniture. (2) No. of new designs is the number of new designs used for making a piece of furniture during the last three months.

Table 24: WS - Fundi - ITT - Enterprise

	(1) Fundi income (KES/week)	(2) Costs total (KES/month)
ITT WorkShop Treatment Effect	−3285.71**	952.78
	(1211.87)	(872.33)
Control mean	7635.71***	675.00
	(1047.37)	(543.23)
Observations	32	32

Heteroskedasticity-robust standard errors in parentheses. * $p < .10$, ** $p < .05$, *** $p < .01$.

Notes: Outcome variables are described here. (1) Fundi income is the total amount of income earned by a Fundi in the past week. (2) Costs total are the total costs incurred by the Fundi over the past month.

Table 25: WS - Fundi - ITT - Tool Investment

	(1) Value of all tools (KES)	(2) Value of non-new tools (KES)	(3) Bought new tools	(4) Value of new tools (KES)
ITT WorkShop Treatment Effect	−10704.41*	−12499.54*	−0.08	94.77
	(5778.71)	(6763.68)	(0.17)	(364.39)
Control mean	19629.86***	20663.43***	0.36**	366.79
	(5591.72)	(6605.67)	(0.13)	(249.68)
Observations	32	32	32	32

Heteroskedasticity-robust standard errors in parentheses. * $p < .10$, ** $p < .05$, *** $p < .01$.

Notes: Outcome variables are described here. Value of all tools includes the estimated value of all power and hand tools owned. Value of non-new tools is the value of tools that were not bought in the last three months. Bought new tools is an indicator for new tools or machinery being purchased within the last three months. Value of new tools is the cost of all such new tools bought.

Table 26: WS - Fundi - ITT - Labor

	(1) Fundi hrs spent on carpentry	(2) Hrs worked for piece-rate in past week	(3) Piece-rate earnings in past week	(4) Job change in past 3 months	(5) Expect to own shop
ITT WorkShop Treatment Effect	−6.48	2.27	−2171.43	0.11	0.83**
	(8.28)	(9.59)	(1452.66)	(0.08)	(0.38)
Control mean	53.43***	37.29***	6521.43***	0.00	2.79***
	(5.65)	(7.41)	(1318.55)	(.)	(0.26)
Observations	32	32	32	32	32

Heteroskedasticity-robust standard errors in parentheses. * $p < .10$, ** $p < .05$, *** $p < .01$.

Notes: Outcome variables are described here. (1) Fundi hours spent on carpentry is the number of hours that the Fundi spent doing carpentry (i.e., making furniture) in the past week. (2) Hours worked for piece rate is the number of hours the Fundi worked for a piece-rate in the past week. (3) Piece-rate earnings are the earnings from piece-rate work in the past week. (4) Job change is an indicator for whether the respondent changed their job in the past three months. (5) Expect to own workshop in 6 months is the expected likelihood (on a 1 to 5 likert scale) by the fundi that they will own their own shop within the next six months.

Table 27: WS - Fundi - ITT - Adoption of Training Practices

| | Acquired knowledge - score | | |
Knowledge type	(1) Overall	(2) Tool use	(3) Business practices
ITT WorkShop Treatment Effect	–0.16	0.64*	–0.80**
	(0.46)	(0.32)	(0.34)
Control mean	5.21***	2.36***	2.86***
	(0.19)	(0.13)	(0.25)
Observations	32	32	32

Heteroskedasticity-robust standard errors in parentheses. * $p < .10$, ** $p < .05$, *** $p < .01$.

Notes: Outcome variables are described here. Respondents were asked a series of questions pertaining to business skills practices and tool use techniques that were taught in training. Each respondent received a point for a correct response to each question in each category. The overall category represents the overall score on the knowledge section of the survey.

Table 28: Pooled - ITT - Attitudes

	Workshop Treatment		App Treatment	
	(1) Building trust with the customer is important.	(2) I take pride in my profession.	(3) Building trust with the customer is important.	(4) I take pride in my profession.
ITT WorkShop Treatment Effect	0.29*** (0.07)	0.26*** (0.09)		
App Treatment Effect			−0.02 (0.03)	−0.12*** (0.04)
Control mean	4.53*** (0.06)	4.59*** (0.07)	4.61*** (0.02)	4.65*** (0.02)
Observations	198	198	1202	1202

Heteroskedasticity-robust standard errors in parentheses. * $p < .10$, ** $p < .05$, *** $p < .01$.

Notes: This table reports responses on a 1-5 Likert scale (from strongly disagree to strongly agree) to the statements described above.