Selection and Sorting when Supervisors have Discretion: Experimental Evidence from a Tanzanian Factory*

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Abstract

Almost all firms rely on supervisors to select and motivate workers, but what are the costs and benefits of doing so? In partnership with a large garment factory in Tanzania, we implement a series of field experiments to examine supervisor discretion in the selection of workers for promotion to leadership positions. In a first experiment with workers, we randomly vary whether the role of supervisors is emphasized in the selection process when workers make application decisions. During the discretionary selection process itself, we then randomize whether supervisors face financial incentives based on the quality of the workers they select. Our results show that delegation crowds in supervisors' private information about the leadership quality of workers. However, delegation also generates costs for firms. Supervisor choices are misaligned with the firm's objectives, as incentives reduce the likelihood that supervisors refer a worker they are personally connected to. Correspondingly, discretion is disliked by workers and reduces the quantity, although not the quality, of workers who apply for promotion. Importantly, the effects of discretion depend on the quality of the decision maker. Higher quality supervisors make better discretionary decisions to begin with. Furthermore, supervisor selection does not discourage workers from applying, and crowds in higher quality applicants, when the supervisors choosing are themselves of higher quality.

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1 Introduction

Firms vary widely in their productivity, across countries, across firms within the same country, and even across teams within the same firm. Increasingly, empirical evidence suggests that individual managers, separate from management practices more broadly, matter in explaining some of this variation (Bertrand and Schoar, 2003; Bandiera, Barankay, and Rasul, 2007; Lazear, Shaw, and Stanton, 2015; Frederiksen, Kahn, and Lange, 2020; Hoffman and Tadelis, 2021; Fenizia, 2022; Adhvaryu, Nyshadham, and Tamayo, 2023; Giardili, Ramdas, and Williams, 2023; Metcalfe, Sollaci, and Syverson, 2023; Minni, 2026; Weidmann et al., 2026). Given their importance, how can firms find good managers? The fact that there is such large dispersion in observed managerial quality attests to the difficulty of solving this problem.

This issue is particularly important in developing countries with relatively low human capital, where a "missing middle" in management is a key constraint to firm growth.[1] Hjort, Malmberg, and Schoellman (2026) find that the average pay of middle-managers in the lowest income countries is approximately 9.7 times GDP per worker, compared to 0.8 times GDP per worker in the highest income countries. Given the relative scarcity and cost of such skills, firms in developing countries may rely on "importing" expensive foreign managers, or cannot expand even when it would be efficient for them to do so (Bloom et al., 2013).

To improve firm productivity, it is therefore important to consider the problem of how firms can identify high quality future leaders. On the one hand, firms could promote existing workers to managerial positions based on seniority or observed performance. Such measures have the benefit of being transparent and objective. However, a potential drawback is that the best workers may not make the best managers (Benson, Li, and Shue, 2020). This may be due, in part, to the fact that managerial roles often require specific skills and competencies, such as in leadership, communication, and strategic thinking, that are not required in many other types of roles. Indeed, recent evidence suggests leaders differ in both ability and personality traits from the average worker, displaying, for example, more extroversion, conscientiousness, and locus of control (Boudreau et al., 2025).

In practice, many firms delegate the selection of new managers to the decision of

[1]Examples of recent policy coverage include Bassi, Vittorio, Amanda Awadey, Ama Baafra Abeberese, Virginia Minni, and Anne Kersting (March 24, 2026), "Why People Matter in High-Growth Entrepreneurship in Africa," *J-PAL Blog* , `https://www.povertyactionlab.org/blog/3-24-26/why-people-matter-high-growth-entrepreneurship-africa` and The Global Prosperity Institute, (May 29, 2023), "The Missing Middle Management," `https://www.thegpi.org/p/the-missing-middle-management?utm_campaign=post&utm_medium=web`

existing managers. In theory, such delegation can crowd in valuable private information that improves the quality of decision making (Aghion and Tirole, 1997; Dessein, 2002; Acemoglu et al., 2007; Bloom and Van Reenen, 2011; Friebel, 2026). Supervisors often work closely with workers day to day and may therefore have the best knowledge of which workers have hidden leadership potential. However, supervisors may also have bias, favoritism, or personal preferences when selecting workers for promotion that are not aligned with the firm's interests. While managers often exercise discretion over various workplace decisions, ranging from project prioritization to production decisions, discretion over personnel decisions in particular may also have additional effects depending on how workers perceive and respond to discretion.

Studying discretionary selection empirically is challenging, as selection processes within firms are usually a black box. Often, only realized promotions are observable in administrative data. In partnership with one of the largest garment factories in Tanzania, we implement a series of field experiments during a period of firm expansion, when the firm was actively promoting assembly line-level workers to become supervisors in a new facility. In the status quo, our partner factory almost entirely delegates such promotion decisions to existing supervisors. To study this selection, we first examine how different selection methods affect workers' decisions to apply for promotion. By randomizing whether supervisor selection is emphasized during the application process, we test whether discretion affects the quantity and quality of workers who apply for promotion. During the discretionary selection itself, we then randomize whether supervisors face financial incentives based on the quality of their choices. This experimental variation allows us to test simultaneously for the theorized benefits and costs to delegating such decisions within organizations.

A key outcome of interest across both experiments is the managerial quality of selected workers. Typically, managerial ability is only observable for workers who are eventually promoted. However, to assess the selection and sorting effects of discretion, it is important to measure the managerial ability of the entire pool of workers who could be *potentially* promoted. To do so, we invite all workers who applied or who were referred for promotion to take an assessment of their leadership quality. Part of the test includes questions on firm-specific production processes and technical knowledge the factory believed future managers should possess. The remaining questions measure soft skills often cited in the literature, such as conscientiousness, self-esteem, and grit,[2] as well as attributes that have been found to correlate specifically with manager performance, including locus of

[2]For example, see Hurtz and Donovan (2000); Borghans et al. (2008); Almlund et al. (2011); Heckman and Kautz (2012); Donato et al. (2017); Deming (2017); Boudreau et al. (2025).

control (Adhvaryu, Nyshadham, and Tamayo, 2023) and fluid intelligence (Weidmann et al., 2026).

In the sorting experiment, we first invite all workers from the two main production facilities to apply for a leadership training program, which fast tracks workers for promotion.[3] During this process, we vary the selection criteria that is emphasized on the application forms that workers receive. In lieu of discretion, firms could instead use objective performance data to make promotion decisions. To test how discretion compares to such alternatives, in the Control group, we inform workers that selection will be based on many criteria, including their *performance record*. In the Discretionary group, we inform workers that selection will be based on many criteria, including their *supervisor referrals*. All other aspects of the application form and the promotion opportunity itself are identical across these two groups.

The results suggest that workers are responsive to selection methods and are averse to discretion. Randomly emphasizing supervisor referrals in the selection process significantly reduces the likelihood that workers apply for promotion, a 6.4 percentage point (11%) decrease relative to a 56% application rate in the control group. However, discretionary selection does not significantly affect the managerial quality of applicants (stochastic dominance test (Goldman and Kaplan, 2018): $p = 0.978$).

Next, in the selection experiment, all supervisors are asked to refer up to two workers for the same leadership training program. During the referral process, we randomize whether supervisors face financial incentives, worth roughly 10% of their monthly base wage, based on the quality of their referrals. Importantly, while incentivized supervisors are informed that their referrals will be verified by the firm for quality, they are not informed about the details of this verification process. In this way, the referral bonus is designed to bring supervisor referrals more in alignment with the firm, while preventing supervisors from simply "picking to the test."

Results from the selection experiment show that randomly assigned financial incentives lead supervisors to refer workers with 13% higher measured managerial quality on average relative to the status quo. To guide our analysis, we use a simple conceptual framework adapted from Beaman and Magruder (2012), where supervisors trade-off using their private information about worker quality against their personal benefits from referring certain workers when making referral decisions. Through the lens of this framework, these results indicate that supervisors have private information about worker quality, otherwise the referral bonus would not have shifted selection along the desired

[3]Note that 24% of trained workers were promoted to a supervisor position within one year of the training, compared to less than 0.01% of non-trained workers receiving promotions.

dimension. However, financial incentives also reduce the likelihood that a supervisor refers a worker they are personally connected to, consistent with ex-ante misalignment in objectives.

Importantly, both the selection and sorting effects of discretion depend on the quality of the decision maker. At the end of both experiments, we invite all existing supervisors to also take our leadership assessment. Using a supervisor's own score on the leadership test, we examine how a worker's response to discretion depends on the quality of their supervisors. We find that when high quality supervisors wield discretion, workers are not discouraged from applying for promotion and higher quality workers apply (stochastic dominance test, Goldman and Kaplan (2018): $p = 0.015$). Workers likely observe their supervisors on the job and envision "leadership" in this context as entailing similar traits and competencies. Then, workers who are more similar to the existing supervisors they observe are more likely to put themselves forward for leadership opportunities.

Correspondingly, higher quality supervisors also make better discretionary decisions to begin with. We find that a one standard deviation increase in a supervisor's own score is associated with a 7.7% in the score of the worker they refer, which is equal to roughly half the effect size of randomized financial incentives for quality. It also appears that higher quality supervisors make decisions that are more aligned with the firm's objectives, as higher scoring supervisors are significantly less likely to refer workers they are personally connected to, regardless of the incentive structure.

Throughout our analysis, we rely on our leadership test as a measure of managerial quality. Using panel data from the firm's administrative record, we analyze how our measure of managerial quality correlates with the observed performance of supervisors on the job. Leveraging quasi-exogenous switches of workers and supervisors across teams, we estimate how performance *within the same worker* varies with the measured quality of their supervisory team. We find that a 1 standard deviation increase in the average leadership score of a worker's supervisors is associated with a 4.3% increase in daily efficiency (output/target) and a 18.8% decrease in unexcused absenteeism, holding all else constant. This correlation is robust to different constructions of our supervisor quality variable and to different methods of matching workers to supervisors.

In additional extensions, a replication of the referrals experiment with coworkers reveals that supervisors respond to referral incentives differently from the average worker, consistent with the possibility that they possess more valuable private information. Analysis of survey responses and heterogeneous treatment effects also suggest that workers and supervisors have conflicting ideas about what promotions should reward. While workers appear to prefer promotions to reflect existing effort and performance,

supervisors additionally prioritize match quality when making promotion decisions. This mismatch in objectives may make it more difficult for workers to understand and accept discretionary promotion choices. Finally, we consider external validity and find that the supervisor referrals we elicited during our selection experiment are similar to referrals supervisors make for actual promotion openings along a variety of dimensions.

Taken together, our results show that there are both benefits and costs to firms in delegating personnel decisions. On the one hand, delegation crowds in valuable private information, which significantly improves the managerial quality of promoted workers. On the other hand, supervisors do not always use their discretion in the best interest of the firm, and workers dislike discretion and are less likely to apply for promotion when supervisors are involved in the selection process. A key determinant of when discretion will improve versus impair outcomes is the quality of the decision makers themselves. Delegation to high quality supervisors leads to higher quality decision making to begin with and also crowds in better applicants.

Our findings contribute to an existing literature that examines the delegation of decision making within organizations. Existing empirical evidence is mixed, finding that delegation sometimes enhances but other times reduces the quality of decision making. Some studies find that discretion leads to bias in hiring (Hoffman, Kahn, and Li, 2018), lower quality promotions (Xu, 2018), and misaligned incentives in the allocation of talent (Haegele, 2025). Other studies find that discretion can crowd in valuable private information on employee quality (Voth and Xu, 2022; Chen et al., 2025), improve efficiency in procurement (Bandiera et al., 2021), and increase manager value-add (Kala, 2024). We contribute to this literature with experimental evidence from a modern day firm supporting both the theorized benefits and costs of delegation. Furthermore, we identify a key mechanism determining when discretion is likely to be helpful or harmful, namely the quality of the decision maker delegated to.

We also speak to a literature studying the labor supply response to subjectivity. Existing evidence shows that exposure to promotions that workers perceive as unfair can negatively impact retention and effort on the job (Li, 2020; Deserranno, Kastrau, and Leon-Ciliotta, 2025). Managers engage in talent-hoarding, which can deter internal job applications and inhibit career progression (Haegele, 2025). Other studies have shown that subjective performance evaluations can induce influence activities (De Janvry et al., 2023) but also reduce multi-tasking concerns (Andrabi and Brown, 2023). We contribute to this literature with experimental evidence on the effects of different selection methods on workers' decisions to pursue promotion opportunities and show that worker response to subjectivity depends on supervisor quality.

Our study also relates to a literature studying the use of referrals in personnel decisions. The existing literature has largely focused on studying horizontal referrals for hiring decisions and have found that such referrals can reduce moral hazard (Heath, 2018), improve match quality (Loury, 2006; Beaman and Magruder, 2012; Burks et al., 2015; Pallais and Sands, 2016), reduce turnover (Brown, Setren, and Topa, 2016), but also crowd in bias (Beaman, Keleher, and Magruder, 2018). Fewer studies have examined vertical referrals, and much of the existing literature concludes that vertical referrals (Adhvaryu, Murathanoglu, and Nyshadham, 2023) and vertical performance evaluations (Benson, Li, and Shue, 2026; Brabner, Kunneke, and Moers, 2025) lead to sub-optimal personnel decisions. We use novel experimental evidence to show that vertical referrals crowd in valuable private information in the selection of managers and differ in meaningful ways from horizontal referrals.

Finally, we contribute to a growing literature studying the role of individual managers, distinct from managerial practices, on firm performance (Bertrand and Schoar, 2003; Bandiera, Barankay, and Rasul, 2007; Lazear, Shaw, and Stanton, 2015; Giorcelli, 2019; Bandiera et al., 2020; Frederiksen, Kahn, and Lange, 2020; Hoffman and Tadelis, 2021; Adhvaryu, Murathanoglu, and Nyshadham, 2023; Adhvaryu, Nyshadham, and Tamayo, 2023; Metcalfe, Sollaci, and Syverson, 2023; Adhvaryu et al., 2025; Minni, 2026; Weidmann et al., 2026). Our findings shed light on how different internal selection processes used by firms can affect the quality of middle managers chosen.

The rest of this paper proceeds as follows. In Section 2, we provide more information about the study context and the data used throughout the analysis. We present the design and results of the sorting experiment in Section 3 and for the selection experiment in Section 4. Section 5 discusses how supervisor quality is a key mechanism underlying the results from both experiments. Section 6 presents empirical evidence that our leadership measure correlates with manager performance on the job, and Section 7 examines other mechanisms and extensions. We discuss the findings and conclude in Section 8.

2 Context and Data

Our partner factory belongs to a large multi-national garment manufacturing firm which employs over 30,000 people across approximately 30 factories globally. The firm receives orders for export production from major global brands, which they then allocate to specific factories based on capacity, regulatory compliance, and trade policy considerations.

Our study focuses on their factory in Tanzania, which has been operating in the

country for over a decade. The factory is located in a dedicated export-processing zone, on the periphery of a large, urban center. It is the only factory in the area engaged in large-scale garment manufacturing for exports. Foreign employees make up less than 1% of the workforce and hold primarily upper management positions, creating a multi-cultural and multi-lingual management environment.

During the study period, between 2022 - 2024, the factory employed over 4,000 full-time workers. Similar to the broader global garment industry, the majority of workers in the firm (80%) are female. On average, workers are 29 years of age and have been with the firm for over three years. In comparison, 62% of supervisors are female, and supervisors are on average somewhat older and have around two more years of tenure at the factory (Table A.1).

Our study focuses on the production departments of the factory, including cutting, sewing, bartack, and finishing, which are split across three facilities on the factory's campus. To fulfill a purchase order of ready-made garments for a client, the cutting departments first prepare, cut, and mark fabric; which is then passed to sewing departments to sew into garments; then to bartack teams to reinforce high stress areas; and then finally to finishing teams for hemming, pressing, and attaching decorations and labels.

Within these departments, production is typically organized into assembly lines, where each line has on average 57 workers. Along each line, production progresses sequentially, with each worker performing a specific operation repeatedly using specialized machinery. For example, workers at the front of the line will each perform a separate operation to produce the left front panel of a garment, while the next workers on the line complete operations to create the right front panel, both of which are then fed to workers in the middle of the line who assemble the two front panels together, and so on. This results in a stream of progressively completed material that is fed from worker to worker along the line, culminating in a finished garment.

Each production line is managed by on average three line supervisors, whose role is to assign workers to tasks, motivate and monitor workers, balance production across the line, and identify and relieve bottlenecks, such as from absenteeism or machine breakdowns. Ultimately, supervisors are responsible for ensuring that their lines meet daily production targets so that production orders are fulfilled by their respective deadlines. These line-level supervisors in turn report to facility-level managers.

In terms of compensation, both workers and supervisors are paid a fixed base wage, with the median supervisor earning a base salary that is 125% of the median worker's. In addition, workers can earn bonus pay each day if they individually exceed the production

target for their task and if their line exceeds the daily line-level production target. Both of these individual and group bonuses are linear in productivity above their respective thresholds. Targets for individual operations are set by the engineering team, based on global garment industrial standards, and seldom change. In fact, during the two year period of this study, all tasks maintained the same targets for determining individual bonuses. In contrast, line-level targets can change daily, depending on the style of garment produced and the time remaining for completing different purchase orders. Supervisors are incentivized to ensure their lines meet their daily targets, earning double the group bonus that workers earn when this is achieved. Bonus earnings can be substantial. The median worker earns monthly bonuses equivalent to 46% of their monthly base salary, and the median supervisor earns bonuses equivalent to roughly 80% of their base salary.

When the factory needs to hire a new supervisor, there are advantages to promoting an existing worker to the position, as the firm uses specialized machinery and production processes that must be learned on the job. Indeed, the vast majority (84%) of new production supervisors are internally promoted. On the other hand, identifying which workers would perform well as future managers is a challenging inference problem, as the best line workers may not make the best managers in this setting. Line-level workers do highly repetitive and manual tasks, requiring finger dexterity, experience with operating specific machinery, and the ability to work quickly with attention to detail. In contrast, supervisors say their role requires strategic problem solving, leadership, communication skills, and discipline, corresponding with soft skills often cited in the management literature.

2.1 Timeline and Intervention

During our study period, our partner factory planned to open a new production facility on their campus that would create at least 15 promotion opportunities for line-level workers to become supervisors in this new facility. In the status quo, the factory entirely delegates such promotion decisions to the discretion of existing supervisors. However, the factory was open to testing new, more data-driven selection methods, creating an opportunity for research collaboration.

We therefore conduct our main selection and sorting experiments during a first selection round for this promotion opportunity. The factory first chose workers for a leadership training program, representing a significant investment in developing workers' managerial capacity. Only 60 training spots were available, 30 for line-level workers and 30 for existing supervisors, making the selection process highly competitive. The

training included one week of management soft skills training implemented by an external consulting firm, which focused on developing communication, coordination, and leadership skills, as well as effective self management. This was followed by a week of on-the-job shadowing of existing supervisors. Workers who successfully completed the training program were then fast tracked for promotion.

On June 22, 2023, all workers from the two largest production facilities were first invited to learn about the leadership opportunity and to participate in our sorting experiment, where they could choose whether to apply. Two weeks later, on July 4th, we conducted our selection experiment with supervisors, who refer workers for the opportunity. The next day, July 5th, we replicated our selection experiment with a randomly selected sub-sample of workers, who refer their coworkers for the training. All workers who applied for the leadership training or who were referred by either a supervisor or a coworker then took a written test on July 20th or 21st measuring their managerial potential (see Section 2.3), which we use as a main outcome of interest across all experiments. Finally, all supervisors were also invited to take the leadership test on July 26th, both to help select supervisors for the training and to validate our test measure with administrative data on supervisor performance. A detailed timeline of the study is presented in Figure A.1.

The factory then selected workers and supervisors for the leadership training program, using a combination of all information available, including administrative data on work performance, applications, supervisor referrals, coworker referrals, and leadership test scores. The training program itself took place during August 14 - September 15, 2023. Following the training, 24% of trained workers were eventually promoted to become supervisors in the new facility, compared to less than 0.01% of non-trained workers receiving promotions.

Due to unforeseen circumstances, the opening of the new facility was delayed by a year. The factory therefore also conducted a second selection process from June - July, 2024, closer to the actual opening of the facility, to fill the remaining supervisor vacancies. During this second selection round, we collect additional survey data from workers and supervisors to explore mechanisms underlying our initial experimental results.

2.2 Administrative Data

The factory collects regular administrative data on its employees, which we use throughout our analysis. The firm maintains a roster of all current employees, which is updated monthly and includes information regarding a worker's gender, religion, date

of birth, martial status, and tenure. At a daily level, the factory collects data regarding attendance and individual-level output. At the weekly level, the firm records the amount of individual-level and group-level bonuses each worker earns. Finally, the factory keeps a record of the number and type of disciplinary issues incurred by a worker during the past nine months, such as instances of misconduct or unexcused absenteeism, which are called Key Performance Indicators (KPIs).

Throughout our analysis of the selection and sorting experiments, we use cross-sectional summary statistics of work performance from the year preceding the experiment (May 2022 - May 2023) as additional controls. In particular, we control for the percentage of working days attended; median bonus earnings; and the total number of KPIs incurred over the past nine-month period. For daily productivity, similar to (Adhvaryu et al., 2024), we first scale each worker's output by the target set for their operation. Such targets are set by the industrial engineering team and are exogenous to the productivity of individual workers. For example, a simple operation such as loop cutting has a daily target of 23,000, whereas a more complex operation such as waistband attaching has a daily target of 500. Thus, operation-specific targets allow us to normalize productivity across workers assigned to operations that differ in complexity. We then estimate each worker's fixed effect from a regression on Output/Target which partials out operation fixed effects, as some targets may be set arbitrarily low or high for some operations relative to others, and day fixed effects, to account for common seasonality in performance across workers. We use this estimated worker fixed effect, Output/Target (FE), as an additional control.[4]

We also exploit the panel nature of the factory's administrative data to validate our leadership test measure, which we discuss in detail in Section 6.

2.3 Measuring Managerial Quality

Typically, managerial ability is only observable for workers who are eventually promoted. To assess the selection and sorting effects of discretion, however, it is important to measure the managerial ability of the entire pool of workers who could be *potentially* promoted. To this end, we introduce a written assessment to measure workers' leadership potential across three domains: production knowledge, soft skills, and logical reasoning.

For the first section, the factory provided questions on firm-specific production processes to measure technical knowledge they believed future managers should possess. While line-level workers focus only on the task they are assigned to, successful supervisors

[4]Alternatively, our results are robust to using a simple mean of each worker's output/target as a control.

must understand the entire production process and all the tasks along the assembly line. To test for this type of knowledge, workers were asked to order tasks in the correct sequence, to identify common causes of quality issues, and to classify the uses of different machinery.

For soft skills, we measure traits which have been found to correlate with leadership and manager performance across diverse settings, including conscientiousness, consideration, grit, locus of control, and self-esteem (Hurtz and Donovan, 2000; Borghans et al., 2008; Almlund et al., 2011; Heckman and Kautz, 2012; Donato et al., 2017; Adhvaryu, Nyshadham, and Tamayo, 2023; Boudreau et al., 2025). The factory provided input into which questions they thought would be most useful for this setting, and also provided additional questions related to work style. Finally, for logical reasoning, we include mathematical problems as well as Raven's matrices to measure fluid intelligence (see Appendix B for the full test instrument). We use this combined measure of managerial quality as a main outcome of interest throughout our analysis.

All workers who applied for promotion or who were referred by either a supervisor or coworker for promotion were invited to take the management test, which took place during lunchtime on a regular work day. Attrition rates are remarkably similar across all experiments, with between 85-87% of invited workers actually showing up to take the test on their appointed day. This attrition is likely driven by idiosyncratic factors that affect absenteeism more generally, as the factory experiences an average daily absenteeism rate of 13%. Indeed, attrition across all experiments is balanced by treatment assignment and correlated with past absenteeism. In total, 728 workers completed the leadership test in the first selection round. Among those who took the test, 502 (81%) applied for promotion, 137 (19%) were referred by any supervisor, and 249 (34%) were referred by any coworker. Workers and supervisors were not informed of the test in advance, so the existence of the test itself could not have affected application or referral decisions directly.

Our measure of managerial quality appears to capture abilities and traits that are not well reflected in the factory's existing administrative data. We find that observable worker characteristics, including demographics and work performance, explain only 3-6% of the variation in measured managerial potential (Table A.2). Relaxing functional form assumptions does not improve predictability, as seen in Column 4 of Table A.2.

At the end of all experiments, we validate our measure of managerial quality by testing its correlation with the observed performance of existing supervisors on the job, which we discuss in more detail in Section 6.

3 Sorting under Supervisor Discretion

Given that firms often rely on supervisor discretion to make various personnel decisions, how do workers respond to the use of such discretion? To study this question, we first implement a field experiment with workers to study how emphasizing different aspects of the selection process affect workers' decisions to apply for promotion.

3.1 Sorting Experiment: Design

All workers from the production departments of the two largest facilities of the factory were invited to an introductory session to learn about the leadership training opportunity. During this session, workers were also given the opportunity to apply for the training program. All workers received the same information about the opportunity but were randomly assigned to receive different versions of the application form. The application forms differed in whether they emphasized the role of supervisor referrals in the selection process but were otherwise identical.

Specifically, the Control version of the application form states that workers will be selected based on many criteria, including their *performance record*. In contrast, the Discretionary application form states that workers will be selected based on many criteria, including their *supervisor referrals* (see Appendix D for the full application forms). We chose the wording for the Control application to reflect the fact that, in the absence of supervisor referrals, performance records are the only existing information available to the firm to make promotion decisions.

To conduct the randomization, we adopt a similar method to Bursztyn, Egorov, and Jensen (2019) and presort Control and Discretionary application forms in an alternating pattern and then distribute forms to workers consecutively in the order that they are seated. Workers were told to complete their application forms without talking or looking at the forms of other workers in the session. Our main outcomes of interest are the quantity and quality of workers who apply for promotion under each selection method, with quality measured by the leadership test.

3.2 Sorting Experiment: Results

In total, there were 1,678 full-time production workers in the two main production facilities of the factory, 1,118 of whom voluntarily chose to participate in the application experiment. From this sample, 559 of workers were randomly assigned to receive Control application forms and 560 to receive Discretionary forms. Table A.3 shows that

our random assignment method generated two groups that are balanced on observable characteristics.

To measure the effects of discretion on workers' application decisions, we estimate the following model:

$$Apply_i = \alpha + \beta T_i + X_i + \gamma_l + \varepsilon_i \tag{1}$$

where $Apply_i$ is an indicator variable for whether worker i applies for the leadership training; T_i is an indicator variable for whether the worker received a Discretionary application form; X_i is a vector of worker controls, including demographics (gender, religion, and marital status) and work performance in the prior year (tenure, output/target fixed effect, median bonus earnings, attendance, and total KPIs); and γ_l are production line fixed effects. To test the sensitivity of our results to functional form assumptions, we estimate Equation 1 using OLS and Logit.

Table 1: Discretion and Application Rates

	OLS (Apply = 1)			Logit (Apply = 1)
	(1)	(2)	(3)	(4)
Discretionary Application	-0.065**	-0.062**	-0.064**	-0.064**
	(0.030)	(0.030)	(0.030)	(0.029)
Control Mean	0.562	0.565	0.564	1.000
Control SD	0.497	0.496	0.496	0.000
Demographic Controls		✓	✓	✓
Work Performance Controls			✓	✓
Line FEs			✓	✓
N Workers	1119	1106	1032	1032

Notes: This table reports the effect of randomly receiving a Discretionary application form relative to a Control form on whether a worker chooses to apply for promotion. Columns (1), (2), and (3) report the results from estimating Equation 1 using OLS, with robust standard errors reported in parentheses. Column (4) reports average marginal effects from estimating Equation 1 using a Logit model, with standard errors for average marginal effects reported in parentheses. Demographic controls include gender, religion, and marital status. Work performance controls include tenure, output/target fixed effects, median bonus earnings, percentage of working days attended, and total KPIs from the past year (May 2022 - May 2023). Columns (3) and (4) also include production line fixed effects. *p < 0.1, ** p < 0.05, *** p < 0.01.

Table 1 reports the results from estimating Equation 1. First note that in the control group approximately 56% of workers chose to apply for the promotion opportunity. The fact that a significant portion of workers choose not to apply could reflect a few factors. Some workers may prefer not to take on leadership positions, as this would entail more responsibility, potential stress, and would change their interactions with their peers. They may also feel they are not well qualified for such roles. Furthermore, while the median

supervisor earns approximately 61% more than the median worker (inclusive of base salary and bonus earnings), it is possible for some workers to earn more than supervisors if they are particularly productive in their specific operation. Indeed, the top fifth percentile of workers earn higher bonuses than the median supervisor. Thus, some workers may not be interested in management opportunities because they believe they are better suited to, and potentially profit more from, remaining in their current roles. Finally, the leadership training took place over three weeks, in place of a worker's normal job responsibilities, and workers would earn their base salary, but not any bonus pay, while participating in the training. Thus, some workers may not have been available during those weeks or may have preferred to continue with their regular job responsibilities and earning opportunities.

Relative to this baseline, our results show that worker choices are sensitive to the perceived importance of supervisors in the selection process. Emphasizing discretionary selection leads significantly fewer workers to apply for the promotion-related opportunity, a 6.4 percentage point (11%) decrease relative to the Control group (Table 1). These results are robust across different specifications, including using different sets of control variables and using a LPM or Logit model.

Next, we examine whether different selection methods affect the managerial quality of applicants. One limitation is that only workers who applied were invited to take the managerial assessment. We therefore cannot compare the managerial quality of workers who chose not to apply to those that applied. Nevertheless, we can compare the managerial quality of workers who apply under the two different selection methods. All 592 workers who applied for promotion were invited to take the test, and 502 (85%) of those invited actually took the test. Attrition is balanced by a worker's treatment assignment and is comparable to the factory's average daily absenteeism rate (Table A.4).

We then compare the distribution of residualized leadership scores among workers who applied under Control versus Discretionary applications. Residualized leadership scores are calculated by regressing a worker's score on their demographics (gender, religion, and marital status), work performance in the prior year (tenure, output/target fixed effect, median bonus earnings, and total KPIs), and line fixed effects.

Our results are reported in Figure 1 and show that the distribution of managerial quality across applicants under Discretionary selection does not differ significantly from control applicants (stochastic dominance test, Goldman and Kaplan (2018): $p = 0.716$).[5]

[5]This result is robust to simply comparing the distribution of raw leadership scores by treatment assignment; stochastic dominance test (Goldman and Kaplan, 2018): $p = 0.978$.

Taken together, results from the sorting experiment show that discretion affects the quantity but not the quality of workers that apply for promotion.

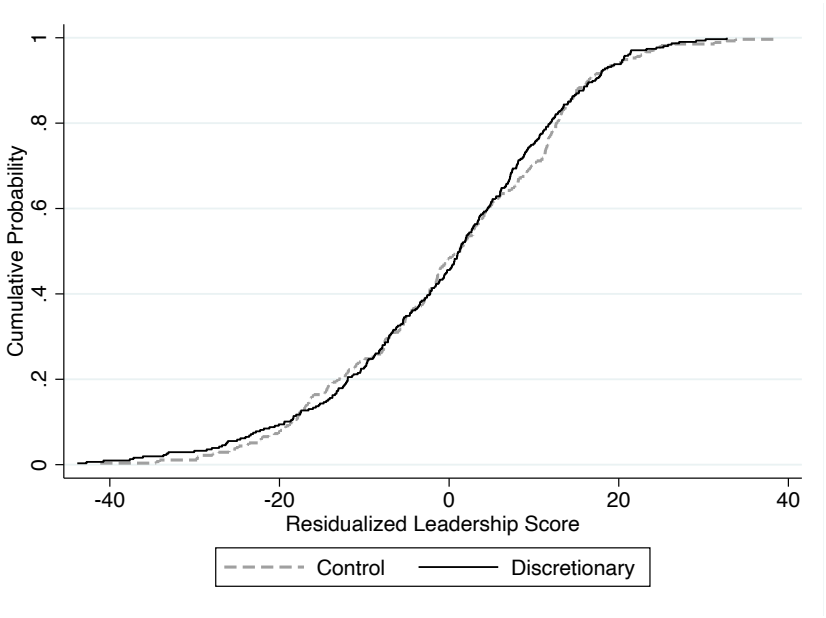


Figure 1: Discretion and Applicant Quality

Notes: This figure shows the cumulative distribution function (CDF) of residualized leadership scores of applicants by whether they were randomly assigned to receive a Control or Discretionary application form. Residualized leadership scores are calculated by regressing a worker's score on their demographics (gender, religion, and marital status), work performance in the prior year (tenure, output/target fixed effect, median bonus earnings, and total KPIs), and line fixed effects. The null hypothesis that the two distributions of scores are equal across treatment groups cannot be rejected, stochastic dominance test (Goldman and Kaplan, 2018): $p = 0.716$.

4 Selection when supervisors have discretion

Next, we study how supervisors actually wield their discretion when making promotion choices. We directly elicit supervisors' promotion choices and randomly vary whether supervisors face financial incentives based on the quality of their choices. Under a simple conceptual framework, our experimental design allows us to test for both the theorized costs and benefits of delegating personnel decisions to supervisors. Specifically, we examine whether supervisors have private information about the managerial quality of workers and whether their discretionary referrals are aligned with firm objectives.

4.1 Selection Experiment: Design

In the experiment, all supervisors are given the opportunity to refer up to two workers for the leadership opportunity. Supervisors are informed that the purpose of the training is to "identify promising workers and train them in technical production skills, leadership,

and management skills" and that "the HR team will select workers for the training based on a variety of criteria, including supervisor referrals" (see Appendix C for the full script).

During the referral process, we introduce a bonus based on the quality of the referral, worth approximately 10% of the median supervisor monthly base wage. Importantly, while supervisors are informed that their referrals will be verified by the firm for quality, they are not informed about the specific measures that the firm will use. In particular, supervisors are told "for each worker you refer, if that worker successfully completes the entire training and scores within the top 50% of the training cohort, as measured by their scores on a verbal technical test and panel interview, you will receive a referral bonus of 20,000Tsh." In this way, the referral bonus is designed to increase the incentives to refer workers that the factory would deem are high quality, while avoiding being too prescriptive so that supervisors simply select "to the test."

To generate random variation in incentives, we experimentally vary the *timing* of announcement of the referral bonus. In the Control group, supervisors first give their referrals and are then informed of the referral bonus afterwards. This process essentially elicits the referrals that occur in the status quo without additional incentives. In contrast, in the Incentivized group, supervisors are informed of the referral bonus *before* they give their referrals, which elicits referrals under financial incentives for quality. This random variation in timing allows us to measure the effect of the referral bonus without actually withholding the referral bonus from some supervisors, a key fairness consideration when implementing an experiment with real employees in a real firm.

To conduct the randomization, all supervisors were first invited to an introductory session about the leadership training program. Within the session, supervisors were counted off into two groups consecutively in the order in which they were seated. The two groups were then led to separate rooms to complete the referral process, with one group randomly assigned to receive the Control group script while the other group was randomly assigned to receive the Incentivized group script. Trained session moderators then followed the assigned scripts to explain the referral process to supervisors. The content of the scripts were identical between the two groups, the only difference in the scripts was whether the referral bonus was announced before or after supervisors gave their referrals.

All supervisors then gave their referrals via a standard paper form during the one hour session. Supervisors were asked to provide as much information as possible to correctly identify the workers they were referring, including each worker's full name, work ID number, personal mobile number, facility, department and line, and job description. This procedure standardizes the referral process and bounds the effort and inputs that

supervisors could use to make referral decisions. For example, supervisors could not contact workers directly or review past records or CVs before making their referral decisions.

4.2 Selection Experiment: Conceptual Framework

We use a simple conceptual framework adapted from Beaman and Magruder (2012) to illustrate the potential trade-offs a supervisor faces when selecting workers for promotion. By incorporating financial incentives based on referral quality and heterogeneity in imperfect information on the part of the supervisor, the framework highlights how incentives can affect promotion choices and what we can identify from our selection experiment.

Supervisor j has the opportunity to choose a worker for promotion. In making a selection, each supervisor chooses among the workers that they know in the firm. Each worker i has an inherent ability at the promotion position, either high or low, where $\theta_i \in \{\theta^H, \theta^L\}$. The supervisor is offered a referral bonus P_j, where she will receive P_j if she correctly selects a high-ability worker ($\theta_i = \theta^H$). The supervisor observes a signal of each worker's ability, $\hat{\theta}_i \in \{\theta^H, \theta^L\}$, which is accurate with probability $\beta_j = P(\theta = \theta^H | \hat{\theta} = \theta^H, j) = P(\theta = \theta^L | \hat{\theta} = \theta^L, j)$, where $\beta_j \in (0.5, 1]$. The supervisor also gains personal benefits σ_{ij} from referring each specific worker i, such as arising from bias, talent hoarding, or favoritism. Suppose the effort of making a referral will cost her c_j.

Since there are two ability types of workers, it is without loss of generality to focus on the decision between worker 1, for whom $\sigma_{1j} \in argmax(\sigma_{ij} | \hat{\theta}_i = \theta^H)$ and worker 2, for whom $\sigma_{2j} \in argmax(\sigma_{ij} | \hat{\theta}_i = \theta^L)$. If the supervisor selects worker 1, then she will receive in expectation $\beta_j P_j + \sigma_{1j} - c_j$. If she instead selects worker 2, she will receive in expectation $(1 - \beta_j) P_j + \sigma_{2j} - c_j$. Comparing these two expressions, a supervisor will select the higher quality worker if $P_j > \frac{\sigma_{1j} - \sigma_{2j}}{2\beta_j - 1}$.

An empirical implication of the model is that there are four necessary characteristics for a referral bonus to increase the quality of the selected worker: (i) workers must be heterogeneous, so that j observes workers with both types of signals; (ii) there must be trade-offs between a supervisor's personal incentives and the firm's incentives ($\sigma_{2j} - \sigma_{1j} > 0$); (iii) the trade-offs must not be too large relative to P_j; and (iv) supervisor j receives at least weakly informative signals about the quality of workers, so that $\beta_j > 0.5$.

In our selection experiment, we randomly vary whether $P_j = 0$ or $P_j = 20,000$Tsh. If we observe an increase in the quality of selected workers in response to the referral bonus, we will be able to conclude that all four of these characteristics hold. In contrast, if the

referral bonus does not change the quality of selected workers, then we cannot distinguish between these mechanisms.

4.3 Selection Experiment Results

We invited all 167 supervisors from the three main production facilities to participate in the referral experiment, 118 of which voluntarily participated. From our randomization procedure, 58 supervisors were randomly assigned to the Control group and 60 were randomly assigned to the Incentivized group. Table A.5 shows that our treatment assignment produced two groups that are balanced on observable characteristics.

All supervisors referred at least one worker, and 110 (93%) referred two workers, generating a total sample of 228 referrals. Among these referrals, 40 (18%) could not be matched to a current worker employed at the factory based on the identifying information provided by the referring supervisor. However, both the amount of information and the quality of information provided, as proxied by our ability to correctly identify the referred worker, are balanced by the treatment assignment of the referring supervisor (p = 0.180 and p = 0.742 respectively; Table A.6).

Among the 188 referrals correctly matched to an actual worker, 22 workers were referred by more than one supervisor, generating a sample of 166 unique workers. All workers who were referred by a supervisor for promotion were then invited to take the leadership test, and 140 (84%) of these invited workers actually showed up and took the test, representing 161 referrals. Whether a referred worker took the leadership test is also balanced by the treatment assignment of the referring supervisor (p = 0.640; Table A.6).

Our main outcome of interest is whether the referral bonus affects the managerial quality of the workers that supervisors refer. Specifically, we estimate the following model for the sample of referrals made by supervisors:

$$M_{ij} = \alpha + \beta T_j + X_j + \varepsilon_{ij} \tag{2}$$

where M_{ij} is the measured managerial quality of worker i referred by supervisor j; T_j is an indicator variable for whether the supervisor was randomly assigned to the Incentivized group; and X_j is a vector of supervisor controls, including gender, religion, marital status, and tenure. Standard errors are clustered at the supervisor level. We estimate Equation 2 for the total score on the managerial test as well as the scores on each sub-section of the test: production knowledge, soft skills, and logical reasoning.

Note that while we use the managerial test to assess the quality of supervisor referrals, the test scores themselves were not what supervisors' referral bonuses were

based on. Instead, supervisor referral bonuses were determined by a separate test and panel interview process administered only to trained workers at the end of the training. Supervisors were also not informed about the existence of the leadership test when they gave their referrals. Given these factors, it is highly unlikely that supervisors selected workers "to the test."

Our estimates from estimating Equation 2 are reported in Table 2.[6] The results indicate that financial incentives increase the managerial quality of referred workers. Incentivized supervisors refer workers who score on average 6 points higher on the leadership test, a 13% increase relative to workers referred by Control supervisors. This result is driven by Incentivized supervisors referring workers with relatively higher scores on the soft skills and logical reasoning portions of the test.

Table 2: Referral Bonus and Managerial Quality

	(1) Total Score	(2) Production Score	(3) Traits Score	(4) Logic Score
Incentivized Supervisor Referral	6.067**	0.469	3.466***	2.131**
	(2.735)	(1.996)	(1.056)	(0.822)
Control Mean	45.763	29.100	9.787	6.875
Control SD	17.071	10.507	6.031	5.583
Supervisor Controls	✓	✓	✓	✓
N Referrals	161	161	161	161

Notes: This table reports the effects of randomized referral incentives on the managerial quality of the workers referred by supervisors for promotion. Quality is measured by a worker's score on a management test, including the total score and the score on each sub-section of the test: production knowledge, soft skills, and logical reasoning. Supervisor controls, including gender, religion, tenure, and marital status, are included in all regressions. Standard errors are clustered by supervisor. *p < 0.1, ** p < 0.05, *** p < 0.01.

Through the lens of our conceptual framework, these results indicate simultaneously that supervisors have private information about worker quality, and that trade-offs exist between supervisors' personal preferences and the firm's objectives. Intuitively, supervisors must have private information on quality, otherwise the referral bonus would not have shifted referrals along the quality dimension. However, supervisors were also not using this private information as much as they could have in the status quo, consistent with ex-ante misalignment.

Given these results, what could be the source of misalignment between supervisors and the firm to begin with? We explore four potential explanations: effort, discrimination, talent hoarding, and personal connections. First, it could be the case that supervisors

[6]Note that for three supervisors we were missing information on their religion, marital status, and tenure. In Table 2 we report our results where we have imputed the median values from the sample for these missing variables. Our results are very similar if we drop these observations.

exert less effort in making referrals in the status quo, and financial incentives motivate them to exert more effort in response. However, all referrals take place during a standardized one hour session, which bounds the effort and inputs that supervisors could use to make referral decisions. Moreover, we find no difference in the number of referrals, amount of information provided, or quality of information provided, between control and incentivized supervisors (Table A.6).

Alternatively, supervisors may have made referral choices, in part, based on discriminatory preferences or beliefs. Indeed, in the status quo, all else equal, supervisors are descriptively less likely to refer workers who are female or Muslim and somewhat more likely to refer workers who are married (Figure A.6). If this were the case, we would expect the financial incentive either to reduce discrimination, if it is taste-based, or increase discrimination, if it is statistical-based. Instead, the financial incentive has no significant effect on a summary index of worker's demographic characteristics (Column 1, Table 3).

Supervisors could also be talent hoarding, reluctant to nominate their most productive workers. This may be particularly relevant in this setting since supervisors earn bonuses based on the output of the teams they supervise. To test for this, we construct an inverse-covariance weighted summary index of worker performance on the job (Anderson, 2008) in the prior year, including their tenure; average, standard deviation, and fixed effect in efficiency (output/target); proportion of work days attended; median and standard deviation in bonus earnings; and the number and type of disciplinary issues recorded in the prior nine months. We find that the financial incentive has no significant effect on the work performance of referred workers (Column 2, Table 3).

Finally, it could instead be the case that supervisors prefer to nominate workers they are personally close to. While we do not observe the social networks of employees in the firm, we proxy for personal connections based on whether a supervisor refers a worker of the same gender or religion, and whether a supervisor is able to provide the personal mobile number of the referred worker. Our results are most consistent with this channel, as financial incentives reduce the likelihood that a supervisor refers a worker they have personal connections to ($p = 0.056$, Column 3, Table 3).

5 Mechanism: Supervisor Quality

We next examine how the selection and sorting effects of discretion depend on the quality of the decision maker themselves. Once the application and referral experiments were completed, we invited all existing supervisors across the three main production

Table 3: Referral Bonus and Other Attributes

	(1) Demographics Index	(2) Performance Index	(3) Connections Index
Incentivized Supervisor Referral	0.012	0.018	-0.199*
	(0.115)	(0.027)	(0.103)
Control Mean	-0.151	-0.026	0.123
Control SD	0.819	0.171	0.639
Supervisor Controls	✓	✓	✓
N Referrals	187	187	228

Notes: This table reports the effects of randomized financial incentives on three inverse-covariance weighted summary indices (Anderson, 2008) of characteristics of the workers referred by supervisors for promotion: (1) demographics (gender, religion, and marital status), (2) work performance in the prior year, May 2022 - May 2023 (tenure; average, standard deviation, and fixed effect of output/target; proportion of working days attended; median and standard deviation in bonus earnings; and key performance indicators); and (3) personal connections (whether a supervisor refers a worker of the same gender or religion, and whether a supervisor can provide the personal mobile number of the referred worker). Supervisor controls, including the supervisor's gender, religion, marital status, and tenure, are included in all regressions. Standard errors are clustered by supervisor. *p < 0.1, ** p < 0.05, *** p < 0.01.

facilities to also take the leadership assessment. In total, 111 supervisors volunteered to take the test, including 80% of the supervisors who participated in the referral experiment, which is balanced by their referral treatment assignment (p-value = 0.204).

On the worker side, we first study how the quality of the supervisors assigned to each worker affects their application decisions under different selection criteria. Note that there are on average three supervisors assigned to each production line. Thus, workers are almost always managed by a team of supervisors rather than by one supervisor individually. We therefore average the leadership score of the supervisors assigned to each worker on the day of the sorting experiment. We then classify the supervisory team as being either high or low quality depending on whether their average score is above or below the median.

We report heterogeneous treatment effects by supervisor quality for the sorting experiment in Table 4. Our results show that when workers have higher quality supervisors, they are less likely to apply for promotion in general. However, such workers are not additionally discouraged from applying when discretionary selection is emphasized. In other words, discretionary selection has no effect on a worker's likelihood of applying for promotion when the supervisors selecting are themselves high quality.

This could also be "crowding out lower quality applicants"? Table 4 shows that high-quality supervisors reduce application rates. The alternative interpretation is that the surviving application pool is more selected and scores higher.

The reduction in application rates under high-quality supervisors leads to a surviving applicant pool that is more selected and scores higher on the leadership test. (Figure 2).

We find that the distribution of residualized leadership scores of applicants who have high quality supervisors stochastically dominates those with low quality supervisors (stochastic dominance test, Goldman and Kaplan (2018): $p = 0.015$).[7] It appears that workers observe their supervisors on the job and likely envision "leadership" in this context as entailing similar traits and competencies. Then, workers who are more similar to the existing supervisors they observe are more likely to put themselves forward for leadership opportunities.

Table 4: Application Experiment: Heterogeneous Treatment Effects

	OLS (Apply = 1)			Logit (Apply = 1)
	(1)	(2)	(3)	(4)
Discretionary Application	-0.112***	-0.113***	-0.122***	-0.120***
	(0.040)	(0.040)	(0.041)	(0.039)
High Quality Supervisors	-0.101**	-0.109***	-0.143	-0.143*
	(0.042)	(0.042)	(0.088)	(0.087)
Discretion X High Quality	0.102*	0.113*	0.131**	0.128**
Supervisors	(0.060)	(0.060)	(0.061)	(0.059)
Control Mean	0.562	0.565	0.564	1.000
Control SD	0.497	0.496	0.496	0.000
Demographic Controls		✓	✓	✓
Work Performance Controls			✓	✓
Line FEs			✓	✓
N Workers	1116	1103	1032	1032

Notes: This table reports heterogeneous treatment effects of randomly assigned Discretionary forms on worker applications for promotion by the average quality of the worker's supervisors. "High Quality Supervisors" is a dummy variable indicating whether the average leadership score of the worker's supervisors is above the median. Columns (1), (2), and (3) report results from using OLS, with robust standard errors reported in parentheses. Column (4) reports average marginal effects from a Logit model, with standard errors for average marginal effects reported in parentheses. Demographic controls include gender, religion, and marital status. Work performance controls include tenure, output/target fixed effect, median bonus earnings, percentage of working days attended, and total KPIs. Columns (3) and (4) also include production line fixed effects. *p < 0.1, ** p < 0.05, *** p < 0.01.

Next, we examine how a supervisor's own leadership score affects their discretionary decision making. In the referrals experiment, we study how a supervisor's own score correlates with the quality of the workers they refer, as well as other attributes of selected workers.[8] We find that a one standard deviation increase in a supervisor's own score is

[7] This result is robust to simply comparing the distribution of raw leadership scores by supervisor quality; stochastic dominance test (Goldman and Kaplan, 2018): $p = 0.046$.

[8] We do not estimate heterogeneous treatment effects by supervisor quality because, based on our conceptual framework, it is ex-ante ambiguous what direction of effects to expect. If higher quality supervisors are less likely to have misaligned incentives to begin with, then a referral bonus is not expected to further improve the quality of their referrals. With only 135 referrals from supervisors who also took the test themselves, we are also underpowered to estimate heterogeneous treatment effects precisely.

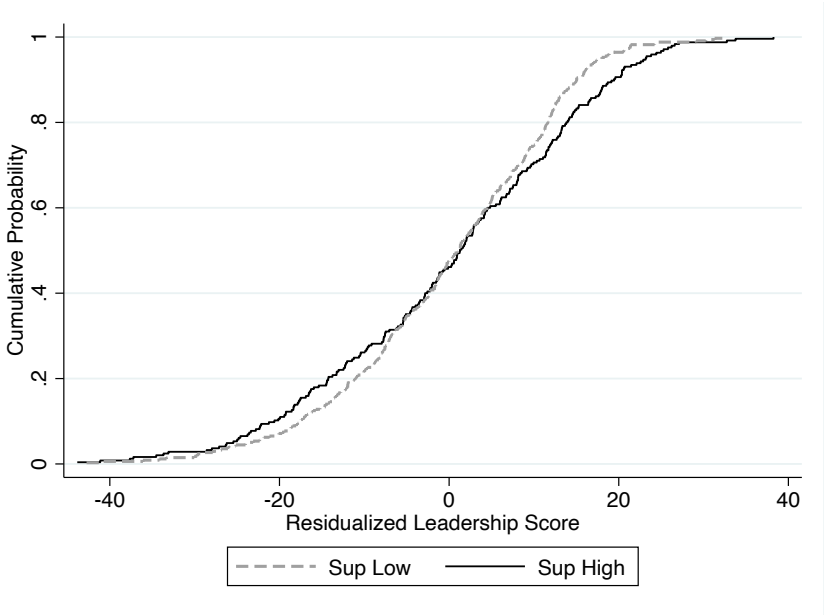


Figure 2: Supervisor Quality and Applicant Quality

Notes: This figure shows the cumulative distribution function (CDF) of residualized leadership scores of applicants by whether they have high-quality or low-quality supervisors. Supervisor quality is classified based on whether the average leadership score of the supervisors assigned to each worker on the day of the sorting experiment is above or below the median. Residualized leadership scores are calculated by regressing a worker's score on their demographics (gender, religion, and marital status); work performance (tenure, output/target fixed effect, median bonus earnings, and total KPIs); and production line fixed effects. The null hypothesis that the two distributions of scores are equal across these two groups is rejected at the 5% level, stochastic dominance test, (Goldman and Kaplan, 2018): $p = 0.015$.

associated with a 7.7% increase in the score of a worker they refer, which is equal to roughly half the effect size of randomized financial incentives for quality (Table 5). This effect is particularly driven by higher quality supervisors referring workers with more technical knowledge and logical reasoning skills.

Higher quality supervisors also seem to make decisions that are more aligned with the firm's objectives to begin with. A one standard deviation increase in a supervisor's own score is associated with a 10.8 percentage point decrease in the likelihood that they refer workers they are personally connected to, separate from the effect of any financial incentives (Table 6).

Taken together, these results suggest that the selection and sorting effects of discretion depend critically on the quality of the decision maker. Delegation to higher quality supervisors leads to better discretionary decision making that is more aligned with the firm's objectives. Furthermore, when high quality supervisors wield discretion, workers are not discouraged from applying for promotion and higher quality workers apply.

Table 5: Supervisor Referral Experiment: Controlling for Supervisor Quality

	(1) Total Score	(2) Production Score	(3) Traits Score	(4) Logic Score
Incentivized Supervisor Referral	7.349**	1.859	3.413***	2.077**
	(2.876)	(2.041)	(1.186)	(0.911)
Supervisor's Leadership Score	3.536**	3.141***	-0.467	0.862**
	(1.546)	(0.956)	(0.673)	(0.424)
Control Mean	45.970	29.104	9.701	7.164
Control SD	16.856	10.413	5.939	5.701
Supervisor Controls	✓	✓	✓	✓
N Referrals	135	135	135	135

Notes: This table reports the effects of randomized referral incentives on the managerial quality of the workers referred by supervisors, where quality is measured by a worker's score on a management test, including the total score and the score on each sub-section of the test: production knowledge, soft skills, and logical reasoning. In addition, we control for a supervisor's own standardized score on the leadership test. Other supervisor controls, including the supervisor's gender, religion, tenure, and marital status, are included in all regressions. Standard errors are clustered by supervisor. *p < 0.1, ** p < 0.05, *** p < 0.01.

Table 6: Referral Bonus and Other Attributes: Controlling for Supervisor Quality

	(1) Demographics Index	(2) Performance Index	(3) Connections Index
Incentivized Supervisor Referral	0.122	0.038	-0.204*
	(0.132)	(0.028)	(0.114)
Supervisor's Leadership Score	0.075	-0.011	-0.108**
	(0.066)	(0.013)	(0.053)
Control Mean	-0.136	-0.041	0.095
Control SD	0.831	0.166	0.640
Supervisor Controls	✓	✓	✓
N Referrals	182	152	182

Notes: This table reports the effects of randomized financial incentives on three inverse-covariance weighted summary indices (Anderson, 2008) of characteristics of the workers referred by supervisors for promotion: (1) demographics (gender, religion, and marital status), (2) work performance in the prior year, May 2022 - May 2023 (tenure; average, standard deviation, and fixed effect of output/target; proportion of working days attended; median and standard deviation in bonus earnings; and key performance indicators); and (3) personal connections (whether a supervisor refers a worker of the same gender or religion, and whether a supervisor can provide the personal mobile number of the referred worker). In addition, we control for a supervisor's own standardized score on the leadership test. Supervisor controls, including the supervisor's gender, religion, tenure, and marital status, are included in all regressions. Standard errors are clustered by supervisor. *p < 0.1, ** p < 0.05, *** p < 0.01.

6 Validation of Leadership Measure

Throughout our analysis, we rely on our leadership test as a measure of managerial quality. But how does our test measure compare to the observed performance of managers on the job? As only 15 workers were ultimately promoted to become new supervisors after our experiments, we are underpowered to measure how their test scores correspond to their performance as new supervisors. We also only observe factory administrative data for a two year period prior to when the promotions took place. Instead, at the end of all of the experiments, we invite all existing supervisors to also take our leadership assessment. We then analyze how our measure of managerial quality correlates with supervisors' observed performance on the job over the past year. Leveraging quasi-exogenous switches of workers and supervisors across teams, we estimate how performance *within the same worker* varies with the measured quality of their supervisory team. We focus on three dimensions of work performance: productivity, bonus earnings, and absenteeism.

We construct a panel dataset at the daily worker level from May 2022 - September 2023, which includes daily attendance, daily productivity (output/target), weekly bonus earnings, and monthly roster data. Recall that there are on average three supervisors assigned to each production line, so workers are almost always managed by a team of supervisors.[9] We match workers to supervisors in two ways. First, we fuzzily match workers to supervisors based on the name of the team listed in their daily attendance data. Second, for a subset of months (March - September 2023), the factory also listed the main supervisor for each worker in the monthly roster.

At the end of both experiments, we invite all existing supervisors to take the leadership test themselves and 111 do so. This includes 80% of the supervisors who participated in the referral experiment (balanced by their referral treatment assignment, p-value = 0.204); 62% of the main supervisors listed in the roster; and 53% of the supervisors identified via the attendance data.

Worker mobility across teams is somewhat common in our partner factory. One reason for this is worker absenteeism. On a typical day, 13% of workers are absent, and so supervisors may reassign workers to teams to ensure that each line has enough workers and is able to complete the critical operations necessary to meet production targets on time. Supervisors can also reassign workers across lines for reasons that are separate from absenteeism. In addition, supervisors are also sometimes moved to different lines.

[9] A natural alternative would be to estimate individual supervisor fixed effects, along the lines of Abowd, Kramarz, and Margolis (1999). However, this approach is not feasible in our setting because workers are managed by teams of supervisors and some supervisors are always paired together or rarely switch teams. This partial bundling effect generates severe multi-collinearity when estimating individual manager fixed effects in this setting.

From May 2022 - September 2023, workers make 1.32 team switches on average, and 51% of workers switch teams at least once. Only 3% of workers switch teams more than three times, with a maximum of six switches observed. The average duration of a worker's first switch is 177 work days, with the shortest duration lasting 5 work days. Over this same time period, supervisors make on average 0.77 team switches, and 45% of supervisors switch teams at least once. The average duration of a supervisor's first switch is 196 work days, with the shortest duration also lasting 5 work days.

Empirical Strategy. We examine the correlation between the quality of a worker's supervisory team and various metrics of a worker's performance on the job. Analogous to Adhvaryu et al. (2024), our measure of productivity is daily efficiency, which equals the percentage of the target quantity of a particular operation that is completed by a worker each day. We also examine weekly bonus earnings, which are based on a worker's individual output and on their team's output, as well as whether they had an unexcused absence, conditional on being absent.[10] We include worker fixed effects to estimate how variation in our measure of supervisor quality correlates with worker productivity within the same worker, leveraging variation generated by quasi-exogenous switches of workers and supervisors across teams. Specifically, we estimate the following model:

$$Y_{it} = \beta Supervisor\ Quality_{it} + \theta_i + S_{it} + \delta_t + \gamma_f + \varepsilon_{it} \tag{3}$$

where Y_{it} is our outcome of interest for worker i at time t, which includes $Output/Target$ at the daily level, individual and group bonuses at the weekly level, or unexcused absenteeism, conditional on being absent, at the daily level. $Supervisor\ Quality_{it}$ captures the quality of the supervisory team assigned to worker i at time t, and we vary whether we use the average, maximum, or minimum standardized leadership score of the supervisory team linked to worker i in the daily attendance data, or whether we use the standardized score of the head supervisor listed for worker i in the monthly roster. S_{it} includes additional controls for a worker's supervisory team, including the number of supervisors and their average gender, religion, and tenure. We also include worker fixed effects (θ_i); time fixed effects (δ_t) that account for common seasonality in performance across workers (daily for productivity and attendance outcomes and weekly for bonus outcomes); and facility fixed effects (γ_f). Standard errors are clustered at the team level when using team names to match workers to supervisors and are clustered

[10] Workers can be absent due to taking sick leave, earned personal leave, or due to other reasons which are pre-approved or "excused" by their supervisors. As we are interested in measures of work performance, we focus on whether a worker has an unexcused absence, which is not pre-approved by their supervisors and therefore most problematic from the firm's perspective.

at the supervisor level when using the head supervisor specified in the roster. For the dependent variable $Output/Target$, we additionally include operation fixed effects, as some targets may be set arbitrarily low or high for some operations relative to others. When bonus earnings are the dependent variable, since these are measured at the weekly level, we use the modal assigned supervisors to each worker over each week to generate our *Supervisor Quality* variable.

Endogenous Mobility Checks. Both worker and supervisor switches across teams appear to be orthogonal to supervisor quality. To test this identification assumption formerly, we follow a similar strategy to Minni (2026). For worker switches across teams, we test whether a worker's performance prior to a switch predicts the quality of supervisors switched to. For supervisor switches across teams, we test whether a team's performance prior to a switch predicts the quality of the incoming supervisor.

For worker switches, we estimate the following model at the worker-day level:

$$Y_{it} = \beta Future\ Supervisor\ Quality_i + \delta_t + \gamma_f + \epsilon_{it} \tag{4}$$

where Y_{it} is our outcome of interest for worker i at time t, which includes $Output/Target$ at the daily level, individual and group bonuses at the weekly level, or unexcused absenteeism, conditional on being absent, at the daily level; $Future\ Supervisor\ Quality_i$ denotes the average standardized quality of the future supervisory team; δ_t are time fixed effects; and γ_f are facility fixed effects. Standard errors are clustered at the future team level. We estimate this model for two time periods: either two weeks or one month prior to each switch. We restrict our analysis to the first move observed for each worker.[11] Our coefficient of interest is β: since future supervisor quality cannot impact current work performance directly, any correlation between past performance and a future change in supervisor quality is indicative of sorting.

For supervisor switches, we estimate an analogous model at the supervisor-day level:

$$Y_{jt} = \beta Future\ Supervisor\ Quality_i + \delta_t + \gamma_f + \epsilon_{it} \tag{5}$$

where Y_{jt} is the current performance of the team that will be assigned to supervisor j in the future, which includes average $Output/Target$ at the daily level, median individual and group bonuses at the weekly level, or the percentage of unexcused absences, among total absences, at the daily level; $Future\ Supervisor\ Quality_j$ denotes the quality of the supervisor that will switch teams; δ_t are time fixed effects; and γ_f are facility fixed effects. Standard errors are clustered at the supervisor level. Again, we estimate this model for

[11] Our results are similar if we include all worker moves across teams.

both the two weeks and the one month prior to each switch and restrict our analysis to the first move observed for each supervisor.[12] Our coefficient of interest is again β: since future supervisor quality cannot impact current team performance directly, any correlation between past team performance and a future change in supervisor quality is indicative of sorting.

Finally, we also examine the cross-section of worker switches and supervisor switches and test whether worker demographics, or team level demographics, predict worker or supervisor switches respectively.

Our results show that past worker-level performance does not predict the quality of supervisors switched to (Table A.10). Similarly, past team-level performance does not predict the quality of the incoming supervisor (Table A.12). These results are robust to whether we examine performance 14 or 30 days prior to the switch. Similarly, neither worker-level demographics nor team-level demographics predict the quality of future supervisors for either switch type (Tables A.11 and A.13). Taken together, these results suggest that changes in supervisor quality that result from either workers or supervisors switching teams are orthogonal to a variety of worker and team-level characteristics.

Results. Our preferred specification is to use the average leadership score of the supervisory team linked to each worker via the daily attendance data, and we report these results in Table 3. Overall, it appears that our leadership test measure of supervisor quality is significantly correlated with the observed performance of supervisors on the job. Within the same worker, a 1 standard deviation increase in the average leadership score of a worker's supervisory team is associated with a 4.3% increase in daily efficiency and a 18.8% decrease in unexcused absenteeism, holding all else constant. This correlation is robust to different constructions of our supervisor quality variable and to different methods of matching workers to supervisors (Tables A.14, A.15, and A.16). Furthermore, it seems that the quality of the best supervisor and head supervisor are particularly predictive of a worker's performance on the job.

7 Additional Mechanisms and Extensions

In this section, we discuss a replication of the referrals experiment with coworkers, which reveals that supervisors respond to referral incentives differently from the average worker. We also explore additional mechanisms, including worker ability and preferences, that contribute to our main experimental results. Finally, we consider external validity and find that the supervisor referrals we elicited during our selection experiment are

[12] Our results are similar if we include all supervisor moves across teams.

Table 7: Average Supervisor Score and Worker Performance

	(1) Output/Target	(2) Individual Bonus	(3) Group Bonus	(4) Unexcused Absence
Average Supervisor Score	0.036*	730.521	-37.997	-0.009**
	(0.019)	(475.352)	(661.884)	(0.004)
Mean	0.838	11444.734	6936.290	0.048
SD	0.426	13231.582	8514.754	0.213
Operation FEs	✓			
Worker FEs	✓	✓	✓	✓
Date FEs	✓	✓	✓	✓
Supervisor Controls	✓	✓	✓	✓
SEs Clustered Team	✓	✓	✓	✓
Number of Teams	59	69	69	66
Number of Workers	2611	3662	3662	3670
Number of Dates	329	63	63	466
R2	0.406	0.622	0.541	0.228

Notes: This table reports the results from estimating Equation 3, regressing the standardized average leadership score of a worker's supervisory team on a worker's daily efficiency; individual bonus earnings; group bonus earnings; and unexcused absenteeism. Output/Target and Unexcused Absences are measured at the daily level and these specifications include day fixed effects. Bonus earnings are measured at the weekly level and these specifications include week fixed effects and the modal assigned supervisors for each week are used to measure supervisor quality. Supervisor controls include the number of supervisors assigned to each worker and their average gender, religion, and tenure. Standard errors are clustered at the team level. *p $<$ 0.1, ** p $<$ 0.05, *** p $<$ 0.01.

similar to referrals that supervisors make for actual promotion openings along a variety of dimensions.

7.1 Replication of Selection Experiment with Coworkers

For robustness, we also conduct the selection experiment with a randomly selected sample of line-level workers who are asked to refer their coworkers for promotion. As in the supervisor selection experiment, we randomize whether coworkers face financial incentives based on the quality of their referrals. The script, randomization procedure, and referral bonus are identical to those used in the supervisor selection experiment. The coworker selection experiment took place the day after the supervisor selection experiment.

To construct our sample of coworkers, we randomly select 291 workers who had participated in the sorting experiment, with selection stratified by prior treatment assignment and production line. In total, 237 of the 291 (81%) invited coworkers participated. While the initial random sample of coworkers is representative of the broader workforce (Table A.7), coworkers who participate in the selection experiment are different from those who chose not to participate, notably along past absenteeism. Nevertheless, participation did not significantly differ by a worker's treatment assignment or application decision in the sorting experiment.

Our randomization procedure resulted in 114 coworkers randomly assigned to the Control group and 123 randomly assigned to the Incentivized group. Among coworkers

who participated in the experiment, our treatment assignment generated two groups that are balanced on observable characteristics (Table A.8). All coworkers referred at least one worker, and 212 (90%) referred two workers, generating a total sample of 449 coworker referrals. Among these referrals, 93 (21%) could not be matched to a current worker employed at the factory based on the identifying information provided. Of the matched referrals, 56 workers were referred by more than one coworker, generating a sample of 293 unique workers. All workers who were referred by a coworker for promotion were then invited to take the leadership test, and 250 (85%) of these invited workers actually showed up and took the test, representing 308 referrals. Attrition rates at both stages are comparable to those from the supervisor selection experiment and are balanced by the treatment assignment of the referring coworker (Table A.9).

As in the supervisor selection experiment, our main outcome of interest is the managerial quality of workers referred by coworkers. We estimate Equation 2 for the sample of referrals made by any coworker and report our results in Table A.17. Our results show that Incentivized coworkers, despite facing the same financial incentives as Incentivized supervisors, do not refer workers with higher managerial quality. If anything, incentivized coworkers refer workers with lower leadership scores, particularly on the production section of the test. There are also no significant effects of the referral bonus on other attributes of referred workers, including demographics, work performance, or personal connections (Table A.18). In fact, there is little overlap between supervisor and coworker referrals. Only 10% of the workers referred by any coworker are also referred by a supervisor.

Under our conceptual framework, there are many potential mechanisms underlying these results. It could be the case that coworkers do not know as many other workers in the factory, and thus do not observe enough peers with sufficient variation in managerial quality. It could also be the case that there are no conflicts of interest to begin with between coworkers and the firm. Coworkers, unlike supervisors, may also not possess relevant private information on the leadership potential of their peers.

While we cannot fully distinguish between these competing mechanisms, nevertheless, the evidence suggests that the results of the supervisor selection experiment are unlikely to be simply mechanical. The average supervisor responds to financial incentives for quality differently than the average worker when making promotion decisions.

7.2 Worker ability and preferences

Analysis of survey responses and heterogeneous treatment effects suggest that workers and supervisors likely have conflicting ideas about what promotions should reward. While workers appear to prefer promotions to reflect existing effort and performance, supervisors seem to also prioritize match quality when making promotion decisions. This mismatch in objectives may make it more difficult for workers to understand and accept discretionary promotion choices.

We first conduct sentiment analysis of supervisors' and workers' responses to open-ended questions on the referral and application forms from the selection and sorting experiments respectively. In particular, we asked supervisors "In your opinion, what are the three most important skills or traits someone should have to succeed as a supervisor at [firm name]?" To extract the most common sentiments from supervisors' responses to this question, we use the GPT-4o model developed by OpenAI. We first use Google Translate to translate supervisor responses from Swahili to English. We then provided GPT-4o with the translated responses and asked the program to extract the most important "key phrases" from the responses. The results suggests that problem solving, leadership, communication, and discipline are some of the most frequent responses from supervisors, corresponding with soft skills often cited in the management literature.

Correspondingly, we asked workers who applied for promotion to "Please tell us why you are a good candidate for the leadership training program." We then compare the common sentiments expressed by workers to those of supervisors to their respective open-ended questions. To do so, we first use the key phrases identified by GPT-4o from supervisor responses to formulate target phrases. We then calculate the cosine similarity between worker and supervisor responses for these chosen phrases. Our results show that while both workers and supervisors cite experience and hard work as important factors, workers are much less likely to mention soft skills, such as managerial ability or communication skills, that supervisors commonly identify as important (Figure A.4).

This interpretation also fits with worker survey responses. During the second selection round conducted by the factory, we implement additional surveys with workers. In total, 1,593 workers took an opinion survey, with around half (52%) of the workers from the sorting experiment participating. In this survey, we ask workers which selection criteria should be the most important when selecting workers for promotion. In response, 67% of workers say that performance records should be the most important factor considered in promotions, relative to 19% who prefer the leadership test, and 13% who prefer supervisor referrals (Figure A.5). This is not driven by workers who are disadvantaged by discretion,

as the distribution of preferences among workers who were actually referred by supervisors for promotion is nearly identical.

Indeed, in examining other dimensions of heterogeneous treatment effects (Table A.19), we find that it is precisely the workers with higher work efficiency (output/target) that are more likely to apply when performance records are emphasized during the selection process. As shown in Figure A.2, workers in the top quartile of productivity are 46% more likely to apply when performance records are emphasized relative to when supervisor discretion is emphasized. In contrast, workers who are actually referred by a supervisor for promotion are no more likely to apply when supervisor selection is emphasized (Figure A.3). Similarly, despite the fact that, all else equal, supervisors are more likely to refer male workers and those with higher tenure, workers with those characteristics are no more likely to apply when discretionary selection is emphasized (Table A.19). Taken together, these patterns suggest that workers know their own relative work performance and higher performing workers respond positively when informed that promotions will be based on performance. However, workers do not seem to have a similar understanding of what discretionary selection rewards, reflecting the fact that, by its nature, discretion is more ambiguous and opaque.

7.3 External Validity

One year after our main experiments, the firm conducted a second selection round to fill the remaining promotions for supervisor openings in the new facility. During this second selection round, we surveyed 116 supervisors across all production departments to elicit their referrals for these new promotion openings. Specifically, we asked supervisors "[Firm name] is planning to promote some line-level workers to supervisors for the new facility opening later this summer. As a current supervisor, you now have the opportunity to refer up to two workers for this promotion opportunity [...] Would you like to refer a worker for the promotion opportunity?" Supervisors were asked to give their referrals verbally to the enumerator during the survey and were informed that their responses would be shared with the firm.

We thus measure supervisor referrals in a high-stakes setting beyond our experimental context. Supervisors face the naturally occurring incentives of their workplace, such as from reputational concerns,[13] but no additional experimental incentives. These were meaningful decisions. Supervisor referrals were a key consideration in the firm's actual selection process and 75% of the workers who were eventually promoted in this round

[13]Ekinci (2016) shows theoretically how, in a career-concerns model, reputational concerns can provide existing employees with incentives to refer high-quality candidates.

were referred by at least one supervisor.

Separately, all workers who were interested in the promotion opportunity were invited by the firm to take an updated version of the leadership test. This resulted in 886 workers taking the test in the second round, where 226 (26%) of these workers had already taken the test in the first round. For workers who took the test twice, their performance appears relatively stable over time, with a correlation of 59% in scores across rounds.

We then predict the likelihood that a worker is referred by a supervisor in the second selection round based on their observable characteristics and plot the coefficients obtained from this regression in Figure A.7. We do this both for the entire workforce and for the subset of workers who self-selected into taking the managerial assessment. Since the firm ultimately only considered workers who took the assessment for promotion, we consider the choice of whether to take the test as equivalent to a binding application decision. Thus, for the full sample, we control for whether a worker chose to take the test at all ("applied"), capturing their interest and motivation in pursuing promotion opportunities. Among the sample of applicants, we then control for their actual score on the leadership test.

Our results show that managerial quality is a significant predictor of these naturally occurring, high-stakes supervisor referrals for promotion, after controlling for observable characteristics and work performance (Figure A.7). A one standard deviation increase in managerial quality is associated with a 25% increase in the probability that a worker is referred by a supervisor. Other predictors of supervisor referrals are remarkably similar to the patterns we observed during our selection experiment. For example, all else equal, supervisors continue to be more likely to refer male workers and more senior workers. These results suggest that the referrals we elicited during our selection experiment are representative of how supervisors make promotion decisions more generally in this setting. They also show that supervisors appear to consistently consider managerial quality when making such personnel decisions.

8 Conclusion

Firms often rely on supervisors to make various personnel decisions. Our experimental results show evidence for both the theorized benefits and costs of delegating such decisions within organizations. On the one hand, we find that supervisors have valuable private information on the hidden leadership potential of workers. On the other hand, supervisors do not use this information as much as they could in the status quo, preferring instead to refer workers they are personally connected to. Furthermore, discretion is disliked

by workers and reduces the quantity, although not the quality, of workers that apply for promotion. Importantly, the selection and sorting effects of discretion depend on the quality of the decision maker. Higher quality supervisors make better discretionary decisions to begin with and crowd out lower quality applicants.

Throughout our analysis, we use a written assessment to proxy for managerial quality. While our measure appears to predict multiple dimensions of supervisor performance in this setting, there are likely other aspects of managerial quality that are not captured by our measure. Future research should explore whether supervisors have valuable private information about managerial quality above and beyond what can be captured by assessments of skills and traits. Nevertheless, from a policy perspective, our results suggest that firms can bring discretionary decisions more into alignment with firm objectives by credibly announcing and implementing objective measures that proxy for otherwise unobservable qualities.

More generally, some specific considerations can help guide a firm in how to design its promotion rules. First, is this a context where supervisors likely have informational advantages? Supervisors may have better information if they personally know potential candidates, compared to cases where they are making decisions solely based on CVs and written application materials. Second, how similar is the current position to the new position? The more similar the positions, the better existing information on worker performance may predict performance in the new role.

In practice, promotions can serve many purposes for a firm. In addition to matching workers to new positions, promotions can also serve as incentives to encourage worker effort in their current roles (Karachiwalla and Park, 2017; Bertrand et al., 2020; Nieddu and Pandolfi, 2022; Deserranno, Kastrau, and Leon-Ciliotta, 2025). This may be an especially important purpose of promotions in contexts, such as the public sector, that lack performance pay or other direct incentive mechanisms. As fewer workers are interested in promotions under discretionary selection, it follows that promotions would have an incentive effect on fewer workers under discretionary versus more objective selection criteria. Ultimately, whether a firm should use discretionary promotions will depend on their desired objectives.

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Appendices

Appendix A Supplementary Figures and Tables

Table A.1: Summary Statistics

Line-Level Workers	**Mean**	**Median**	**SD**	**P5**	**P95**	**Obs**
Facility: A	0.22	0.00	0.41	0.00	1.00	2366
Facility: B	0.57	1.00	0.49	0.00	1.00	2366
Facility: C	0.21	0.00	0.41	0.00	1.00	2366
Female	0.80	1.00	0.40	0.00	1.00	2364
Muslim	0.45	0.00	0.50	0.00	1.00	2364
Married	0.12	0.00	0.32	0.00	1.00	2364
Age	29.32	28.00	5.67	22.00	40.00	2364
Tenure (Years)	3.29	2.47	2.60	0.19	8.50	2364
Team Size	66.01	63.00	35.12	16.00	167.00	2257
N. Supervisors	3.28	3.00	2.69	1.00	12.00	2366
Output/Target (FE)	-0.04	0.02	0.64	-1.16	0.68	1902
Individual Bonus (Median, Tsh)	11393.74	9750.00	11131.08	0.00	36765.00	2298
Group Bonus (Median, Tsh)	5187.32	5000.00	5594.53	0.00	13750.00	2298
Attendance (%)	0.83	0.85	0.09	0.61	0.92	2344
KPIs	5.53	3.00	8.15	0.00	20.00	2366
Supervisors	**Mean**	**Median**	**SD**	**P5**	**P95**	**Obs**
Facility: A	0.19	0.00	0.39	0.00	1.00	127
Facility: B	0.65	1.00	0.48	0.00	1.00	127
Facility: C	0.16	0.00	0.37	0.00	1.00	127
Female	0.62	1.00	0.49	0.00	1.00	127
Muslim	0.35	0.00	0.48	0.00	1.00	127
Married	0.11	0.00	0.31	0.00	1.00	127
Age	30.59	29.00	5.11	24.00	40.00	127
Tenure (Years)	5.67	6.03	2.76	1.32	10.73	127
Tenure as Supervisor	3.97	4.00	2.69	0.17	8.70	60
N. Teams	1.40	1.00	1.82	1.00	3.00	127
N. Workers	59.80	63.00	43.29	5.00	167.00	126
Education (Years)	10.47	11.00	1.92	7.00	13.00	60
Bonus (Median, Tsh)	40556.73	39000.00	16914.81	15000.00	66000.00	127
Attendance (%)	0.83	0.85	0.08	0.67	0.91	127
KPIs	3.14	1.00	5.07	0.00	14.00	127

Notes: This table reports the mean, median, standard deviation, 5th percentile, 95th percentile, and number of observations for key descriptive variables of line-level workers and supervisors in the production departments of our partner firm. Facility A, B, C are indicator variables for which facility an employee works in. All demographic variables are calculated using factory administrative data from the month and year of the referrals and applications experiments (June 2023), except for Tenure as Supervisor and Education, which were self-reported in a survey of supervisors conducted one year after the experiments (June 2024), with Tenure as Supervisor scaled to the years of tenure the supervisor would have had at the time of the experiments. Output/Target fixed effects, median bonus earnings (Tanzanian shillings), and attendance (percentage of working days attended) are calculated for the year prior to the experiment (May 2022 - May 2023). Key Performance Indicators (KPIs), in line with factory practice, count the number of disciplinary issues that occurred during the last nine months (October 2022 - May 2023).

Table A.2: Predictors of Leadership Scores

	(1) Leadership Score Round 1	(2) Leadership Score Round 2	(3) Leadership Score Pooled	(4) Leadership Score Pooled
Output/Target	-1.132			
	(1.376)			
Output/Target (SD)	0.303			
	(0.580)			
Individual Bonus	0.589	-0.350	1.318**	1.894**
	(0.879)	(1.524)	(0.658)	(0.857)
Individual Bonus (SD)	0.116	0.855	0.286	-0.014
	(0.895)	(0.921)	(0.593)	(0.797)
Group Bonus	1.303	0.587	0.753	0.987
	(0.947)	(0.864)	(0.637)	(0.915)
Group Bonus (SD)	2.910***	1.233	1.591***	1.389*
	(1.090)	(0.842)	(0.600)	(0.830)
Attendance	-0.298	1.294	-1.316	-1.575
	(1.805)	(1.099)	(0.962)	(1.278)
KPIs	-0.015	-0.050	-0.030	-0.032
	(0.119)	(0.108)	(0.077)	(0.108)
Tenure	-0.926***	-0.228	-0.440***	-0.319
	(0.263)	(0.189)	(0.168)	(0.221)
Female	-3.297*	-4.894***	-5.609***	-5.772***
	(1.750)	(1.248)	(1.090)	(1.797)
Muslim	0.504	0.381	-0.186	0.475
	(1.213)	(0.881)	(0.773)	(1.972)
Married	-3.269*	-0.717	-2.029	-2.193
	(1.964)	(1.322)	(1.269)	(2.047)
Mean	47.384	40.044	43.527	43.527
SD	15.252	12.527	14.467	14.467
N	630	816	1519	1519
R^2	0.058	0.039	0.055	0.030
F-Test: Work Performance	0.008	0.094	0.000	
F-Test: Demographics	0.082	0.001	0.000	
Model	OLS	OLS	OLS	Non-Parametric Kernel Regression

Notes: This table reports the regression coefficients of various worker characteristics on a worker's overall leadership test score from the first selection round, second selection round, and both rounds pooled together. Control variables include standardized work performance variables from the prior year, including Output/Target (FE), Output/Target (SD), Individual Bonus (Median, Tsh), Individual Bonus (SD), Group Bonus (Median, Tsh), Group Bonus (SD), Attendance (%), total KPIs, and tenure, as well as a worker's gender, religion, and martial status. Note that data on Output/Target was only available for the first selection round. The model is estimated using OLS in Columns 1-3 and using non-parametric kernel regression in Column 4. Standard errors are reported in parentheses and are clustered at the worker level in Column 3, and bootstrapped standard errors are reported in Column 4. The p-values from F-tests of joint significance of work performance variables and demographic variables are reported. *p $<$ 0.1, ** p $<$ 0.05, *** p $<$ 0.01.

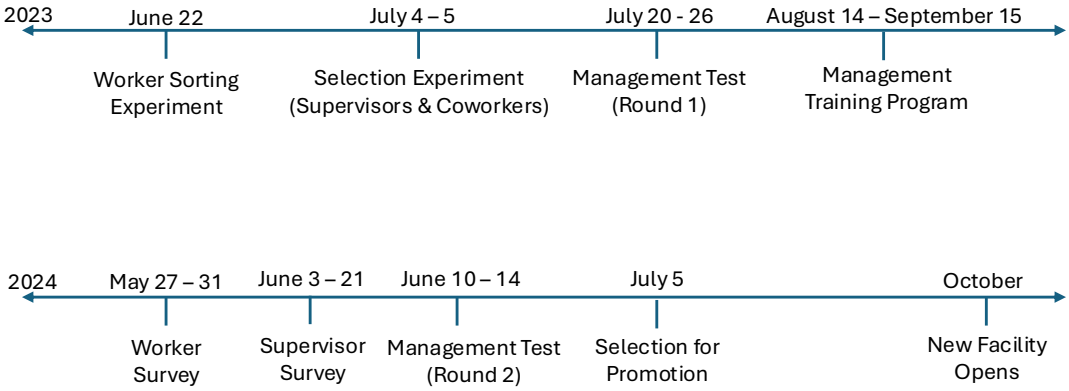


Figure A.1: Study Timeline

Table A.3: Balance Table - Applications Experiment Treatment Assignment

	Control (N = 559)	Treatment (N = 560)	Difference	P-Value
Panel A: Demographics				
Female	0.85	0.86	-0.01	0.568
Muslim	0.43	0.47	-0.05	0.133
Married	0.11	0.10	0.01	0.713
Age	29.29	29.62	-0.34	0.328
Panel B: Work Performance				
Facility: A	0.28	0.28	-0.00	0.864
Facility: B	0.72	0.72	0.00	0.864
Tenure	3.22	3.47	-0.25	0.115
Output/Target (FE)	0.06	0.05	0.01	0.631
Attendance (%)	0.84	0.84	-0.00	0.897
KPIs	4.23	4.18	0.05	0.874
Individual Bonus Earnings (Median, Tsh)	10122.18	10198.80	-76.62	0.917
Group Bonus Earnings (Median, Tsh)	7729.29	7738.99	-9.71	0.973
Panel C: Supervisor Connections				
SupMatch Gender	0.65	0.68	-0.03	0.222
SupMatch Religion	0.50	0.52	-0.02	0.401

Notes: This table reports the average values of observable characteristics of workers randomly assigned to the Control and Discretionary groups in the Worker Sorting Experiment. P-values from two-sided hypothesis tests of equality of sample means are reported. Female, Muslim, and Married are indicator variables corresponding to demographic characteristics. Facility A and B are indicator variables for which facility an employee works in. Age and tenure are measured in years. Output/target fixed effects, median bonus earnings (Tanzanian shillings), and attendance (percentage of working days attend) are calculated for the year prior to the experiment (May 2022 - May 2023). Key Performance Indicators (KPIs), in line with factory practice, count the number of disciplinary issues that occurred during the last nine months (October 2022 - May 2023). SupMatch Gender and SupMatch Religion measure the average degree of matching between a worker's gender and religion and those of their supervisors. *p $<$ 0.1, ** p $<$ 0.05, *** p $<$ 0.01.

Table A.4: Balance Table - Applications Experiment Attrition

	Took Test (N = 502)	Did Not Take Test (N = 90)	Difference	P-Value
Panel A: Application Experiment				
Treatment Assignment	0.46	0.52	-0.06	0.278
Panel B: Demographics				
Female	0.81	0.83	-0.01	0.811
Muslim	0.42	0.47	-0.04	0.481
Married	0.12	0.12	0.00	0.932
Age	29.30	29.45	-0.15	0.819
Panel C: Work Performance				
Facility: A	0.26	0.23	0.02	0.631
Facility: B	0.74	0.77	-0.02	0.631
Tenure	3.07	3.54	-0.47	0.109
Output/Target (FE)	0.08	0.03	0.06	0.191
Attendance (%)	0.84	0.82	0.02	0.016**
KPIs	3.72	5.87	-2.15	0.000***
Individual Bonus Earnings (Median, Tsh)	10439.66	11513.84	-1074.18	0.447
Group Bonus Earnings (Median, Tsh)	7829.63	7140.27	689.36	0.214
Panel D: Supervisor Connections				
SupMatch Gender	0.65	0.63	0.02	0.592
SupMatch Religion	0.52	0.49	0.03	0.359

Notes: This table reports the average values of observable characteristics of workers who applied for the leadership opportunity and either did or did not choose to take the leadership test. The p-values from the two-sided hypothesis tests of equality of sample means are reported. Treatment Assignment is an indicator variable for whether a worker was randomly assigned to the Discretionary treatment in the Worker Sorting Experiment. Female, Muslim, and Married are indicator variables corresponding to demographic characteristics. Facility A and B are indicator variables for which facility an employee works in. Age and tenure are measured in years. Output/target fixed effects, median bonus earnings (Tanzanian shillings), and attendance (percentage of working days attend) are calculated for the year prior to the experiment (May 2022 - May 2023). Key Performance Indicators (KPIs), in line with factory practice, count the number of disciplinary issues that occurred in the last nine months (October 2022 - May 2023). SupMatch Gender and SupMatch Religion measure the average degree of matching between a worker's gender and religion and those of their supervisors. *p $<$ 0.1, ** p $<$ 0.05, *** p $<$ 0.01.

Table A.5: Balance Table - Supervisor Selection Experiment Treatment Assignment

	Control (N = 58)	Incentivized (N = 60)	Difference	P-Value
Female	0.60	0.55	0.05	0.561
Muslim	0.41	0.37	0.05	0.603
Married	0.14	0.07	0.07	0.204
Age	30.46	30.33	0.13	0.901
Facility: A	0.19	0.18	0.01	0.931
Facility: B	0.60	0.58	0.02	0.826
Facility: C	0.21	0.23	-0.03	0.732
Tenure	5.64	5.81	-0.16	0.751
Attendance (%)	0.84	0.85	-0.01	0.412
KPIs	2.95	2.68	0.26	0.732
Bonus Earnings (Median, Tsh)	38521.37	42971.94	-4450.57	0.162

Notes: This table reports the average values of observable characteristics of supervisors randomly assigned to the Control and Incentivized groups, as well as the p-value from the two-sided hypothesis test of equality of sample means. Female, Muslim, and Married are indicator variables corresponding to demographic characteristics. Facility A, B, C are indicator variables for which facility an employee works in. Age and tenure are measured in years. Attendance (percentage of working days attend) and median bonus earnings (Tanzanian shillings) are calculated for the year prior to the experiment (May 2022 - May 2023). Key Performance Indicators (KPIs), in line with factory practice, count the number of disciplinary issues that occurred during the last nine months (October 2022 - May 2023). *p < 0.1, ** p < 0.05, *** p < 0.01.

Table A.6: Balance Table - Attrition within Supervisor Referrals

	Control (N Referrals = 111)	Incentivized (N Referrals = 117)	Difference	P-Value
Number of Referrals	1.95	1.97	-0.02	0.428
Amount Info Provided	4.01	3.85	0.15	0.180
Matched to Roster	0.83	0.81	0.02	0.742
Referred Worker took Test	0.72	0.69	0.03	0.640

Notes: This table reports balance checks by the supervisor's treatment assignment in the referrals experiment of the number of referrals provided (maximum two per supervisor); the amount of identifying information provided by each supervisor for each referred worker; whether the referred worker could be correctly identified based on the information provided; and whether the referred worker took the leadership test. *p < 0.1, ** p < 0.05, *** p < 0.01.

Table A.7: Balance Table - Selection of Coworker Sample

	Not Selected (N = 827)	Selected (N = 292)	Difference	P-Value	Did Not Participate (N = 57)	Participated (N = 237)	Difference	P-Value
Panel A: Application Experiment								
Application Treatment	0.50	0.49	0.01	0.772	0.47	0.50	-0.03	0.722
Applied	0.52	0.55	-0.03	0.374	0.58	0.55	0.03	0.661
Panel B: Demographics								
Female	0.84	0.88	-0.04	0.100	0.84	0.89	-0.05	0.273
Muslim	0.46	0.42	0.04	0.245	0.44	0.42	0.02	0.750
Married	0.11	0.09	0.02	0.359	0.19	0.07	0.13	0.003***
Age	29.34	29.79	-0.45	0.246	30.21	29.67	0.55	0.553
Panel C: Work Performance								
Facility: A	0.28	0.27	0.01	0.725	0.18	0.30	-0.12	0.066*
Facility: B	0.72	0.73	-0.01	0.725	0.82	0.70	0.12	0.066*
Tenure	3.35	3.32	0.04	0.826	3.40	3.29	0.11	0.765
Output/Target (FE)	0.06	0.06	-0.00	0.918	0.09	0.05	0.04	0.272
Attendance (%)	0.84	0.84	0.00	0.806	0.81	0.84	-0.03	0.006***
KPIs	4.31	3.90	0.41	0.287	5.58	3.51	2.07	0.002***
Individual Bonus Earnings (Median, Tsh)	10171.41	10129.89	41.52	0.960	14602.54	9072.57	5529.97	0.001***
Group Bonus Earnings (Median, Tsh)	7774.86	7621.04	153.81	0.636	5710.71	8098.88	-2388.16	0.000***
Panel D: Supervisor Connections								
SupMatch Gender	0.66	0.69	-0.03	0.197	0.63	0.70	-0.07	0.167
SupMatch Religion	0.50	0.53	-0.03	0.146	0.47	0.55	-0.09	0.050*

Notes: This table reports the average values of observable characteristics of the workers randomly selected and not selected for the Coworker Referral Experiment and, among those that were selected, the workers who choose to participate versus not participate. The p-values from the two-sided hypothesis tests of equality of sample means between those selected versus not selected, and between those that participated and did not participate, are reported. Application Treatment is an indicator variable for whether the worker was randomly assigned to the Discretionary treatment in the Worker Sorting Experiment. Applied is an indicator variable for whether the worker themselves applied for promotion. Female, Muslim, and Married are indicator variables corresponding to demographic characteristics. Facility A and B are indicator variables for which facility an employee works in. Age and tenure are measured in years. Age and tenure are measured in years. Output/target fixed effects, median bonus earnings (Tanzanian shillings), and attendance (percentage of working days attend) are calculated for the year prior to the experiment (May 2022 - May 2023). Key Performance Indicators (KPIs), in line with factory practice, count the number of disciplinary issues that occurred during the last nine months (October 2022 - May 2023). SupMatch Gender and SupMatch Religion measure the average degree of matching between a worker's gender and religion and those of their supervisors. *p < 0.1, ** p < 0.05, *** p < 0.01.

Table A.8: Balance Table - Coworker Selection Experiment Treatment Assignment

	Control (N = 114)	Incentivized (N = 123)	Difference	P-Value
Panel A: Application Experiment				
Application Treatment	0.50	0.50	0.00	1.000
Applied	0.56	0.53	0.03	0.661
Panel B: Demographics				
Female	0.88	0.91	-0.03	0.405
Muslim	0.40	0.43	-0.03	0.671
Married	0.07	0.07	-0.00	0.929
Age	29.46	29.85	-0.39	0.630
Panel C: Work Performance				
Facility: A	0.31	0.29	0.01	0.811
Facility: B	0.69	0.71	-0.01	0.811
Tenure	3.41	3.21	0.20	0.554
Output/Target (FE)	0.03	0.07	-0.04	0.312
Attendance (%)	0.84	0.84	0.00	0.664
KPIs	3.18	3.90	-0.73	0.179
Individual Bonus Earnings (Median, Tsh)	8195.83	9865.06	-1669.23	0.217
Group Bonus Earnings (Median, Tsh)	8085.18	8126.79	-41.61	0.944
D: Supervisor Connections				
SupMatch Gender	0.68	0.71	-0.04	0.413
SupMatch Religion	0.57	0.53	0.04	0.237

Notes: This table reports the average values of observable characteristics of coworkers who were randomly assigned to the Control and Incentivized groups of the Coworker Selection Experiment. The p-value from the two-sided hypothesis test of equality of sample means is reported. Female, Muslim, and Married are indicator variables corresponding to demographic characteristics. Facility A and B are indicator variables for which facility an employee works in. Age and tenure are measured in years. Age and tenure are measured in years. Output/target fixed effects, median bonus earnings (Tanzanian shillings), and attendance (percentage of working days attend) are calculated for the year prior to the experiment (May 2022 - May 2023). Key Performance Indicators (KPIs), in line with factory practice, count the number of disciplinary issues that occurred during the last nine months (October 2022 - May 2023). SupMatch Gender and SupMatch Religion measure the average degree of matching between a worker's gender and religion and those of their supervisors. *p < 0.1, ** p < 0.05, *** p < 0.01.

Table A.9: Balance Table - Attrition within Coworker Referrals

	Control (N Referrals = 211)	Incentivized (N Referrals = 238)	Difference	P-Value
Number of Referrals	1.92	1.97	-0.05	0.030**
Amount Info Provided	3.86	3.81	0.06	0.573
Matched to Roster	0.78	0.80	-0.02	0.593
Referred Worker took Test	0.66	0.71	-0.05	0.243

Notes: This table reports balance checks by the coworker's treatment assignment in the coworker referrals experiment of the number of referrals provided (maximum two per coworker); the amount of identifying information provided by each coworker for each referred worker; whether the referred worker could be correctly identified based on the information provided; and whether the referred worker took the leadership test. *p < 0.1, ** p < 0.05, *** p < 0.01.

Table A.10: Endogeneous Mobility Check of Worker Switches, Past Performance

	(1) Output/Target	(2) Individual Bonus	(3) Group Bonus	(4) Unexcused Absence
Panel A: 14 days prior to switch				
Future Supervisors Score	0.004	-303.164	1325.459	-0.000
	(0.024)	(803.345)	(1611.357)	(0.013)
Mean	0.759	9244.198	14357.465	0.090
SD	0.234	15317.431	10080.615	0.286
Date FEs	✓	✓	✓	✓
Facility FEs	✓	✓	✓	✓
Number of Workers	1258	1673	1673	372
Number of Dates	71	27	27	66
Number of Teams	29	43	43	41
Panel B: 30 days prior to switch				
Future Supervisors Score	0.003	-224.858	1485.980	-0.006
	(0.026)	(642.305)	(1419.410)	(0.011)
Mean	0.740	8864.715	12648.348	0.080
SD	0.242	14381.174	10155.670	0.272
Date FEs	✓	✓	✓	✓
Facility FEs	✓	✓	✓	✓
Number of Workers	1292	1719	1719	791
Number of Dates	136	40	40	148
Number of Teams	29	48	48	47

Notes: This table reports the results from estimating Equation 4 at the worker-day level, regressing past performance on the average standardized leadership score of the future supervisors switched to. Standard errors are clustered at the future team level. Panel A includes outcomes within 14 days prior to the switch, and Panel B includes outcomes within 30 days prior to the switch. Output/Target and Unexcused Absences are measured at the daily level and these specifications include day fixed effects. Regressions on Output/Target additionally include operation fixed effects. Bonus earnings are measured at the weekly level and these specifications include week fixed effects and the modal assigned supervisors at the weekly level are used to measure supervisor quality. *p < 0.1, ** p < 0.05, *** p < 0.01.

Table A.11: Endogeneous Mobility Check of Worker Switches, Demographics

	(1) Future Supervisor Score	(2) Future Supervisor Score
Female	0.005	-0.024
	(0.085)	(0.046)
Muslim	-0.039	-0.046
	(0.039)	(0.028)
Married	-0.066	-0.048
	(0.124)	(0.075)
Tenure	0.006	0.014
	(0.018)	(0.012)
Mean	0.256	0.357
SD	0.795	0.742
Type Switch	First Switch	All Switches
Date FEs	✓	✓
Facility FEs	✓	✓
Number of Workers	1272	1450

Notes: This table uses cross-sectional data on all switches of workers across teams and regresses various worker characteristics, including gender, religion, marital status, and tenure, on the average standardized leadership score of supervisors switched to. Column (1) restricts the analysis to the first move observed for each worker, and Column (2) includes all moves observed for each worker. Date and Facility fixed effects are included in all regressions. Standard errors are clustered at the future team level. *p < 0.1, ** p < 0.05, *** p < 0.01.

Table A.12: Endogeneous Mobility Check of Supervisor Switches, Team Performance

	(1) Mean Output/Target	(2) Median Individual Bonus	(3) Median Group Bonus	(4) % Unexcused Absenteeism
Panel A: 14 days prior to switch				
Future Supervisor Score	0.003	-2043.395	1367.001	-0.012
	(0.012)	(1594.190)	(1156.034)	(0.010)
Mean	0.703	6269.973	6441.484	0.181
SD	0.114	8949.910	8950.446	0.268
Date FEs	✓	✓	✓	✓
Facility FEs	✓	✓	✓	✓
Number of Supervisors	18	50	50	22
Number of Dates	42	13	13	56
Panel B: 30 days prior to switch				
Future Supervisor Score	0.001	-2084.556	1218.844	-0.004
	(0.013)	(1544.299)	(1024.203)	(0.004)
Mean	0.692	6667.136	5984.400	0.136
SD	0.118	8596.400	8381.457	0.218
Date FEs	✓	✓	✓	✓
Facility FEs	✓	✓	✓	✓
Number of Supervisors	18	50	50	22
Number of Dates	83	23	23	120

Notes: This table reports the results from estimating Equation 5 at the supervisor-day level, regressing past performance of the team that the supervisor will be assigned to by the standardized leadership score of the supervisor. Standard errors are clustered at the supervisor level. Panel A includes outcomes within 14 days prior to the switch, and Panel B includes outcomes within 30 days prior to the switch. Mean Output/Target and proportion of absences that are unexcused are measured at the daily level and these specifications include day fixed effects. Median bonus earnings are measured at the weekly level and these specifications include week fixed effects. *p < 0.1, ** p < 0.05, *** p < 0.01.

Table A.13: Endogeneous Mobility Check of Supervisor Switches, Team Demographics

	(1) Future Supervisor Score	(2) Future Supervisor Score
% Female	-0.084	-1.188
	(0.866)	(0.802)
% Muslim	0.364	-0.613
	(2.558)	(1.356)
% Married	0.894	-0.233
	(1.402)	(0.985)
Mean Tenure	0.206	0.237
	(0.196)	(0.153)
Mean	0.488	0.562
SD	0.780	0.772
Type Switch	First Switch	All Switches
Date FEs	✓	✓
Facility FEs	✓	✓
Number of Supervisors	56	56

Notes: This table uses cross-sectional data on all switches of supervisors across teams and regresses various team-level characteristics, including the percentage of workers that are female, Muslim, and married, and the average tenure of workers, on the standardized leadership score of the incoming supervisor. Column (1) restricts the analysis to the first move observed for each supervisor, and Column (2) includes all moves observed for each supervisor. Date and Facility fixed effects are included in all regressions. Standard errors are clustered at the supervisor level. *p < 0.1, ** p < 0.05, *** p < 0.01.

Table A.14: Score of Best Supervisor and Worker Performance

	(1) Output/Target	(2) Individual Bonus	(3) Group Bonus	(4) Unexcused Absence
Score of Best Supervisor	0.048***	1009.828**	72.887	-0.008**
	(0.016)	(490.074)	(548.084)	(0.003)
Mean	0.838	11444.734	6936.290	0.048
SD	0.426	13231.582	8514.754	0.213
Operation FEs	✓			
Worker FEs	✓	✓	✓	✓
Date FEs	✓	✓	✓	✓
Supervisor Controls	✓	✓	✓	✓
SEs Clustered Team	✓	✓	✓	✓
Number of Teams	59	69	69	66
Number of Workers	2611	3662	3662	3670
Number of Dates	329	63	63	466
R2	0.407	0.623	0.541	0.228

Notes: This table reports the results from estimating Equation 3, regressing the standardized highest leadership score of a worker's supervisory team on daily efficiency (Output/Target); individual bonus earnings; group bonus earnings; and unexcused absenteeism. Output/Target and Unexcused Absences are measured at the daily level and these specifications include day fixed effects. Bonus earnings are measured at the weekly level and these specifications include week fixed effects and the modal assigned supervisors for each week are used to measure supervisor quality. Supervisor controls include the number of supervisors assigned to each worker and their average gender, religion, and tenure. Standard errors are clustered at the team level. *p < 0.1, ** p < 0.05, *** p < 0.01.

Table A.15: Score of Worst Supervisor and Worker Performance

	(1) Output/Target	(2) Individual Bonus	(3) Group Bonus	(4) Unexcused Absence
Score of Worst Supervisor	0.009	235.789	117.264	-0.001
	(0.013)	(393.314)	(579.153)	(0.003)
Mean	0.838	11444.734	6936.290	0.048
SD	0.426	13231.582	8514.754	0.213
Operation FEs	✓			
Worker FEs	✓	✓	✓	✓
Date FEs	✓	✓	✓	✓
Supervisor Controls	✓	✓	✓	✓
SEs Clustered Team	✓	✓	✓	✓
Number of Teams	59	69	69	66
Number of Workers	2611	3662	3662	3670
Number of Dates	329	63	63	466
R2	0.405	0.622	0.541	0.228

Notes: This table reports the results from estimating Equation 3, regressing the standardized lowest leadership score of a worker's supervisory team on daily efficiency (Output/Target); individual bonus earnings; group bonus earnings; and unexcused absenteeism. Output/Target and Unexcused Absences are measured at the daily level and these specifications include day fixed effects. Bonus earnings are measured at the weekly level and these specifications include week fixed effects and the modal assigned supervisors for each week are used to measure supervisor quality. Supervisor controls include the number of supervisors assigned to each worker and their average gender, religion, and tenure. Standard errors are clustered at the team level. *p < 0.1, ** p < 0.05, *** p < 0.01.

Table A.16: Quality of Head Supervisor and Worker Performance

	(1) Output/Target	(2) Individual Bonus	(3) Group Bonus	(4) Unexcused Absence
Score of Head Supervisor	0.077***	148.375	1195.767***	-0.017**
	(0.016)	(492.822)	(376.910)	(0.007)
Mean	0.763	7922.276	4336.002	0.053
SD	0.517	10322.304	5072.132	0.224
Operation FEs	✓			
Worker FEs	✓	✓	✓	✓
Date FEs	✓	✓	✓	✓
Supervisor Controls	✓	✓	✓	✓
SEs Clustered Roster Supervisor	✓	✓	✓	✓
Number of Teams	51	57	57	61
Number of Workers	1642	2094	2094	1914
Number of Dates	139	22	22	161
R2	0.486	0.671	0.723	0.292

Notes: This table reports the results from estimating Equation 3, regressing the standardized leadership score of a worker's head supervisor, as indicated in the monthly roster from March - September 2023, on daily efficiency (Output/Target); individual bonus earnings; group bonus earnings; and unexcused absenteeism. Output/Target and Unexcused Absences are measured at the daily level and these specifications include day fixed effects. Bonus earnings are measured at the weekly level and these specifications include week fixed effects and the modal assigned supervisors for each week are used to measure supervisor quality. Supervisor controls include the supervisor's gender, religion, and tenure. Standard errors are clustered at the roster supervisor level. *p < 0.1, ** p < 0.05, *** p < 0.01.

Table A.17: Referral Bonus and Managerial Quality: Coworker Selection

	(1) Total Score	(2) Production Score	(3) Traits Score	(4) Logic Score
Incentivized Coworker Referral	-2.855	-2.654***	-0.025	-0.175
	(1.733)	(0.996)	(0.656)	(0.545)
Control Mean	50.223	33.079	10.583	6.561
Control SD	14.076	7.946	5.586	4.644
Coworker Controls	✓	✓	✓	✓
N Referrals	308	308	308	308

Notes: This table reports the effects of randomized referral incentives on the managerial quality of the workers referred by coworkers for promotion. Quality is measured by a worker's score on a management test, including the total score and the score on each sub-section of the test: production knowledge, soft skills, and logical reasoning. Coworker controls, including gender, religion, marital status, and tenure are included in all regressions. Standard errors are clustered by coworker. *p < 0.1, ** p < 0.05, *** p < 0.01.

Table A.18: Referral Bonus and Other Attributes: Coworker Selection

	(1) Demographics Index	(2) Performance Index	(3) Connections Index
Incentivized Coworker Referral	0.039	0.013	-0.106
	(0.085)	(0.025)	(0.073)
Control Mean	-0.191	-0.026	0.030
Control SD	0.819	0.213	0.687
Coworker Controls	✓	✓	✓
N Referrals	356	356	449

Notes: This table reports the effects of randomized financial incentives on three inverse-covariance weighted summary indices (Anderson, 2008) of characteristics of the workers referred by coworkers for promotion: (1) demographics (gender, religion, and marital status), (2) work performance in the prior year, May 2022 - May 2023 (tenure; average, standard deviation, and fixed effect of output/target; proportion of working days attended; median and standard deviation in bonus earnings; and key performance indicators); and (3) personal connections (whether a coworker refers a worker of the same gender or religion, and whether a coworker can provide the personal mobile number of the referred worker). Coworker controls, including the coworker's gender, religion, marital status, and tenure are included in all regressions. Standard errors are clustered by coworker. *p < 0.1, ** p < 0.05, *** p < 0.01.

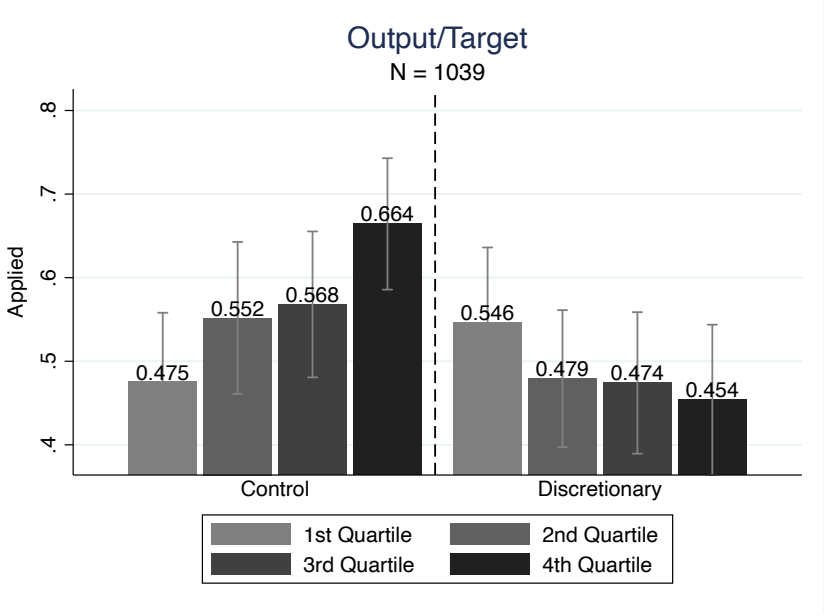


Figure A.2: Application Rates by Productivity

Notes: This figure illustrates the average application rates across Control and Discretionary application forms by quartiles of worker output/target fixed effects, with higher quartiles representing better performance. Output/Target is each worker's fixed effect from a regression that includes operation fixed effects and day fixed effects using data from the year prior to the experiment (May 2022 - May 2023). 95% confidence intervals are displayed.

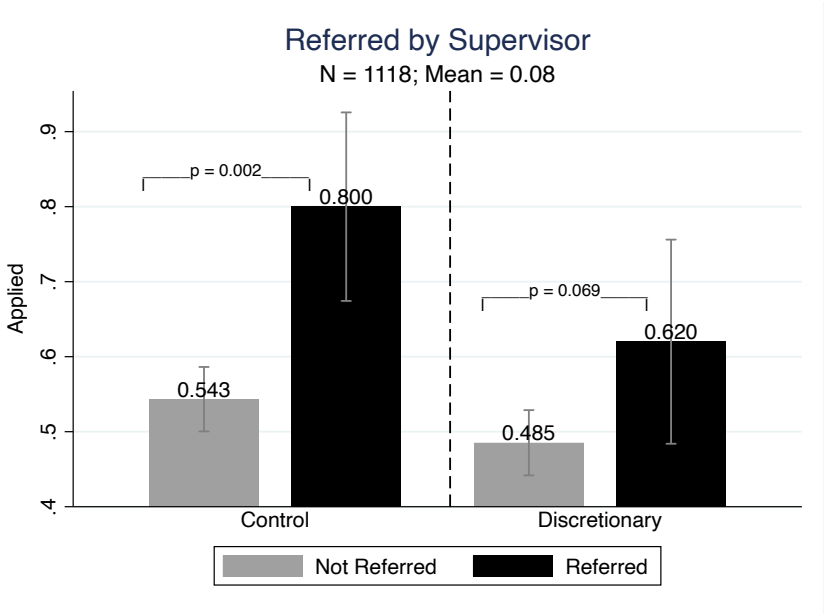


Figure A.3: Application Rates by Referral Status

Notes: This figure illustrates the average application rates across Control and Discretionary application forms by whether a worker received a referral from any supervisor. 95% confidence intervals are displayed. P-values from tests of difference in means in application rates between workers who were referred versus not referred by any supervisor are reported.

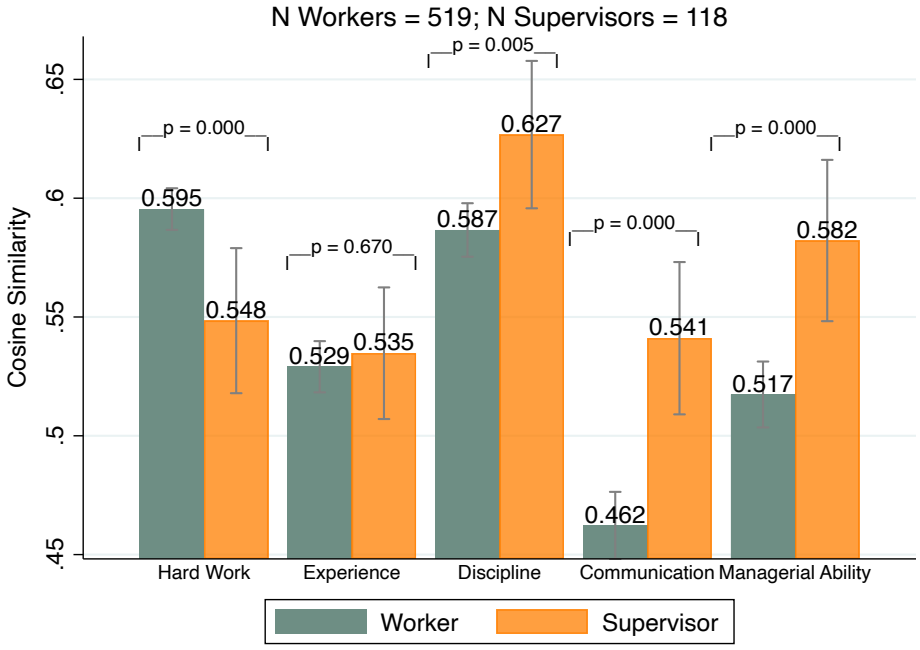


Figure A.4: Sentiment Analysis of Worker versus Supervisor Responses

Notes: This figure illustrates the cosine similarity between worker responses to the question "Please tell us why you are a good candidate for the leadership training program," and supervisor responses to the question "In your opinion, what are the three most important skills or traits someone should have to succeed as a supervisor at [firm name]?" for a list of target phrases identified from sentiment analysis of supervisor responses. P-values from tests of differences in means between worker and supervisor responses for each target phrase are displayed.

Table A.19: Sorting Experiment: Heterogeneous Treatment Effects

	(1) Applied	(2) Applied	(3) Applied	(4) Applied	(5) Applied	(6) Applied	(7) Applied	(8) Applied	(9) Applied	(10) Applied	(11) Applied	(12) Applied
Discretionary Application	-0.068**	-0.068**	-0.067**	-0.068**	-0.046	-0.012	-0.135*	-0.041	-0.059*	-0.066**	-0.062**	0.004
	(0.031)	(0.031)	(0.031)	(0.031)	(0.037)	(0.051)	(0.080)	(0.041)	(0.033)	(0.032)	(0.032)	(0.092)
Panel A: Work Performance												
Treat X Output	-0.076**											-0.079**
	(0.031)											(0.032)
Treat X Indv Bonus		-0.020										-0.009
		(0.031)										(0.034)
Treat X Group Bonus			-0.039									-0.053
			(0.031)									(0.033)
Treat X Attend				-0.001								-0.027
				(0.031)								(0.040)
Treat X KPIs					-0.005							-0.007
					(0.005)							(0.006)
Treat X Tenure						-0.017						-0.019
						(0.012)						(0.013)
Panel B: Demographics												
Treat X Female							0.079					0.072
							(0.086)					(0.090)
Treat X Muslim								-0.060				-0.060
								(0.062)				(0.063)
Treat X Married									-0.093			-0.086
									(0.099)			(0.099)
Panel C: Supervisor Referrals												
Treat X Referred Sup C										-0.039		-0.011
										(0.129)		(0.133)
Treat X Referred Sup T											-0.149	-0.085
											(0.142)	(0.146)
Control Mean	0.563	0.563	0.563	0.563	0.563	0.563	0.563	0.563	0.563	0.563	0.563	0.563
Control SD	0.496	0.496	0.496	0.496	0.496	0.496	0.496	0.496	0.496	0.496	0.496	0.496
Worker Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N	1035	1035	1035	1035	1035	1035	1035	1035	1035	1035	1035	1035

Notes: This table reports heterogeneous treatment effects of Discretionary applications on whether a worker applies for promotion by various worker characteristics, including work performance variables in Panel A, worker demographics in panel B, and whether a worker was referred by a Control or Incentivized supervisor in Panel C. Work performance controls include tenure, output/target fixed effects, median bonus earnings, and KPIs. Demographic controls include gender, religion, and martial status. Continuous variables have been standardized by their mean and standard deviation. Robust standard errors are reported in parentheses. *p $<$ 0.1, ** p $<$ 0.05, *** p $<$ 0.01.

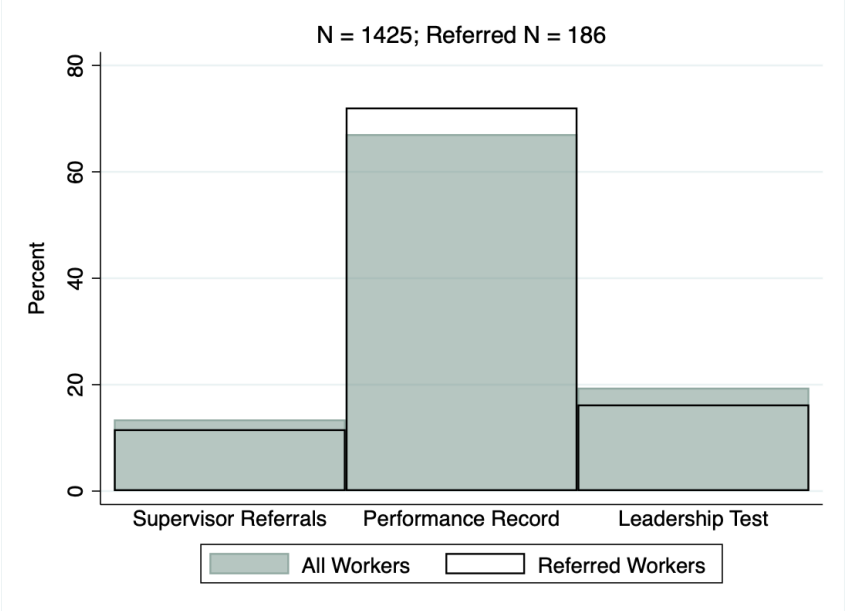


Figure A.5: Worker Preferences over Promotion Selection Criteria

Notes: This figure illustrates the distribution of survey responses to the question "Which do you think should be the MOST important factor considered when selecting workers for promotion?" from the worker opinion survey that took place during the second selection round. Responses are displayed separately for all workers and for the subset of workers who were referred by any supervisor during the second selection round.

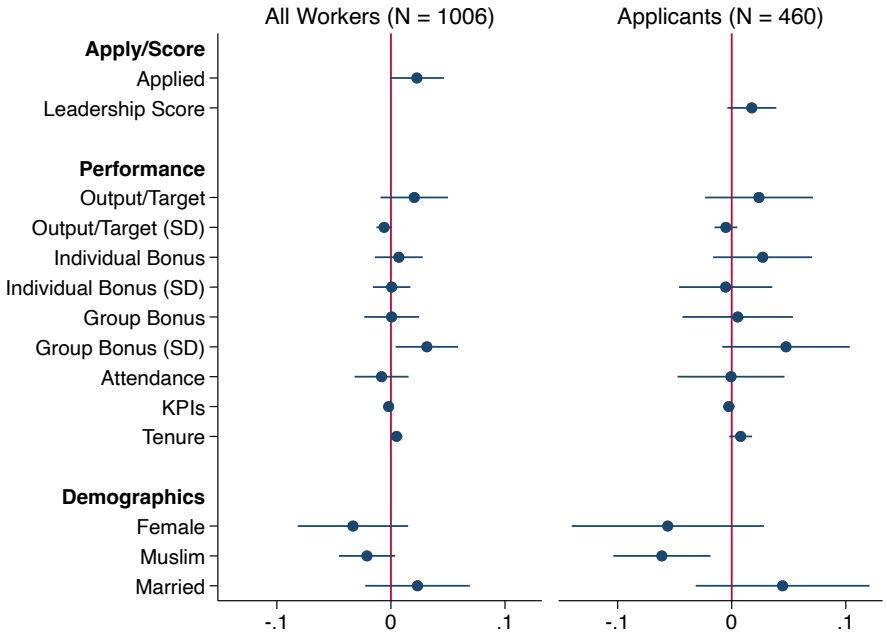


Figure A.6: Predictors of Control Supervisor Referrals

Notes: This figure plots the estimated coefficients from regressions predicting the likelihood that a worker is referred by a control supervisor in the selection experiment for either the entire sample of workers or for the sub-sample of workers who applied for promotion and took the leadership test. 95% confidence intervals are displayed.

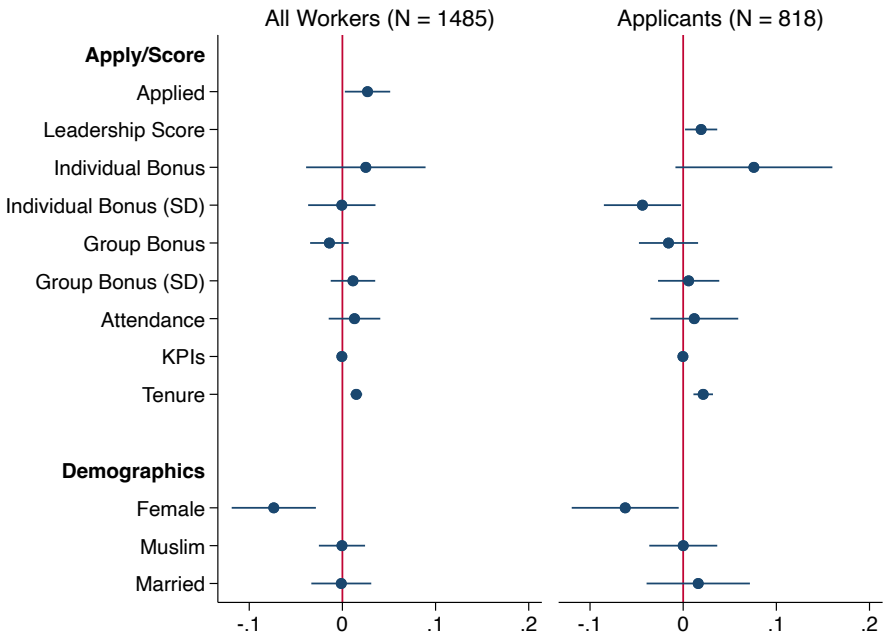


Figure A.7: Predictors of Second Round Supervisor Referrals

Notes: This figure plots the estimated coefficients from regressions predicting the likelihood that a worker is referred by a supervisor in the second selection round for either the entire sample of workers or for the sub-sample of workers who applied for promotion and therefore took the leadership test. 95% confidence intervals are displayed.

Appendix B

Leadership Test Questions

Section A – Production Knowledge

There are three different versions of the production test: Cutting, Sewing, and Finishing. Workers only receive the version of the production test that matches their job description.

Cutting Production Test

A.1 Cutting Process – Arrange the following 6 cutting processes in the correct sequence step by step, starting from the beginning to the last step. Enter "1" for the first step, "2" for the second step, and continue to "6" for the last step.

Cutting	
Fabric relaxing as per the buyer requirements	
Numbering	
Bundling	
PO wise fabric receiving from main warehouse	
Fabric laying	

A.2 Causes of Quality issues in Cutting

A.2.1. Why do we put notches/cut-marks during cutting?

A.2.2. What's the danger of not following table markings during laying?

A.2.3. Why should the marker be checked before laying?

A.2.4. Why do we do numbering?

A.2.5. Why do we do bundling in cutting?

A.2.6. Why should laying be done according to shade allocation?

A.2.7. Why is it necessary to give identity off-cuts?

Sewing Production Test

Choose the correct answer from the choices provided

A.1. SPI (Stitches Per Inch) – What is the meaning SPI (Stitches per Inch)?

( )

A. The machine speed per inch

B. The distance between each needle stitch per inch

C. The amount of different needle stitch types per inch

A.1.2. Why is it important to set the SPI (Stiches Per Inch) on the machine and by whom should this be done?

( )

A. Before sewing starts, the machine SPI (Stitches per Inch) is determined by each machine. So, depending on the specifications of the buyer, there will be used different types of machines.

B. B. Before the sewing starts, the machine SPI (Stitches Per Inch) needs to be set by the Mechanic as per the technical specifications by the buyer. Also, Supervisors should be aware. No one is allowed to tamper with this setup, as this may cause production variation.

C. C. Before the sewing starts, the machine SPI (Stitches Per Inch) is set by the Manager on each machine to assure maximum speed.

A.2. Parts of a Garment

The letters A, B, C, D, E and F identify different parts of a garment in the pictures below. Indicate which letter correctly identifies each part of the garment listed in the table.

Back Yoke	
Coin Pocket	
Front Panel	
Back Panel	
Waistband	
Back Pocket	

A.3. Sewing Machines

Identify the correct machine used to tailor the areas marked by the letters A, B, C, D, E, F, G, and H in the pictures below.

Single Needle Top Stitch	
5 Thread Overlock	
Kansai (Belt)	
Flat Lock (Cover Stitch)	
FOA (Felt Seam)	
5 Thread Overlock + Single Needle Chain Stitch	

A.4. Causes of Quality Issues

Choose the correct answer(s) from the choices provided

A.4.1. What causes High/Low at corner close?

A. Cutting mistake

B. Different sizes of panels

C. Sewing not done correctly

D. Not following mark at corner close belt area

( )

A.4.2. What are the TWO reasons for twisted leg?

A. Washing with too hot water

B. Bundle has been stored poorly

C. Wrong size panels

D. Missing cut marks / Poor operator handling

( ) ( )

A.4.3. What is the cause of out of shape hips?

A. Misplaced back pockets

B. Machine error

C. Not following gauge / Wrongly cut panels

D. Wrong fabric

( )

A.4.4. What causes out of shape waistband?

A. Sewing has not been done correctly

B. Not following marks

C. Operator has pulled fabric

D. Laundry used wrong washing formula

( )

A.4.5. Give TWO causes of skip stitch at chain stitch

A. Improper setting of the looper

B. Mechanic has not set machine properly

C. Power voltage not adequate for machine

D. Wrong needle size / Blunt needle

( ) ( )

A.4.6. Give TWO causes of needle holes

A. Wrong needle size / Blunt needle

B. Improper setting of the feed-dog

C. Operator misusing the trimmer

D. Cutting mistake

( ) ( )

……

Finishing Production Test

A.1. Finishing Process – Arrange the following 10 finishing processes in the correct sequence step by step, starting from the beginning to the last step. Enter "1" for the first step, "2" for the second step, and continue to "10" for the last step.

Trimming	
Packing	
Button Attach	
Pressing	
Final QC	
Loop Cutting	
100% Waist and Inseam Measurement	
Tagging	
Heat-Seal	
Shading	

A.2. Causes of Quality Issues in Finishing

Choose the correct answer(s) from the choices provided

A.2.1. What causes shine marks in pressing?

A. Pressing without using iron shoe

B. Temperature is too hot ( )

C. Machine error

D. Operator leaving iron too long on garment

A.2.2. Name TWO causes of cut damage in finishing

A. Washing mistake

B. Trimming ( ) ( )

C. Ironing too hot

D. Loop cutting

A.2.3. What is the cause of oxidation in finishing?

A. Washing mistake

B. Ironing operator misuse ( )

C. Exposing garments to light for long hours

D. Oxidation is not possible on denim garments

A.2.4. What could be the cause of watermarks in finishing?

A. Wet steam during pressing and also poor housekeeping

B. Heavy rains and weather conditions ( )

C. Laundry has not dried garments well

D. Packaging is humid

A.3. Quality Issues

Identify the correct name for each defect depicted in the pictures below and labeled by the letters A, B, C, D, E, F, G, H, I, and J.

Loose Tension	
Missing Bartack	
Pilling	
Run-off	
Seam Puckering	
Pleat	
Colour Shade	
Broken Stitch	
Fabric Defect	
Raw Edge	

Section B - Soft Skills

For each of the statements below, circle the response that best characterizes the extent that you agree with the statement with 1 being "Not at all", 2 being "To a little extent", 3 being "To some extent", 4 being "To a large extent", and 5 being "To a great extent"

	Not at all	To a little extent	To some extent	To a large extent	To a great extent
B1. I need a push to get started	1	2	3	4	5
B2. I pay attention to details	1	2	3	4	5
B3. At times, I think I am no good at all	1	2	3	4	5
B4. I get sidetracked when I work	1	2	3	4	5
B5. I believe that my success depends on ability rather than luck	1	2	3	4	5
B6. It is not wise to plan too far ahead because many things turn out to be a matter of luck anyway	1	2	3	4	5
B7. I find time to listen to members of my line	1	2	3	4	5

	Not at all	To a little extent	To some extent	To a large extent	To a great extent
B8. I keep to myself	1	2	3	4	5
B9. I am able to do things as well as most other people	1	2	3	4	5
B10. I make plans and stick to them	1	2	3	4	5
B11. When I'm doing something and obstacles get in the way, I am very likely to see it through	1	2	3	4	5
B12. I believe some people are born lucky	1	2	3	4	5

Section C – Work Style

For each question below, please circle the answer choice that best describes you.

C1. If a problem arises at work, I usually:

a. Find a solution on my own

b. Don't do anything, the problem usually fixes itself

c. Involve a supervisor or incharge to find a solution

C2. Suppose you have two tasks, one easy and one hard. Both need to be done today, and you have enough time and resources to do both today. You have the choice between two options. Which option would you choose?

a. Do the easy task first

b. Do the hard task first

Section D - Arithmetic

Please answer the following arithmetic problems to the best of your ability

D.A. $1.3 + 19.1 =$ _____

D.B. $22.25 - 7.08 =$ _____

D.C. Which is larger, ½ or ⅓ ? _____

D.D. Which of these mean $7/10$? *(Indicate your answer by circling the correct answer choice below)*

a. 70
b. 7
c. 0.7
d. 0.07

( )

Let's say the bonus rule for a task is this: If you make 1,500 units you earn 1,000 Tsh, and for each 100 units you make above 1,500 you earn an additional 150 Tsh.

D.E. Based on this rule, how much bonus would you earn if you produced 1,250 units?

Answer: _____

D.F. Based on this rule, how much bonus would you earn if you produced 1,500 units?

Answer: _____

D.G. Based on this rule, how much bonus would you earn if you produced 1,750 units?

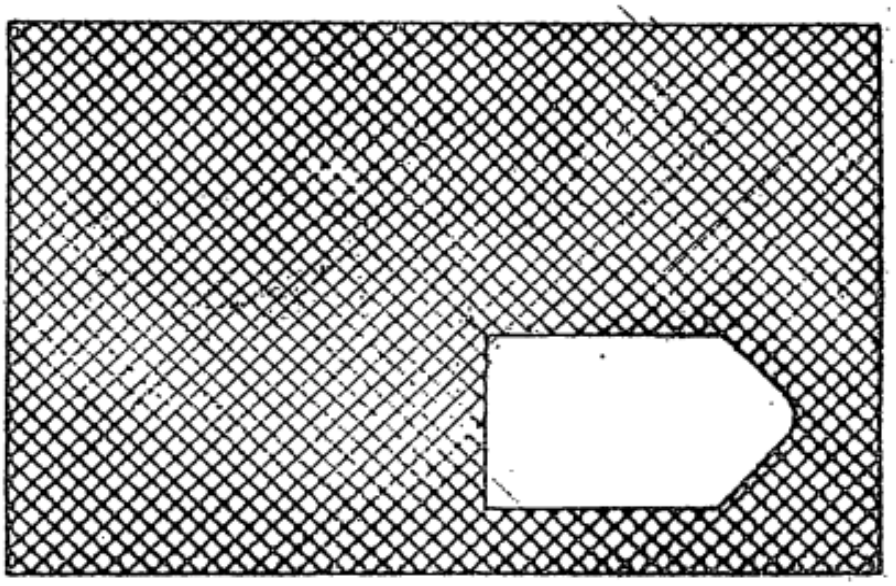
Answer: _____

Section E – Graphic Puzzles

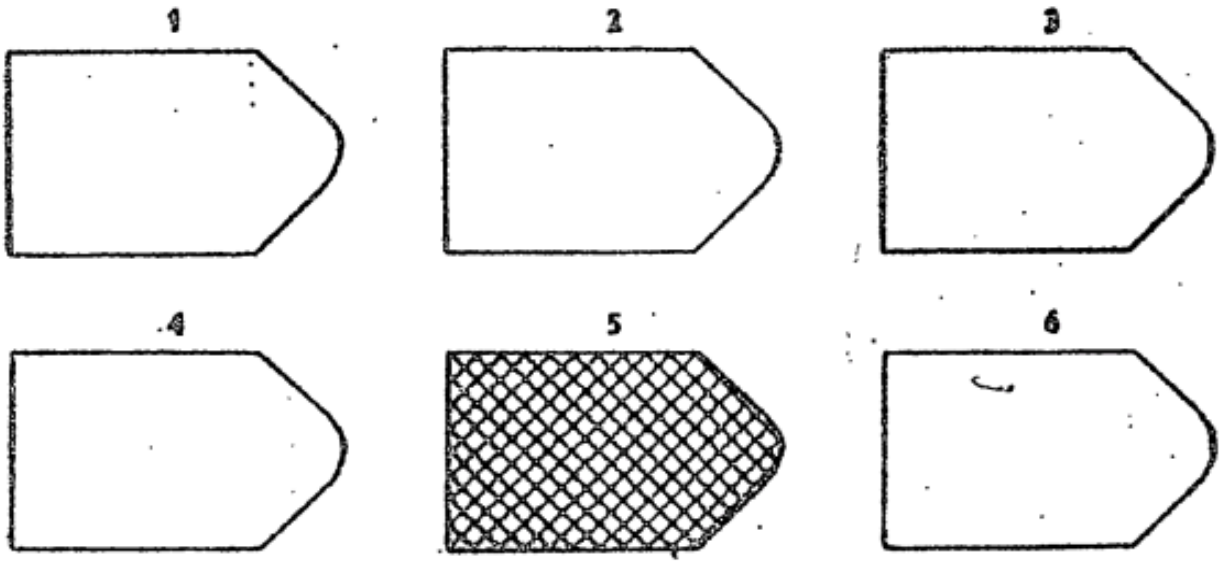
For the following questions, please indicate your answer by writing the number of the piece that completes the diagram correctly among the pieces numbered 1, 2, 3, 4, 5, and 6 in the brackets (parentheses) placed in front of the diagram.

Example

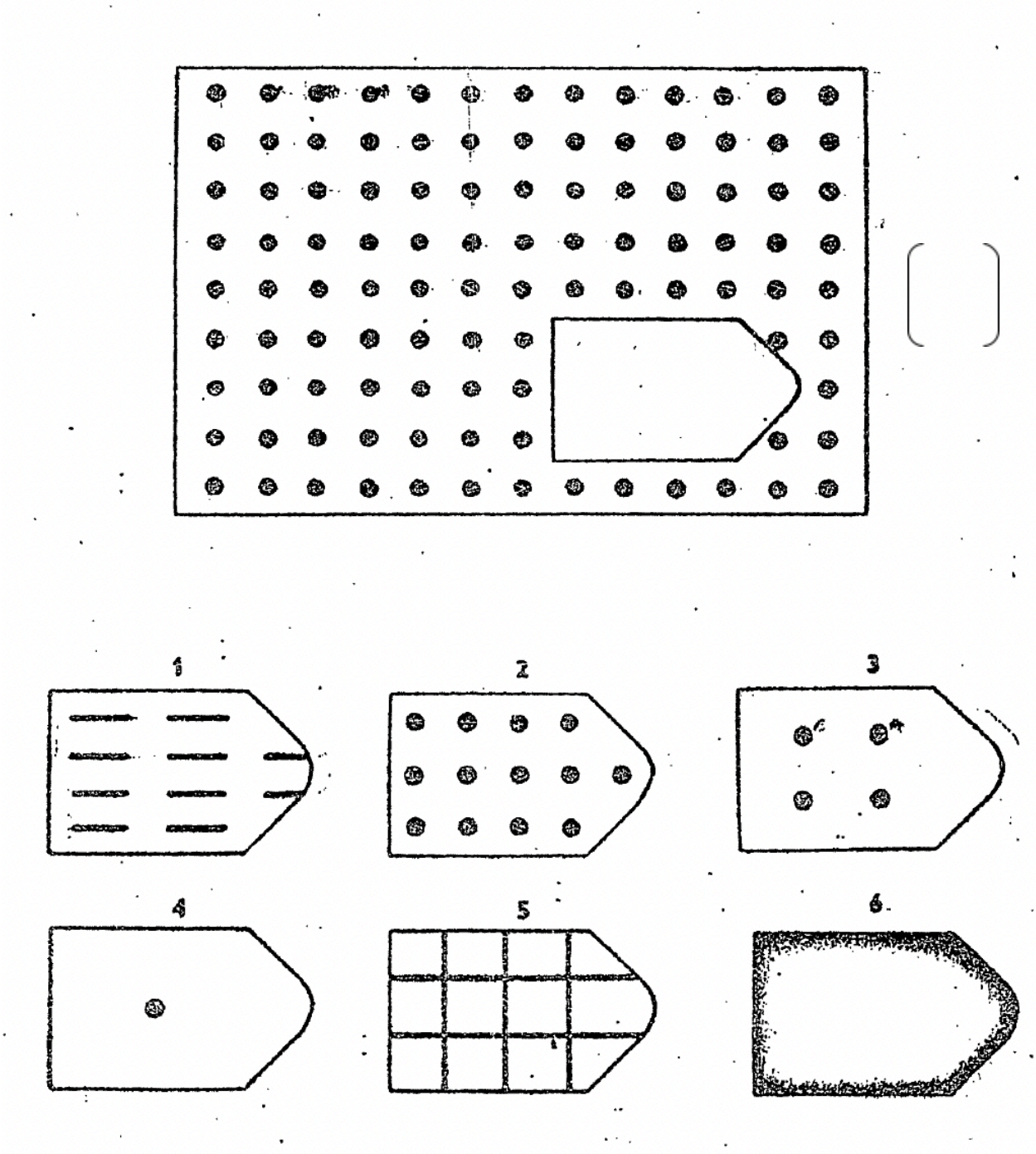
For this diagram, piece "5" best fits the overall pattern



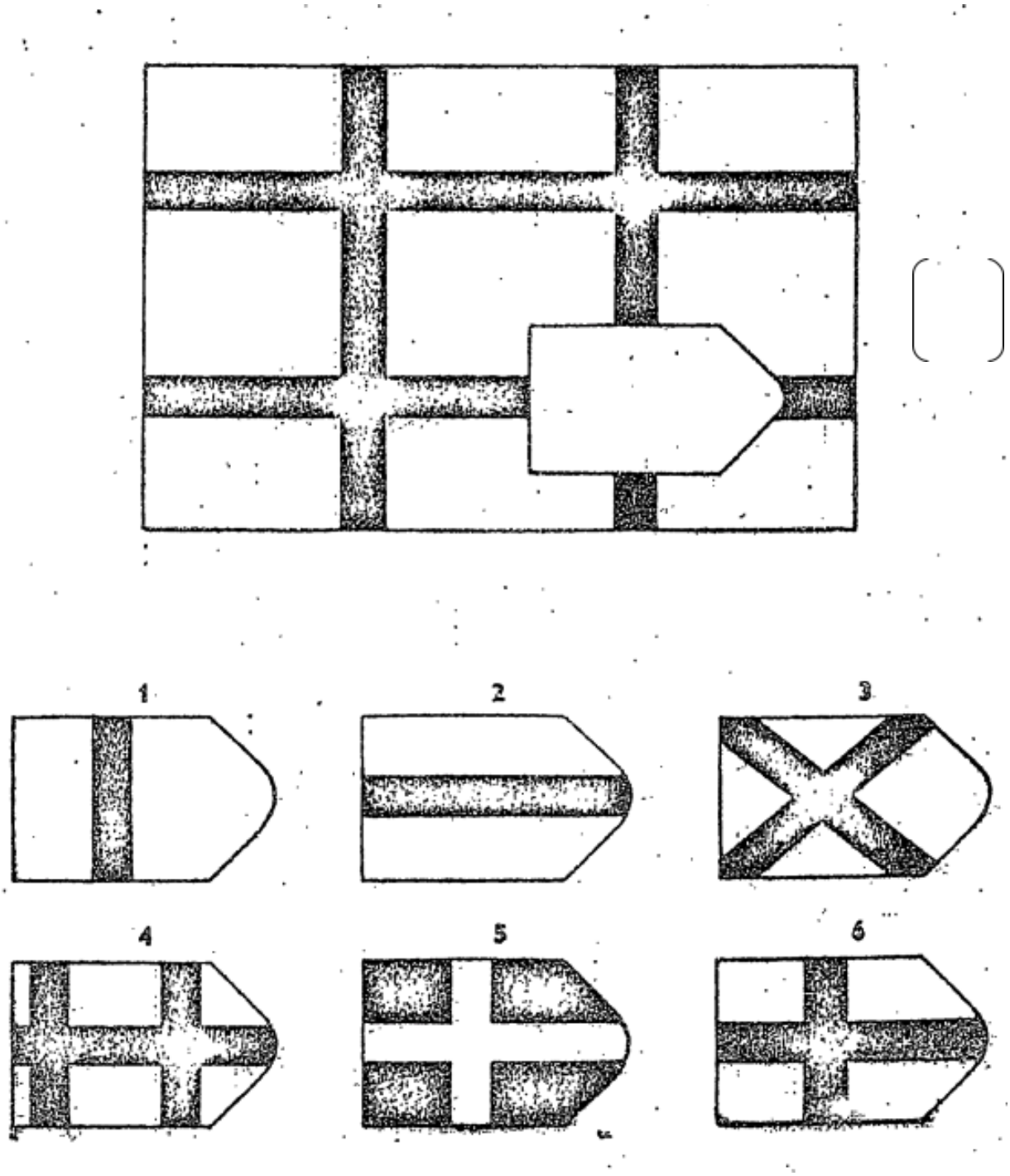
(5)



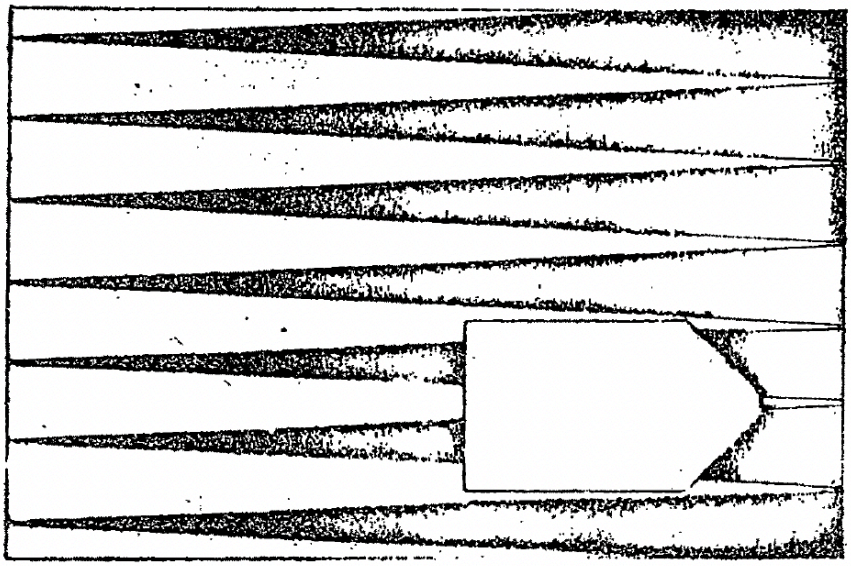
E1

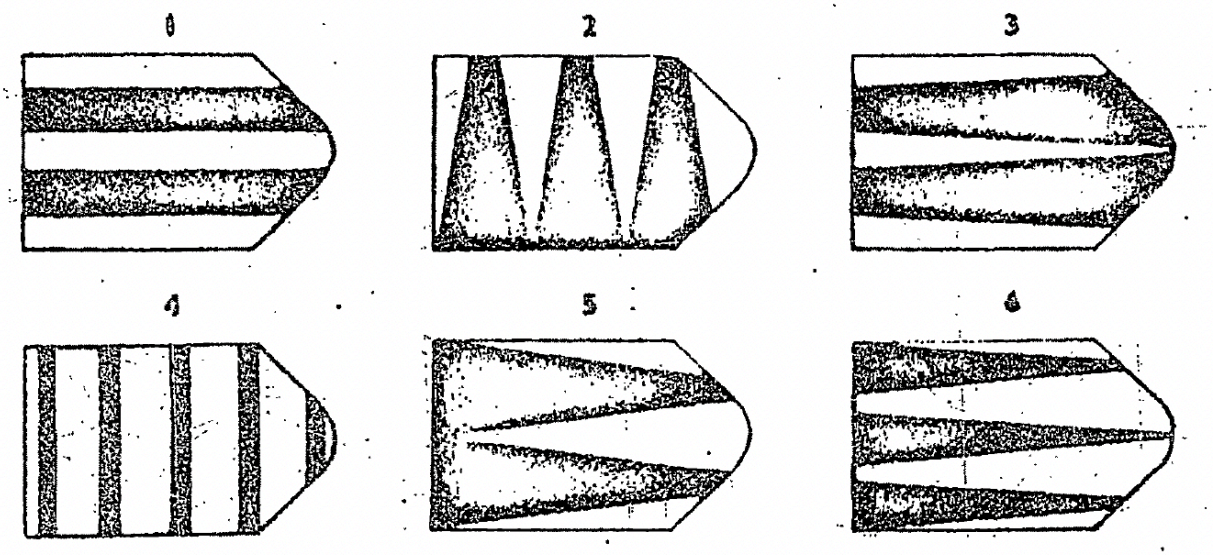


E2

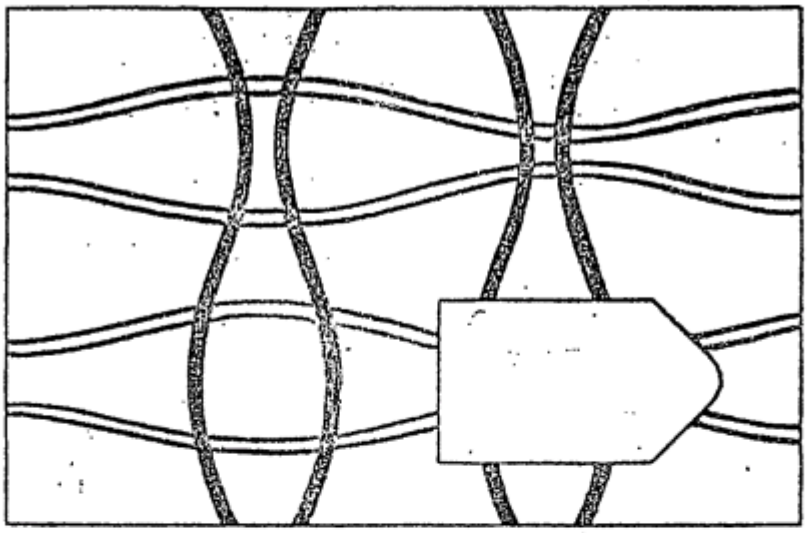


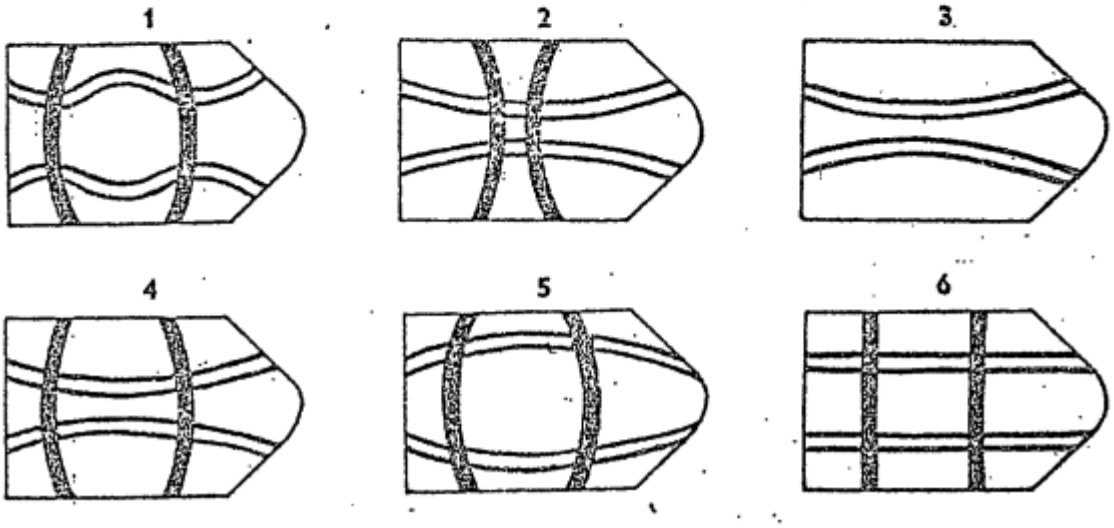
E3



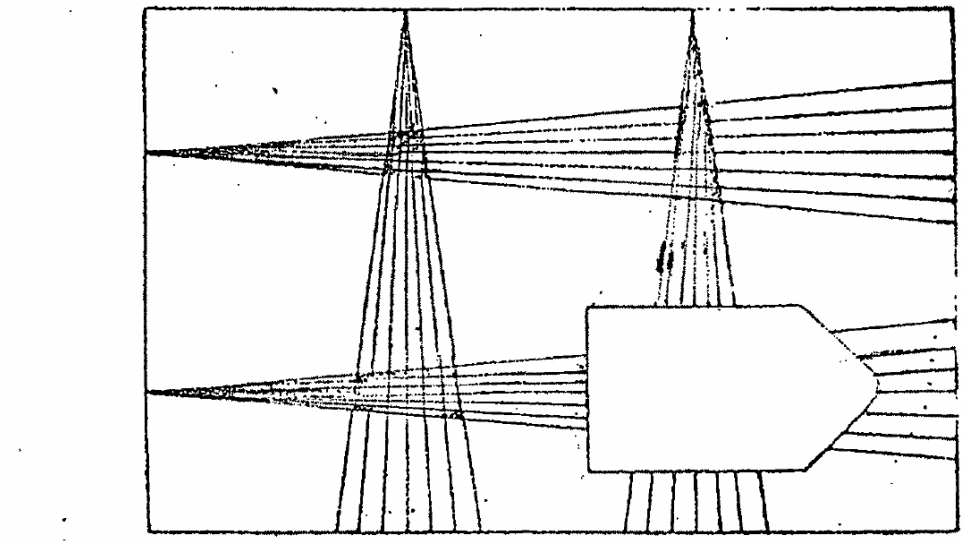


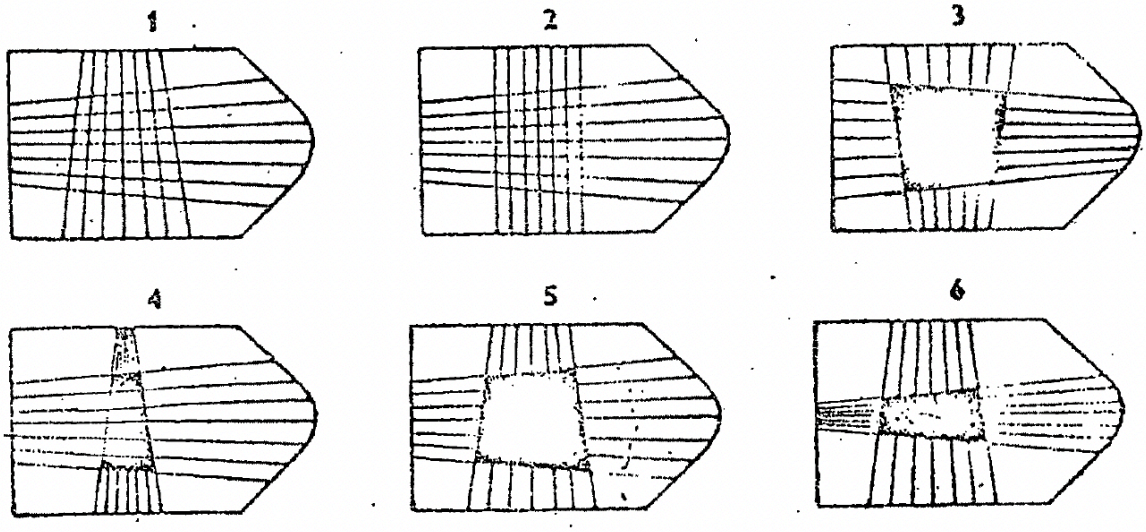
E4





E5





Appendix C

Supervisor Referrals - Moderator Script

Hello, my name is _____ and I work for an independent survey firm [name]. We are partnering with [firm name] to study their professional development opportunities for workers. As you may recall, [firm name] is conducting a Skills and Leadership Training Program in July-August. The purpose of the training is to identify promising workers and train them in technical production skills, leadership, and management skills. Since space is limited, only some workers will be selected to participate in the training. The HR team will select workers for the training based on a variety of criteria, including supervisor referrals. As current supervisors, you have the opportunity to recommend workers who are below the Supervisor level for the training.

Please note that as current supervisors, you are already leaders at [firm name], so the training is not intended for you. The purpose of the training is to professionalize the skills of entry-level workers. The training will not negatively impact the employment of any current supervisors and will not result in the substitution of any current supervisors.

To give you more details, the training will take place for approximately 3 weeks in July - August, Monday - Friday from 8am - 5pm. Selected trainees are expected to attend every day of the training and to show up on time. Trainees will continue to receive their regular base salary throughout the training program. All trainees who successfully complete the training will receive a Training Certificate. At the end of the training, the HR team will assess the technical and leadership skills of each trainee through a verbal technical test and a panel interview.

We would now like to invite you to a brief session which gives you the opportunity to recommend up to 2 workers for the Leadership Training program. If you agree to participate, you will be randomly assigned to a smaller session which will occur directly after this. During the session, we will explain the referral process further and you will be given the opportunity to refer up to 2 workers for the training. If you would like to participate, please simply remain in this room and await further instructions. If you do not wish to participate, you may simply leave the meeting at this time. Please note that participation is strictly voluntary and will not negatively affect your employment or compensation. Thank you for your time and attention.

[Session moderator: Please go 1 by 1 in the order that respondents are seated and assign them to either Group A or Group B. As you assign someone to Group A, tell them to stand on one side of the room. As you assign someone to Group B, tell them to stand on the opposite side of the room. Continue this process until everyone has been assigned to Group A or Group B. Make sure supervisors do not switch their assignments during this process!

Then assign 1 enumerator to lead Group A and a second enumerator to lead Group B. We want approximately 1 enumerator for every 10 supervisors. If there are 20 or more supervisors in each

group, assign 2 enumerators for Group A (1 enumerator for half of Group A, 1 enumerator for the second half of Group A) and 2 enumerators for Group B (1 enumerator for half of Group B, 1 enumerator for the second half of Group B). Each enumerator should take their assigned group to a quiet location outside to conduct the referral process. IMPORTANT: Please make sure that Groups A and Groups B are taken to completely separate areas where they will not overhear or be able to see what is going on in the other group.]

Supervisor Referral Script - Group A

Hello, my name is _____, I work with the survey firm [name], and I will now discuss the referral process with you during this meeting. You will now be given the opportunity to refer up to 2 workers for the Skills and Leadership Training program. You can refer any worker at [firm name], not just the workers you currently supervise, as long as the worker is not already a supervisor.

In appreciation for your referrals, for each worker you refer, if that worker successfully completes the entire training and scores within the top 50% of the training cohort, as measured by their scores on the verbal technical test and panel interview, you will receive a referral bonus of 20,000Tsh, which will be paid to you via mobile money within 2 weeks of the training program finishing (roughly by the end of August). Specifically, among the 2 workers you refer, if none complete the training or score within the top 50% of the training cohort, you will not receive any referral bonus; if 1 of the workers you refer completes the training and scores within the top 50% of the training cohort you will receive a referral bonus of 20,000 Tsh, and if both of the workers you refer complete the training and score within the top 50% of the training cohort you will receive a referral bonus of 40,000 Tsh. Do you understand how your referral bonus will be determined? If you have any questions about the referral bonuses I can answer them now.

[*Enumerator hands out the Supervisor Referral Forms*]

I have just handed you a Supervisor Referral Form, which I will now briefly review with you. The top of the form asks for your name and ID number. The form also asks for your phone number and a second phone number if you have one, please make sure you put an accurate phone number where we may reach you. The form also asks what facility, line or department, and job description you currently have. Next, you have the option to refer up to 2 workers for the training program in the boxes. For each worker you want to refer, please provide their name, ID number, phone, facility, line or department, and job description in one of the boxes. It is ok if you do not know all of this information for the worker you are referring, please just fill out this section to the best of your ability. You may use your phone to fill out the information.

The second page of the form asks you three additional questions. The first question asks what are the 3 most important responsibilities you have in your role as supervisor. The second question asks what are the 3 most important skills or traits you think someone should have to succeed as a supervisor at [firm name]. The third question asks what is one question you would ask in an interview to assess whether someone has the necessary skills or traits to succeed in a leadership role at [firm name]. There are no right or wrong answers, we just want to know your opinions. Please fill out this section to the best of your ability. If anything is unclear about the form, please ask now for clarifications.

Any information you provide on this form will be shared with [firm name] as well as with the research team and and for research purposes may be associated with other existing data from the factory. You are free to skip any section of the form that you do not want to fill out.

We will now give you 10 minutes to read and complete the referral form. To ensure everyone has privacy to complete their forms, please do not look at anyone else's forn and please do not talk to anyone else at this time. Please hold all questions until after all forms have been collected. Please try to complete the form on your own to the best of your ability. If you really are in need of assistance, you may raise your hand and I will come assist you. Thank you.

[*After 10 minutes, the enumerator collects all forms*]

Supervisor Referral Script - Group B

Hello, my name is _____, I work with the survey firm [name], and I will now discuss the referral process with you during this meeting. You will now be given the opportunity to refer up to 2 workers for the Skills and Leadership Training program. You can refer any worker at [firm name], not just the workers you currently supervise, as long as the worker is not already a supervisor.

[*Enumerator hands out the Supervisor Referral Forms*]

I have just handed you a Supervisor Referral Form, which I will now briefly review with you. The top of the form asks for your name and ID number. The form also asks for your phone number and a second phone number if you have one, please make sure you put an accurate phone number where we may reach you. The form also asks what facility, line or department, and job description you currently have. Next, you have the option to refer up to 2 workers for the training program in the boxes. For each worker you want to refer, please provide their name, ID number, phone, facility, line or department, and job description in one of the boxes. It is ok if you

do not know all of this information for the worker you are referring, please just fill out this section to the best of your ability. You may use your phone to fill out the information.

The second page of the form asks you three additional questions. The first question asks what are the 3 most important responsibilities you have in your role as supervisor. The second question asks what are the 3 most important skills or traits you think someone should have to succeed as a supervisor at [firm name]. The third question asks what is one question you would ask in an interview to assess whether someone has the necessary skills or traits to succeed in a leadership role at [firm name]. There are no right or wrong answers, we just want to know your opinions. Please fill out this section to the best of your ability. If anything is unclear about the form, please ask now for clarifications.

Any information you provide on this form will be shared with [firm name] as well as with the research team and and for research purposes may be associated with other existing data from the factory. You are free to skip any section of the form that you do not want to fill out.

We will now give you 10 minutes to read and complete the referral form. To ensure everyone has privacy to complete their forms, please do not look at anyone else's forn and please do not talk to anyone else at this time. Please hold all questions until after all forms have been collected. Please try to complete the form on your own to the best of your ability. If you really are in need of assistance, you may raise your hand and I will come assist you.

We have an announcement to share with you afterwards, so please do not leave early. Please stay seated and wait until everyone has completed their forms. Thank you.

[*After 10 minutes, the enumerator collects all forms. IMPORTANT: Enumerator, please do not let respondents leave early. Remind them to stay because of an important announcement that will occur once all the forms have been completed and collected.*]

You have now just completed the referral process. In appreciation for your referrals, for each worker you refer, if that worker successfully completes the entire training and scores within the top 50% of the training cohort, as measured by their scores on the verbal technical test and panel interview, you will receive a referral bonus of 20,000Tsh, which will be paid to you via mobile money within 2 weeks of the training program finishing (roughly by the end of August). Specifically, among the 2 workers you refer, if none complete the training or score within the top 50% of the training cohort, you will not receive any referral bonus; if 1 of the workers you refer completes the training and scores within the top 50% of the training cohort you will receive a referral bonus of 20,000 Tsh, and if both of the workers you refer complete the training and score within the top 50% of the training cohort you will receive a referral bonus of 40,000 Tsh. Do you understand how your referral bonus will be determined? If you have any questions about the referral bonuses I can answer them now.

Supervisor Referral Form

Name:_____ ID Number: _____

Factory:_____ Line/Department: _____

Current Job Description: _____

Phone Number: _____ Second Phone Number: _____

[Firm name] is conducting a Skills and Leadership Training program. As current supervisors, you are already leaders, so the training is not intended for you. However, as a current supervisor you are invited to recommend up to 2 workers for the training program. You can refer any worker at [firm name], not just the workers you currently supervise, as long as the worker is not already a supervisor. Any information you provide on this form will be shared with [firm name] as well as with the research team and for research purposes may be associated with other existing data from the factory. You are free to skip any section of this form.

Referrals for the Skills and Leadership Training Program

Referral #1	**Referral #2**
Please provide the following information for the first worker you are referring:	*Please provide the following information for the second worker you are referring:*
Full Name: _____	Full Name: _____
ID Number: _____	ID Number: _____
Phone: _____	Phone: _____
What is their current position?	What is their current position?
Facility: _____	Facility: _____
Line/Department: _____	Line/Department: _____
Job Description: _____	Job Description: _____

Leadership Traits

L1. In your opinion, what are the 3 most important responsibilities of your role as supervisor?

1. _____

   _____

2. _____

   _____

3. _____

   _____

L2. In your opinion, what are the 3 most important skills or traits someone should have to succeed as a supervisor at [firm name]?

1. _____

   _____

2. _____

   _____

3. _____

   _____

L3. In your opinion, what is one question you would ask in an interview to assess whether someone has one of the skills or traits you mentioned above in L2?

_____

_____

_____

Appendix D

Discretionary Application

[Firm Name] Skills and Leadership Training Application Card

You are invited to apply for the Skills and Leadership Training program. The training will take place for approximately 3 weeks in July - August, Monday - Friday from 8am - 5pm. All participants who successfully complete the training will receive a Training Certificate from. Any information you provide on this card will be shared with [firm name] as well as with the research team and for research purposes may be associated with other existing data from the factory. You are free to skip any section of this card.

Name:_____ **ID Number:** _____

Factory:_____ **Line/Department:** _____

Current Job Description: _____

Would you like to apply for the Skills and Leadership Training Program? (Please pick one option)

Note: Workers will be selected for the training based on many criteria, including their supervisor referrals.

❒ No **❒ Yes**

If you selected Yes, please tell us why you are a good candidate for the Skills and Leadership training program.

……

……

……

……

Form ID #

Control Application

[Firm Name] Skills and Leadership Training Application Card

You are invited to apply for the Skills and Leadership Training program. The training will take place for approximately 3 weeks in July - August, Monday - Friday from 8am - 5pm. All participants who successfully complete the training in full will receive a Training Certificate. Any information you provide on this card will be shared with [firm name] as well as with the research team and for research purposes may be associated with other existing data from the factory.You are free to skip any section of this card.

Name:_____ **ID Number:** _____

Factory:_____ **Line/Department:** _____

Current Job Description: _____

Would you like to apply for the Skills and Leadership Training Program? (Please pick one option)

Note: Workers will be selected for the training based on many criteria, including their past performance record.

❒ No **❒ Yes**

If you selected Yes, please tell us why you are a good candidate for the Skills and Leadership training program.

……

……

……

……

Form ID #

Appendix E

Worker Opinion Survey

Section A - General Workplace Environment

For each of the statements below, circle the response that best characterizes the extent that you agree with the statement

A1. Overall, I am very satisfied with my workplace.	Not at all	To a little extent	To some extent	To a large extent	To a great extent
A2. The firm's rules are very clear to me	Not at all	To a little extent	To some extent	To a large extent	To a great extent
A3. The firm's rules are always enforced equally for everyone	Not at all	To a little extent	To some extent	To a large extent	To a great extent
A4. I feel a lot of the time what I do at work goes unnoticed	Not at all	To a little extent	To some extent	To a large extent	To a great extent
A5. My supervisors tend to show a lot of favoritism towards certain workers.	Not at all	To a little extent	To some extent	To a large extent	To a great extent
A6. The best worker is unlikely to be promoted unless they have connections with supervisors	Not at all	To a little extent	To some extent	To a large extent	To a great extent
A7. Generally speaking, the workers who work the hardest earn the most individual bonuses	Not at all	To a little extent	To some extent	To a large extent	To a great extent
A8. I tend to prefer leaders who are very similar to me in background (religion, tribe, region)	Not at all	To a little extent	To some extent	To a large extent	To a great extent

A9. Do you believe men generally make better leaders or do you believe women generally make better leaders?

a. Men generally make better leaders
b. Men and women equally make good leaders
c. Women generally make better leaders

A10. Do you think your success at [firm name] depends mostly on how hard you work or do you think it mostly depends on luck and connections?

a. Mostly depends on how hard I work
b. Mostly depends on luck and connections

A11. Overall, how would you rate your relationship with your supervisors?

a. Very poorly
b. Somewhat poorly
c. Somewhat well
d. Very well

A12. How well do you think your supervisors know you?

a. Not at all well
b. Only a little well
c. Somewhat well
d. Very well

A13. On a typical work day, how often do your supervisors monitor or check-in on you?

a. Almost never
b. Only occasionally
c. Somewhat frequently
d. Very frequently

A14. Compared to how they treat other workers, would you say that your supervisor tends to treat you?

a. Relatively worse
b. The same
c. Relatively better

Section B: Self-Evaluation

The following questions ask you about your own performance at [firm name]. Please answer these questions as accurately as possible. For questions B1 - B6, you will earn 500 Tsh for each question that you answer correctly, with a maximum possible payment of 3,000 Tsh.

B1. In the past week, what was the MAIN task that you performed and what was the production target for that task?

Task Name: _____ Task Production Target: _____

B2. In the past week, how much total bonus pay (group + individual bonus) did you receive?

_____ Tsh

B3. In the past month (March 26 - April 25) , how many times did you arrive to work late? *Write 0 if you had no late arrivals.*

_____ Times

B4. In the past month (March 26 - April 25), how many unexcused absences did you have? *Write 0 if you had no unexcused absences*

_____ Days

B5. In the past month (March 26 - April 25), how many days of permission leave did you take? *Write 0 if you took no permission leave.*

_____ Days

B6. Your supervisor will be asked to refer up to 2 workers for promotion, do you think you will be one of the workers referred by your supervisor? *Circle one option*

Yes No

Compared to all the other workers on your team, how would you rate **yourself** in terms of:
Circle the answer that best describes you

B7. Meeting Targets	Poor	Below Average	Average	Above Average	Exceptional
B8. Attendance	Poor	Below Average	Average	Above Average	Exceptional
B9. KPIs	Poor	Below Average	Average	Above Average	Exceptional
B10. Overall Performance	Poor	Below Average	Average	Above Average	Exceptional
B12. Teamwork /Cooperation	Poor	Below Average	Average	Above Average	Exceptional
B13. Loyalty	Poor	Below Average	Average	Above Average	Exceptional
B14. Leadership Skills	Poor	Below Average	Average	Above Average	Exceptional
B15. Promotion Readiness	Poor	Below Average	Average	Above Average	Exceptional

Compared to all the other workers on your team, how do you think **your supervisors** would rate you in terms of:

Circle the answer that best describes you

B16. Meeting Targets	Poor	Below Average	Average	Above Average	Exceptional
B17. Attendance	Poor	Below Average	Average	Above Average	Exceptional
B18. KPIs	Poor	Below Average	Average	Above Average	Exceptional
B19. Overall Performance	Poor	Below Average	Average	Above Average	Exceptional
B21. Teamwork/ Cooperation	Poor	Below Average	Average	Above Average	Exceptional
B22. Loyalty	Poor	Below Average	Average	Above Average	Exceptional
B23. Leadership Skills	Poor	Below Average	Average	Above Average	Exceptional
B24. Promotion Readiness	Poor	Below Average	Average	Above Average	Exceptional

Section C - Promotion Decisions

Sometimes promotion opportunities come up where existing workers can be promoted to supervisor positions. For each of the questions below, write the letter of the answer choice that best describes you in the box provided.

C1. How fair would you rate the selection process for promotions at [firm name]?

a. Very fair
b. Somewhat fair
c. Somewhat unfair
d. Very unfair

C2. How much would you say that favoritism and connections play a role in which workers are promoted at [firm name]?

a. No role at all
b. A small role
c. A somewhat important role
d. A very important role

C3. How much more likely do you think it is for women to be promoted than men?

a. Much more likely
b. Somewhat more likely
c. Neither more or less likely
d. Somewhat less likely
e. Much less likely

C4. Which of the following do you think **should be** the MOST important factor considered when selecting workers for promotion?

a. Supervisor referrals
b. Performance record
c. Written test evaluating their leadership ability

Anything else you would like to share with us about your opinions about your workplace?

_____

_____

_____

_____

_____

_____

Appendix F

Supervisor Survey

Work facts

- What facility do you work in?
- What is the main team you currently supervise?
- When did you first start supervising this team?
- Approximately how many workers do you directly supervise?
- When did you first become a supervisor?

Referral of workers for promotion-related opportunity

- Note: As you may know, *[firm name]* is planning to promote some line-level workers to supervisors for the new facility opening later this summer. As a current supervisor, you now have the opportunity to refer up to two workers for this promotion opportunity. You may refer any worker at *[firm name]*, not just the workers you currently supervise, as long as the worker is not already a supervisor. Please refer workers who you think have the most potential to become effective, successful supervisors in the new facility.
- Would you like to refer a worker for the promotion opportunity?
    - What is the name of the worker you would like to refer?
    - Can you verify that this is the correct worker you would like to refer?
    - What is the phone number of this worker?

Evaluation of randomly selected sample of workers from their team

- Note: We have randomly selected some workers from your team and we would like to ask you a few questions about each of these randomly selected workers. Please answer these questions to the best of your ability. Note, you can earn up to an extra 5,000 Tsh depending on the accuracy of your responses to some of these questions, so you can maximize your earnings by answering each question to the best of your ability as truthfully as possible.
- I will now ask you some questions about *[worker name]*. Is this a worker you supervise currently?
- How well do you know this worker?
- On a typical work day, how often would you say you monitor or check-in on this worker?
- How long has this worker been at the factory (in years)?
- How many different operations does this worker know how to do?
- In the past week, what was the MAIN task that this worker performed?
- In the past week, how much individual bonus did this worker earn?
- In the past week, how many days did this worker work?
- In the past month, how many days was this worker:
    - Absent
    - Sick
    - Late Arriving

    - Receiving a warning letters
- Compared to all the other workers on your team, how would you rate this worker in terms of their
    - Overall performance
    - Self Discipline
    - Team-work/cooperation
    - Loyalty
    - Leadership skills
    - Readiness for Promotion
- Note: Among the *[xx]* workers we just asked you about, you can earn up to an extra 5,000 Tsh if you answered the questions about that worker accurately. For that worker, you will earn 1,000 Tsh for each correct answer to the following questions about that worker, earning up to a total of 5,000 Tsh:
    - In the past week, what was the MAIN task that this worker performed
    - In the past week, how much individual bonus did this worker earn?
    - How many absences do you think they have on their KPI record?
    - How many lates do you think they have on their KPI record?
    - How many warning letters do you think they have on their KPI record?
- Which worker would you like your accuracy payments to be based on?

Soft skills

- Note: Thank you for your referrals and evaluations of workers on your team. The information you have provided will be very useful for the factory to select workers for promotion. Now we will transition to the final part of the survey. In this final section, I will ask you a few questions about your private opinions and views. Your answers to these questions will be kept private and will only be used for research purposes and will not be shared with anyone else. Only anonymized and aggregated results may be shared with the factory.
- Note: Now I will read you a few statements. For each statement, please tell me which statement best describes you.
    - In general, do you believe older people always make better leaders or do you believe that young people can also be good leaders. Please give your answer on a scale from 1 to 5 where 1 means “I believe older people always make better leaders” and 5 means “I believe young people can also be good leaders.” You can use any number between 1 and 5 to indicate where you fall on the scale.
    - Do you believe men generally make better leaders or do you believe women generally make better leaders? Please give your answer on a scale from 1 to 5 where 1 means “I believe men generally make better leaders” and 5 means “I believe women generally make better leaders”. You can use any number between 1 and 5 to indicate where you fall on the scale.

- In general, do you think that whether a worker gets ahead at *[firm name]* depends mostly on how hard they work or do you think it mostly depends on luck and connections? Please give your answer on a scale from 1 to 5 where 1 means "Whether a worker gets ahead at *[firm name]* depends mostly on how hard they work" and 5 means "Whether a worker gets ahead at *[firm name]* depends mostly on luck and connections". You can use any number between 1 and 5 to indicate where you fall on the scale.
- In general, do you prefer to work with people who have a very similar background to you or do you prefer to work with people who have a very different background from you? Please give your answer on a scale from 1 to 5 where 1 means you prefer to work with people who have a very similar background to you and 5 means you prefer to work with people who have a very different background from you. You can use any number between 1 and 5 to indicate where you fall on the scale.
- In general, do you think the rules should always be followed or do you think that special allowances should always be made for special circumstances? Please give your answer on a scale from 1 to 5 where 1 means you think the rules should always be followed and 5 means you think that special allowances should always be made for special circumstances. You can use any number between 1 and 5 to indicate where you fall on the scale.
- Do you think that individual bonuses should be allocated entirely based on whether workers reach their target or do you think workers can also deserve bonuses for other reasons that only a supervisor can decide? Please give your answer on a scale from 1 to 5 where 1 means you think individual bonuses should be allocated entirely based on whether workers reach their target and 5 means you think that workers can also deserve bonuses for other reasons that only a supervisor can decide.
- How willing are you to punish someone who treats you unfairly even if there may be costs to you? Please give your answer on a scale from 1 to 5 where 1 means "Completely unwilling" and 5 means "completely willing." You can use any number between 1 and 5 to indicate where you fall on the scale.
- When someone does you a favor, how willing are you to return it? Please give your answer on a scale from 1 to 5 where 1 means "Completely unwilling" and 5 means "completely willing." You can use any number between 1 and 5 to indicate where you fall on the scale.