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 benefits and costs of doing so? In partnership with a large garment manufacturing firm in Tanzania, we implement a series of field experiments to examine supervisor discretion in the selection of workers for promotion to managerial positions. In a first field experiment with supervisors, we randomize whether supervisors face financial incentives based on the quality of their referrals. In a complementary experiment with workers, we randomly vary whether supervisor referrals are emphasized in the selection process when workers make application decisions. Our results show that discretion crowds in supervisors' private information about the managerial quality of workers. Supervisors use private information beyond what the firm could infer from existing administrative data, workers' self-assessments, or coworker referrals. However, discretion also generates costs for firms. Supervisor referrals are not perfectly aligned with the firm's objectives, and supervisors show preferences consistent with gender bias and favoritism. Furthermore, discretion is disliked by workers and reduces the likelihood that workers apply for promotion. Despite the costs of discretion, supervisors select workers with significantly higher measured managerial ability relative to more objective selection methods.

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1 Introduction

Good managers matter. Variation in the quality of individual managers contributes significantly to differences in performance across teams within firms and across firms (Bertrand and Schoar, 2003; Frederiksen, Kahn, and Lange, 2020; Lazear, Shaw, and Stanton, 2015). But 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 also particularly important in developing countries with relatively low human capital, where a "missing middle" in management is often cited as a key barrier to firm growth.[1] When firms cannot find effective middle managers, firms cannot expand even when it would be efficient for them to do so (Bloom et al., 2013), and may end up with managers who perform poorly or reduce their productivity.

In practice, many firms delegate promotion decisions to existing managers. Whether this is optimal for firms is an open question, particularly compared to alternative, more objective selection methods. In theory, discretion can crowd in valuable private information that improves match quality for firms (Aghion and Tirole, 1997; Dessein, 2002; Acemoglu et al., 2007). Supervisors work closely with workers and may therefore have the best knowledge of which workers would perform well in new roles. However, supervisors may also have bias, favoritism, or personal preferences when selecting workers for promotion that are not aligned with the firm's interests. Despite the robust theoretical prediction that discretion should have informational advantages, much of the existing empirical evidence finds that discretion leads to worse personnel decisions (Hoffman, Kahn, and Li, 2018; Xu, 2018; Adhvaryu, Murathanoglu, and Nyshadham, 2023). As workers experience supervisor discretion directly, discretionary selection may also affect the types of workers who pursue promotion opportunities, either through formal or informal channels.

Studying discretionary selection empirically is challenging, as selection processes within firms are usually a black box. Often, only realized promotions are observable in firm administrative data. In partnership with one of the largest garment manufacturing firms in Tanzania, we implement a series of field experiments to examine supervisor discretion in the selection of workers for promotion to managerial roles. In our partner firm, as in most firms, supervisors have very different types of responsibilities than lower-level workers. Line-level workers do highly repetitive, manual tasks, such as cutting cloth, attaching buttons, or hemming seams. In contrast, supervisors are responsible for monitoring and motivating a large team of workers to ensure that production targets are met. When asked, supervisors say their role requires problem solving, leadership, communication, and discipline, corresponding with soft skills often identified in the management literature (Hurtz and Donovan, 2000; Borghans et al., 2008; Becker et al., 2012). Identifying which workers would perform well as future managers is therefore a challenging inference problem for the firm, as the best workers may not make the best managers (Benson, Li, and Shue, 2020).

[1] The Missing Middle Management," The Global Prosperity Institute, May 29, 2023, https://www.thegpi.org/p/the-missing-middle-management?utm_campaign=post&utm_medium=web

In the status quo, our partner firm typically relies on supervisors to select workers for promotion. To study this discretionary selection, we first conduct a field experiment where all supervisors are given the opportunity to refer up to two workers for a leadership training program, which essentially fast tracks workers for promotion.[2] 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." 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. Under this framework, our experimental design allows us to test whether supervisors have private information about the managerial quality of workers and whether their discretionary referrals are aligned with firm objectives.

To study the sorting effects of discretion, we then study how different selection methods affect workers' decisions to apply for promotion. In lieu of discretion, firms could instead use objective performance data to make promotion decisions. To test how discretion compares to such alternatives, we vary the selection criteria that is emphasized on the application forms that workers receive. Specifically, 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.

In terms of measurement, 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 a leadership test that proxies for managerial ability. Part of the test includes questions provided by the firm, which they believed would be effective screening questions. The remaining questions measure soft skills that have been found to correlate with managerial performance across a variety of settings (Borghans et al., 2008; Adhvaryu, Kala, and Nyshadham, 2023; Weidmann et al., 2024), including conscientiousness, locus of control, self-esteem, and logical reasoning.

To validate our leadership measure, at the end of the experiment, all existing supervisors also took the test, and we compare their test scores to their observed performance as managers. Our measure appears to pick up something that is predictive of managerial performance in this context that is not captured by existing administrative data available

[2]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.

to the firm. We find that an assembly line worker's score on the leadership test is not significantly correlated with observable performance measures, such as output or attendance. This is consistent with the idea that such roles can be performed well without requiring managerial ability. However, we find that a supervisor's score on the leadership test is significantly correlated with the performance of the workers and teams they supervise, consistent with such roles requiring managerial ability. Our validation exercise suggests that replacing a supervisor in the 10th percentile of leadership test scores with a supervisor in the 90th percentile would be correlated with an increase in worker productivity of 12%.

The results of our referral experiment suggest that supervisors have private information on the managerial quality of workers. Randomly assigned financial incentives lead supervisors to refer workers with 13% higher measured managerial quality on average relative to non-incentivized supervisors. Through the lens of our conceptual framework, these results indicate simultaneously that supervisors have private information about worker quality and that there are trade-offs between supervisors' personal preferences and the firm's objectives in the status quo. Intuitively, if the status quo referrals were perfectly aligned, then the referral bonus would not improve the quality of the referrals. However, supervisors also need to possess useful private information in order for the financial incentive to shift referrals along the desired dimension.

Descriptively, supervisors also show preferences consistent with gender bias and favoritism. Supervisors are more likely to refer a male worker rather than a female worker for promotion, even after controlling for a worker's measured leadership ability and performance record. This pattern matches the stated gender beliefs of supervisors. Supervisors also show favoritism. The discretionary portion of a worker's individual bonus earnings, but not their actual output, significantly predicts whether a worker is referred by their supervisor. Notably, the randomized referral bonus does not significantly change other characteristics of referred workers, such as gender, favoritism, or homophily with the referring supervisor, which would have been consistent with taste-based or statistical-based discrimination depending on the direction. Instead, supervisors appear to have precise knowledge about the managerial quality of workers and do not appear to conflate this attribute with other worker characteristics.

While our experimental results show that supervisors have information on worker quality, is this information public or truly private? To make progress on this question, we replicate our referral experiment with a representative sample of line-level workers who are asked to refer their coworkers for promotion. Such horizontal referrals have been found to improve other types of personnel decisions, such as hiring (Beaman and Magruder, 2012; Burks et al., 2015; Pallais and Sands, 2016). The randomization procedure, script, and referral bonus were identical to those used in our supervisor referral experiment. 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 more seniority. These results suggest that either coworkers

do not possess the same private information as supervisors or that the referral bonus was not large enough to overcome their personal preferences. Our experimental design does not allow us to distinguish between these mechanisms. Nevertheless, these results suggest that the firm would not gain the same informational advantages from asking the average factory worker to make promotion decisions relative to the average supervisor.

Turning to the application experiment, the results suggest that there are also sorting effects from discretionary selection, as workers appear to perceive discretion and are averse to discretion. Randomly emphasizing supervisor referrals in the selection process significantly reduces the likelihood that workers apply for promotion, a 6.5 percentage point (12%) decrease relative to the control group. As a direct result, discretionary selection reduces the number of high quality candidates the firm receives. While discretion does not appear to shift the distribution of managerial quality among applicants, the firm receives fewer high quality applicants in the Discretionary group relative to the Control group.

In terms of mechanisms, these application results are consistent with the stated preferences of workers over different selection methods. The majority of workers say they prefer promotion decisions to be based on objective criteria rather than subjective criteria. This is not driven by workers who are disadvantaged by discretion, as the distribution of preferences among workers who were referred by supervisors is nearly identical. Heterogeneity analysis reveals that workers who are more productive in their current roles are more likely to apply when performance-based selection is emphasized, suggesting that workers know their own productivity and are responsive to different selection criteria. In contrast, workers who are actually referred by supervisors are not differentially more likely to apply when supervisor selection is emphasized. Similarly, despite the fact that supervisors are more likely to refer workers who are male, have more seniority, and benefit from discretion in other domains, workers with these characteristics are not significantly more likely to apply when discretionary selection is emphasized. Together, this suggests that workers' application decisions under discretionary selection are not responsive to the dimensions that supervisors reward, potentially because discretion is opaque and difficult to understand.

Instead of relying on supervisor discretion, firms could instead promote workers to managerial positions based on seniority or observable performance metrics. Such alternative selection methods have the benefit of being transparent and easy to understand and are also preferred by a majority of workers in this context. To assess how supervisor discretion compares to such alternative selection methods, we simulate which workers would have been selected for promotion based on their seniority or based on a rules-based method that equally weights a worker's output, attendance, tenure, and disciplinary record, among all workers who applied for promotion. Our benchmarking exercise reveals that supervisors select workers who score 21-24% higher on the leadership test compared to these alternative rules-based selection methods. A back of the envelope calculation suggests that this difference in leadership ability between selection methods

would correlate with a difference in daily worker productivity of 2-3%. Thus, while discretion does have costs, it also leads to the selection of workers with significantly higher managerial quality relative to more objective selection methods.

In summary, our results show that discretion crowds in supervisors' private information about the managerial quality of workers. Supervisors appear to have private information beyond what the firm could infer from existing administrative data, workers' self-assessments, or from referrals from the average worker. However, we also find that discretion generates costs for firms. Supervisor referrals do not appear to be perfectly aligned with the firm's objectives, and supervisors show preferences consistent with gender bias and favoritism. Furthermore, discretion is disliked by workers and reduces the likelihood that workers apply for promotion opportunities, directly reducing the number of high quality applicants that the firm receives.

In practice, almost all firms rely on discretion to make promotion decisions. While theory suggests that discretion should have informational advantages for making personnel decisions, empirical evidence supporting this theoretical prediction is scarce. One notable exception is Voth and Xu (2022), who find that discretionary promotions resulted in historically more battle victories in the British Royal Navy, using family connections to the Admiralty to proxy for private information. We contribute to this literature by showing experimental evidence that supervisors have informational advantages about the managerial potential of workers through eliciting discretionary selection directly within a modern day, real firm.

In doing so, we contribute to a literature studying the use of discretion in personnel decisions. Much of the existing literature has focused on 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), 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 lead to poor personnel decisions (Hoffman, Kahn, and Li, 2018; Xu, 2018; Adhvaryu, Murathanoglu, and Nyshadham, 2023). We use novel experimental evidence to show that vertical referrals crowd in valuable private information in the selection of managers and are not substitutable with horizontal referrals.

We also contribute to a literature on 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, Forthcoming). 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 discretion on workers' decisions of whether to pursue managerial opportunities.

Finally, we contribute to a large literature studying the importance of managers and managerial practices for firm performance (Bertrand and Schoar, 2003; Frederiksen,

Kahn, and Lange, 2020; Lazear, Shaw, and Stanton, 2015; Bloom and Van Reenen, 2007, 2011; Bloom et al., 2013). An open question in this literature is why, given the importance of managers, low managerial quality appears to be commonplace. Our findings highlight the trade-offs firms face when selecting workers for promotion that can contribute to the persistence of low managerial quality within firms.

The rest of this paper proceeds as follows. In Section 2, we provide more information about the context of the study. In Section 3 we discuss our experimental design and outcome measures. In Section 4 we present our results. Section 5 discusses extensions and mechanisms and Section 6 concludes.

2 Context

We partner with one of the largest garment manufacturing firms in Tanzania, which has been operating for over a decade and has over 4,000 full-time employees. 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 a tenure of over three years. Workers come from diverse religious and ethnic backgrounds, with 55% identifying as Christian and 45% as Muslim. Workers also identify with 88 distinct tribes. In comparison, 62% of supervisors are female, 65% Christian, 35% Muslim, and supervisors identify with 44 distinct tribes. Supervisors are on average 31 years of age, have a tenure of over five years, have completed some secondary education, and manage on average 60 workers (Table A.1).

Our study focuses on the production departments of the factory, including cutting, bartack, sewing, and finishing. Within these departments, workers are organized into production lines with on average 57 workers and 3 supervisors. As in most firms, lower-level workers and supervisors have very different types of jobs and responsibilities. Line-level workers do highly repetitive and manual tasks, such as cutting panels, attaching buttons, or hemming seams, with workers moving to more challenging tasks as they gain experience. In contrast, a supervisor's main responsibilities include ensuring that their team's daily production targets are achieved; balancing lines, such as re-assigning workers to tasks given unexpected absences or bottlenecks; motivating and monitoring worker effort; and resolving conflicts and disciplinary issues among workers.

In surveys, we asked supervisors what they believed the most important skills or traits someone should have to succeed as a supervisor at the firm. Sentiment analysis suggests that problem solving, leadership, communication, and discipline are some of the most frequent responses from supervisors, corresponding with soft skills often identified in the management literature (Hurtz and Donovan, 2000; Borghans et al., 2008; Becker et al., 2012) (Appendix D).

As in many private sector contexts, the firm offers performance pay to workers and supervisors. Workers earn a monthly base salary based on attendance as well as weekly

individual bonus, based on their individual output, and group bonus, based on their team's output. Supervisors earn a median base salary that is 125% of the median worker's base salary. Supervisors also earn around double the group bonus that workers earn when their teams achieve their daily production targets. Bonus earnings can be substantial. The median worker earns monthly bonuses equivalent to 46% of the median worker base salary, and the median supervisor earns bonuses equal to roughly 80% of the median supervisor base salary.

Supervisor discretion is a regular part of a worker's experience on the job. Many status quo decisions in the factory rely on supervisor discretion, including a variety of personnel decisions. The factory relies almost solely on supervisors to choose which workers to hire, allocate workers to tasks, and select workers for promotion. While the factory has some rules-based procedures for how to reward worker effort and discipline shirking, supervisors also have some discretion in these domains.

2.1 Factory Administrative Data

The factory regularly collects administrative data on its employees, which we use in our analysis. Available demographic information includes worker gender, religion, date of birth, and marital status. In addition, the firm regularly collects performance-related information, including tenure, daily attendance, hours worked, key performance indicators (KPIs), line-level output, individual bonus earnings, and group bonus earnings.

From June 2022 - September 2023, the factory also collected individual-level output data. Most workers are assigned to a task that has a task-specific production target. For example, loop cutters are expected to cut 23,000 loops a day to meet their daily production target while waistband attachers are expected to attach 500 waistbands to meet their daily target. Throughout our analysis, we therefore scale individual output by the relevant task-specific target ("Output/Target") to measure worker productivity.

We also use two measures to capture the degree to which workers experience past supervisor discretion in the workplace. The factory tracks formal disciplinary issues of workers in their key performance indicators (KPIs), which they use to make important personnel decisions such as terminations. We measure the extent to which workers experience supervisor discretion in whether to "forgive" or to "record" attendance-related issues on a worker's KPI record. We also measure the extent to which workers benefit from supervisor discretion in the allocation of individual performance bonuses. Most tasks have their own bonus schedule, where workers earn a set bonus amount if they meet the daily production target for their task, as well as a piece rate bonus for additional units they produce above their target. However, supervisors also allocate additional individual bonuses to workers at their discretion. See Appendix B for details on how we construct these measures.

2.2 Timeline

During our study period, our partner firm planned to open a new facility that would create at least 15 promotion opportunities of line-level workers to new supervisor-level positions. The firm conducted two selection rounds to identify workers for promotion. In the first round, June - August 2023, the firm chose workers for a leadership training program, representing a significant investment in developing workers' managerial capacity. Only 30 training spots were available, making the selection process highly competitive. The training included one week of management soft skills training implemented by an external consulting firm as well as on-the-job shadowing of existing supervisors. Workers who successfully completed the training program were fast tracked for promotion, with 24% of trained workers selected for promotion for the new facility. To fill the remaining promotion openings, the firm conducted a second selection round in June - July 2024. Our main experiments occur during the first selection round that the firm conducted. We also collect some survey and descriptive data during the second selection round. A detailed timeline of the study is presented in Figure A.1.

3 Experimental Design

3.1 Supervisor Referral Experiment

All supervisors are given the opportunity to refer up to two workers for the leadership training, which essentially fast tracks workers for promotion to managerial positions. 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 F for the full script).

During the referral process, we introduce a referral 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 or characteristics that the firm will use to judge quality. Specifically, 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 bring supervisor referrals more in alignment with the firm without revealing detailed information about the firm's objectives, reducing the ability of supervisors to select "to the test."[3]

[3]Following classic moral hazard models with multi-tasking (Baker, 2002), supervisors may prioritize selecting based on measurable dimensions of quality at the expense of other dimensions of quality that are also important. Our referral bonus is designed so that supervisors are informed that their referrals will be assessed for quality, but supervisors are not informed of the explicit dimensions that will be measured, reducing multi-tasking concerns.

We use a simple conceptual framework adapted from Beaman and Magruder (2012) to illustrate what we can identify from our experimental design. In the framework, supervisors face potential trade-offs when making a referral for promotion. On the one hand, supervisors observe informative signals of each worker's inherent ability at the promotion position. On the other hand, supervisors also derive personal benefits from referring specific workers, such as from bias, patronage, or favoritism. In the experiment, we randomly vary whether supervisors face a referral bonus, which increases the expected returns to the supervisor of referring a worker they believe is high quality. If we observe that the referral bonus increases the quality of referred workers, this indicates simultaneously that 1) the supervisor must have private information about workers' quality; 2) there are trade-offs between a supervisor's personal preferences and the firm's objectives; and 3) that the trade-offs are not too large relative to the referral bonus. If the referral bonus does not change the quality of the referred worker, then we cannot distinguish between these mechanisms (see Appendix C for the conceptual framework).

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. 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 consideration when implementing an experiment with real employees in a real firm.

To conduct the randomization, all supervisors from the production departments 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 gave their referrals during the one hour session via written forms.

In total, we invited 120 supervisors to participate in the referral experiment, of which 118 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.3 shows that our treatment assignment of supervisors to the Control and Incentivized groups is balanced on observable characteristics.

3.2 Worker Application Experiment

To examine the sorting effects of discretion, we study how different selection methods affect workers' decisions to apply for promotion. 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 promotion-related 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 identical in all other aspects.

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 G 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 selection 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. In total, 1,118 workers participated in the application experiment, 559 of which were randomly assigned to receive Control application forms and 559 were randomly assigned to receive Discretionary forms. Table A.4 shows that our random assignment method generated two groups that are balanced on observable characteristics.

3.3 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 leadership test to measure workers' managerial potential. As part of the test, the firm provided questions which they believed would be effective screening questions, covering firm-specific production processes, quality issues, and policies. The remaining questions measure soft skills which have been found to correlate with managerial performance across a variety of settings (Borghans et al., 2008; Adhvaryu, Kala, and Nyshadham, 2023; Weidmann et al., 2024), including conscientiousness, locus of control, self esteem, and logical reasoning, (see Appendix E for the full test instrument).

All workers who applied for the training or who were referred by a supervisor were invited to take the leadership test. Among the 228 workers referred by a supervisor across both

Control and Incentivized groups, 40 (18%) could not be matched to the factory roster to be invited to the test. Among those invited, 161 (86%) took the test. Attrition is balanced by the treatment assignment of the referring supervisor in the referral experiment (Table A.5). Similarly, among the 592 workers who applied for promotion across both the Control and Discretionary groups, 502 (85%) took the leadership test. While attrition is not balanced on some observable worker characteristics, notably past attendance, it is balanced on a worker's treatment assignment in the application experiment (Table A.6).

Note that the leadership test occurred after both workers made their application decisions and supervisors made their referral decisions. Furthermore, workers and supervisors were not informed of the test in advance, so the existence of the test could not have affected application and referral decisions. While we use our leadership test score measure to assess the quality of supervisor referrals, the test scores 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. Given these factors, it is unlikely that supervisors selected workers "to the test."

Our leadership measure appears to pick up something that is predictive of managerial performance in this context that is not captured by existing administrative data available to the firm. We find that a line-level worker's score on the leadership test is not significantly correlated with observable measures of performance, such as output or attendance (Table A.9). This is consistent with the idea that such roles can be performed well without requiring managerial ability.

We also assess whether our leadership measure correlates with managerial performance within our partner firm. To do so, all supervisors from the main production facilities of the factory also took the leadership test after the application and referral experiments were completed. We then compare their test scores to their observed performance as managers. A key limitation in assessing our leadership measure is that supervisors and workers seldom switch teams in this context. During the 16 months when the factory collected individual output data, workers experienced on average 1.63 different combinations of supervisors, with 57% of workers experiencing no changes. These switches could have occurred either from supervisors switching teams or workers switching teams. Similarly, during this time period, supervisors work with on average 1.49 different teams, and 67% of supervisors never switch teams.

We therefore estimate whether supervisor leadership scores correlate with the individual-level output of the workers they supervise in the cross-section, by estimating the following regression using daily-level panel data on worker output:

$$Output/Target_{it} = \alpha + \beta SupervisorScore_{it} + X_i + S_{it} + \delta_w + \gamma_f + \varepsilon_{it} \qquad (1)$$

where $Output/Target_{it}$ is the output of worker i on day t, scaled by task-specific targets; $SupervisorScore_{it}$ is the average leadership score of the supervisors assigned to worker i's team on day t; X_i is a vector of worker controls, including a worker's gender, religion,

marital status, and a quadratic for tenure; S_{it} is a vector of controls for the supervisors assigned to worker i's team on day t, including the number of supervisors, the percentage of supervisors who are female, the percentage of supervisors who are Muslim, and the average tenure of the supervisors; δ_w are week fixed effects; and γ_f are facility fixed effects. We cluster standard errors at the worker level.

We also estimate whether supervisor leadership scores correlate with line-level output in the cross-section by estimating an analogous regression using daily-level panel data on line-level output:

$$Output_{lt} = \alpha + \beta SupervisorScore_{lt} + X_{lt} + S_{lt} + \delta_w + \gamma_f + \varepsilon_{lt} \quad (2)$$

where $Output_{lt}$ is the output of line l on day t; $SupervisorScore_{lt}$ is the average leadership score of the supervisors assigned to line l on day t; X_{lt} is a vector of line controls, including the number of workers assigned to that line at the monthly level; S_{lt} is a vector of controls for the supervisors assigned to line l on day t, including the number of supervisors, the percentage of supervisors who are female, the percentage of supervisors who are Muslim, and the average tenure of the supervisors; δ_w are week fixed effects; and γ_f are facility fixed effects. We cluster standard errors at the line level. Note that the factory only collects line-level output data for their sewing assembly lines, which represents about a third of the workers in their main production facilities.

Finally, we also estimate whether this correlation exists within workers and teams, using variation from workers switching supervisors and supervisors switching lines, by adding worker fixed effects and team fixed effects to Equations 1 and 2 respectively.

Our results from estimating Equations 1 and 2 are reported in Table 1. Overall, it appears that supervisor leadership scores are significantly correlated with worker productivity, and this relationship is robust to different control variables and is true both across workers and within the same worker. Our results suggest that a one standard deviation increase in the average leadership scores of supervisors is correlated with a 3-5% increase in daily worker productivity. In other words, replacing a supervisor at the 10th percentile of leadership test scores with one at the 90th percentile would correlate with a 12% increase in worker productivity. Supervisor leadership scores are also positively correlated with line output, although this relationship is noisier given that we only observe output data for 24 production lines, which represents about one third of workers in the main production facilities. While descriptive, our results suggest that our leadership score measure significantly predicts managerial performance in this setting.

4 Results

4.1 Referrals experiment: Results

We begin with some descriptive evidence of the predictors of status quo, Control, supervisor referrals (Table A.7). Among all workers that supervisors could have referred

Table 1: Supervisor Leadership Scores and Output

	Individual Output/Target			Line Output		
	(1)	(2)	(3)	(4)	(5)	(6)
Supervisor Leadership Score	0.044***	0.029***	0.032***	21.677	31.511*	49.140
	(0.008)	(0.009)	(0.009)	(18.349)	(16.998)	(43.074)
Mean	0.916	0.916	0.912	1206.402	1229.098	1229.098
SD	0.580	0.580	0.566	395.217	392.558	392.558
Week FEs	✓	✓	✓	✓	✓	✓
Factory FEs	✓	✓	✓	✓	✓	✓
Supervisor Controls		✓	✓		✓	✓
Unit FEs			✓			✓
Number of Units	2236	2236	2710	24	24	24
Avg Number of Days	124	124	112	191	176	176
Overall R^2	0.041	0.042	0.036	0.261	0.247	0.201

Notes: This table reports the regression coefficients of the average leadership score of supervisors assigned to each worker/team on individual worker output, scaled to task-specific targets in Columns (1) - (3) and on line-level output in Columns (4) - (6). Standard errors are clustered at the worker-level in Columns (1) - (3) and at the line level in Columns (4) - (6) and are reported in parentheses. Supervisor controls include the number of supervisors assigned to each worker/team and the average gender, religion, and tenure of supervisors assigned to each worker/team. Columns (4) - (6) additionally control for the number of workers assigned to each line. *p < 0.1, ** p < 0.05, *** p < 0.01.

for the promotion opportunity, Control supervisors are significantly more likely to refer a worker who actually applies for the opportunity (Column 1, Table A.7). Conditional on a worker applying, supervisors are more likely to refer workers who end up scoring higher on the leadership test (Column 2, Table A.7). A one standard deviation increase in a worker's measured leadership ability is associated with a 28% increase in the probability that a worker is referred by a supervisor in the status quo. Supervisors are also more likely to refer workers with more tenure.

Supervisors also display patterns consistent with gender bias and favoritism in the status quo. Supervisors are more likely to refer a male worker relative to a female worker, even after controlling for a worker's performance record and measured leadership ability (Columns 1 and 2, Table A.7). This matches survey responses that indicate supervisors on average prefer male leaders over female leaders. Specifically, 34% of supervisors state they believe men generally make better leaders than women, compared to 16% of supervisors who believe women generally make better leaders, and 50% of supervisors who state gender neutral beliefs. Supervisor referrals also show favoritism. The discretionary portion of a worker's individual bonus earnings, but not their actual output, significantly predicts whether a worker is referred by their supervisor.

We next measure the effects of the referral bonus on the leadership ability of referred workers. To do so, we estimate the following regression:

$$M_{ij} = \alpha + \beta T_j + X_j + \varepsilon_{ij} \tag{3}$$

where M_{ij} is the measured leadership ability of worker i referred by supervisor j; T_j is an indicator variable equal 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. To account for potential correlations in the residual within referrers, we cluster standard errors at the supervisor level. Note that this analysis is restricted to the pool of workers who were referred by at least one supervisor. We estimate Equation 3 for the total score on the leadership test as well as the scores on each sub-section of the test: production, soft skills, and logical reasoning. To check whether the referral bonus also affected the characteristics of referred workers along other dimensions, we also estimate Equation 3 for a variety of other characteristics including demographics (gender, religion, marital status, and tenure), work performance in the prior year (output/target, individual bonus, attendance, and KPIs), and favoritism (degree of homophily with the referring supervisor by gender, religion, and tribe; discretionary bonuses; and discretion in KPIs).

Table 2 reports the results from estimating Equation 3. 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 (Panel A of Table 2). This is driven by Incentivized supervisors referring workers with relatively higher scores on the soft skills and logical reasoning portions of the test. Aside from the incentivized attribute (leadership ability), the referral bonus does not appear to significantly affect supervisor referrals along other dimensions. Specifically, the average demographics, work performance, and experience of past discretion of referred workers do not significantly differ between Control and Incentivized referrals (Panels B, C, and D of Table 2).

Taken together, the results suggest that randomly assigned financial incentives increase the quality of referred workers. Through the lens of our conceptual framework, these results indicate simultaneously that there are trade-offs between supervisors' personal preferences and the firm's objectives and that supervisors have private information about workers' quality. Intuitively, if status quo referrals were perfectly aligned, then the referral bonus would not have shifted referrals. Supervisors also appear to have private information about the managerial potential of workers, as they are able to identify higher quality workers when explicitly incentivized. These results also suggest that supervisors do not appear to be conflating leadership quality with something else, as the referral bonus significantly changes the measured leadership potential of referred workers but not other characteristics. Overall, our results support the commonly theorized trade-offs to discretion. On the one hand, supervisor referrals crowd in valuable private information. On the other hand, supervisor referrals are not perfectly aligned with the firm's interests in the status quo.

4.2 Application experiment: Results

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

$$Apply_i = \alpha + \beta T_i + X_i + \varepsilon_i \tag{4}$$

Table 2: Effect of Referral Bonus on Characteristics of Referred Workers

Panel A: Leadership Score	(1)	(2)	(3)	(4)
	Total Score	Production Score	Traits Score	Logic Score
Incentivized Supervisor Referral	5.872**	0.335	3.423***	2.114**
	(2.786)	(2.034)	(1.077)	(0.839)
Control Mean	45.763	29.100	9.787	6.875
Control SD	17.071	10.507	6.031	5.583
Supervisor Controls	✓	✓	✓	✓
N Referred Workers	156	156	156	156
Panel B: Demographics	(1)	(2)	(3)	(4)
	Female	Muslim	Married	Tenure
Incentivized Supervisor Referral	-0.056	0.066	-0.038	-0.107
	(0.068)	(0.080)	(0.042)	(0.385)
Control Mean	0.696	0.359	0.141	4.193
Control SD	0.463	0.482	0.350	2.572
Supervisor Controls	✓	✓	✓	✓
N Referred Workers	180	180	180	180
Panel C: Work Performance	(1)	(2)	(3)	(4)
	Output/Target	Individual Bonus	Attendance	KPIs
Incentivized Supervisor Referral	-0.100	-0.086	-4.088	-0.228
	(0.118)	(1.231)	(6.448)	(0.669)
Control Mean	1.024	6.920	243.130	4.009
Control SD	0.714	7.469	32.110	5.878
Supervisor Controls	✓	✓	✓	✓
N Referred Workers	146	176	180	220
Panel D: Favoritism	(1)	(2)	(3)	
	RefMatch Gender	RefMatch Religion	Discretionary Bonus	Discretion in KPIs
Incentivized Supervisor Referral	0.050	-0.128	-0.925	0.074
	(0.068)	(0.080)	(6.481)	(0.341)
Control Mean	0.693	0.602	56.603	1.432
Control SD	0.464	0.492	29.359	2.699
Supervisor Controls	✓	✓	✓	✓
N Referred Workers	180	180	121	220

Notes: This table reports the effects of randomized referral incentives on the average characteristics of the workers referred by supervisors. The omitted category in all specifications is Control supervisor referrals. Supervisor controls, including the supervisor's gender, religion, tenure, and marital status, are included in all regressions. RefMatch Score indicates the degree to which a supervisor refers a worker with the same gender, religion, and tribe. Standard errors are clustered by supervisor. *p < 0.1, ** p < 0.05, *** p < 0.01.

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; and X_i is a vector of worker controls, including demographics (gender, religion, and marital status) and work performance in the prior year (output/target, individual bonus, group bonus, attendance, KPIs, and a quadratic for tenure). To test the sensitivity of our results to functional form assumptions, we estimate Equation 4 using OLS and Logit.

Table 3: Effect of Discretion on Application Rates

	OLS (Apply = 1)			Logit (Apply = 1)
	(1)	(2)	(3)	(4)
Discretionary Application	-0.065**	-0.065**	-0.066**	-0.065**
	(0.030)	(0.031)	(0.031)	(0.030)
Control Mean	0.562	0.562	0.562	0.562
Control SD	0.497	0.497	0.497	0.497
N	1119	1041	1016	1014
Worker Controls		✓	✓	✓
Line FEs			✓	✓

Notes: This table reports the effect of receiving a Discretionary application form on application rates. Columns (1), (2), and (3) report the results from estimating Equation 4 using OLS, with robust standard errors reported in parentheses. Column (4) reports average marginal effects from estimating Equation 4 using a Logit model, with standard errors for average marginal effects reported in parentheses. Worker controls include demographic variables (gender, religion, marital status) and work performance in the prior year (output/target, individual bonus, group bonus, attendance, KPIs, and a quadratic for tenure). Columns (3) and (4) also include production line level fixed effects. *p < 0.1, ** p < 0.05, *** p < 0.01.

Table 3 reports the results from estimating Equation 4. Our results show that worker behavior is sensitive to the perceived importance of supervisor discretion in the selection process. Emphasizing discretionary selection criteria leads to significantly fewer workers to apply for the promotion-related opportunity, a 6.5 percentage point (12%) decrease relative to the Control group. These results are robust across different specifications, including using different sets of control variables and using a LPM or Logit model.

The fact that using discretion in the selection process significantly reduces the number of applications a firm receives indicates potential efficiency costs, as it restricts the pool of potential matches available to the firm. In tournament-like settings, the value of additional competitors is typically high (Bulow and Klemperer, 1996). Intuitively, if potential applicants are independently drawn from the same distribution, then increasing the number of applicants increases the expected maximum quality. In other words, more applicants increases the likelihood that firms will find candidates with rare attributes, in this case, high managerial ability. Indeed, while the distribution of measured leadership ability is statistically comparable across both groups (Figure A.2), there are fewer high scoring applicants who apply under Discretionary applications relative to Control

applications (Table 4). At the most selective, there are nearly double the number of top 1% scorers who apply under Control relative to Discretionary criteria. Using 5,000 bootstrap samples with replacement from the sample of Discretionary applicants, we estimate there is a 7.8% probability the firm would have received the same number of applicants that score in the top 1% under Discretionary applicants compared to Control applications. This evidence suggests that a decrease in the overall number of applicants decreases the number of high quality candidates that the firm receives.

What might be driving the decrease in applications under supervisor selection? In survey responses, it appears that workers strongly prefer promotion decisions to be based on objective rather than subjective criteria. Specifically, 67% of workers say the performance record should be the most important factor considered when selecting workers for promotion, relative to 19% who prefer the leadership test, and 13% who prefer supervisor referrals (Figure A.4). 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.

We also conduct a heterogeneity analysis to see if there are systematic patterns in the types of workers who apply under Control versus Discretionary application forms. In particular, we examine whether there are heterogeneous treatment effects by a worker's performance record (including by output/target, individual bonus, group bonus, attendance, KPIs, or tenure), demographics (including by gender, religion, or marital status), or by their experience of supervisor discretion in other domains (including discretion in KPIs, discretion in bonuses, and whether a worker is actually referred by a supervisor). Our results indicate that workers who are more productive in their current roles are significantly more likely to apply for promotion when performance-based selection is emphasized (Figure A.3 and Panel A of Table A.8), suggesting workers know their own productivity and are responsive to different selection criteria. Workers with a one standard deviation higher output are more than twice as likely to apply when objective performance metrics are emphasized in the selection process compared to workers with average output. In contrast, discretionary selection reduces applications across all observable worker characteristics. Workers who are actually referred by supervisors are no more likely to apply for promotion when supervisor selection is emphasized. Similarly, despite the fact that supervisors are more likely to refer workers who are male, who have more seniority, and who have higher managerial quality, workers with those characteristics are also no more likely to apply when discretionary selection is emphasized. These results are consistent with discretion being opaque and difficult to understand by workers.

5 Extensions and Mechanisms

Given the costs of discretion, could firms obtain comparable private information from other sources? Our results below suggest no. Supervisors appear to have private information beyond what the firm could infer from existing performance records, from

Table 4: Sorting and Selectivity Trade-Offs under Discretion

Selectivity	Apply Control	Apply Discretion	% Change	Bootstrap P-Value
Top 25% Scorer	67	62	-6%	0.243
Top 10% Scorer	30	24	-20%	0.106
Top 5% Scorer	16	12	-25%	0.121
Top 1% Scorer	7	4	-43%	0.078

Notes: This table reports the number of workers who scored in the top 25%, 10%, 5%, and 1% of the 2023 leadership test that applied under Control and Discretionary applications respectively, and the percentage change resulting from receiving a Discretionary application relative to a Control application. The last column reports 1 - CDF(top scorers who apply under Control) using 5,000 bootstrap samples with replacement from the sample of Discretionary applicants.

workers' self-assessments, or from horizontal referrals from coworkers. We also test the external validity of our results and find that supervisors appear to use their private information in naturally occurring, high stakes referrals beyond our experimental context.

5.1 Horizontal referrals

Given that horizontal referrals have been found to improve other types of personnel decisions, such as hiring, (Beaman and Magruder, 2012; Burks et al., 2015; Pallais and Sands, 2016), we also test whether firms could gain the same informational advantages from using horizontal referrals for promotion. To do so, we replicate our referral experiment with a randomly selected sample of line workers who are asked to refer coworkers for promotion. Similar to our referral experiment with supervisors, we randomize whether coworkers face financial incentives based on the quality of their referrals. The script, randomization procedure, and interventions used in the Coworker Referrals experiment were identical to those used for the Supervisor Referrals experiment (see Appendix F). Note that the coworker referrals experiment took place at the same time as the supervisor referrals experiment, and all workers who were referred by a coworker were also subsequently invited to take the leadership test.

In total, 237 out of 300 (79%) invited coworkers participated, with 114 coworkers randomly assigned to the Control group and 123 randomly assigned to the Incentivized group. While the initial random sample of coworkers is representative of the broader workforce (Table A.10), coworkers who participated in the referrals experiment are different from those who chose not to participate across some demographic and work characteristics (Table A.11). Nevertheless, participation did not significantly differ by treatment assignment or application decisions in the application experiment. Among coworkers who participated in the experiment, our referrals treatment assignment generated two groups that are balanced on observable characteristics (Table A.12). Among the 378 workers referred by a coworker across Control and Incentivized groups, 84 (22%) could not be matched to the factory roster to be invited to the test. Among those invited, 250 (85%) took the test. Attrition is balanced by the treatment assignment of the referring coworker in the referral experiment (Table A.13).

Our results show that Incentivized coworkers, despite facing the same financial incentives as Incentivized supervisors, do not refer workers with higher leadership ability (Table A.14). If anything, Incentivized coworkers refer workers with more seniority. There is also little overlap between supervisor and coworker referrals of workers for managerial training. Only 10% of the workers referred by coworkers are also referred by a supervisor. Under our simple conceptual framework, these results suggest that either coworkers do not possess the same private information as supervisors or that the referral bonus was not large enough to overcome their personal preferences or strategic concerns. Our experimental design does not allow us to distinguish between these mechanisms. Nevertheless, these results suggest that the firm would not gain the same informational advantages from asking the average factory worker to make promotion decisions relative to the average supervisor.

5.2 Worker's self-assessments

Could the firm rely, instead, on workers' self-assessments of their own skills? To test this, we ask workers who took the leadership test in the second selection round to guess how many questions they answered correctly on the leadership test. Note that workers were incentivized for accuracy when answering this question.[4]

Survey responses show that approximately 82% of workers overestimate their score, with 60% of workers overestimating by at least 200% (Figure A.5). These patterns are consistent with new lab evidence that finds that participants who nominate themselves for leadership positions perform worse as managers than those selected by lottery, driven in part by overconfidence (Weidmann et al., 2024). These patterns suggest that firms are not likely to gain the same informational advantages from asking workers to assess their own managerial potential.

5.3 Selection by more objective methods

As alternatives to discretion, firms could instead promote workers to managerial positions based on seniority or observable performance metrics. Such methods have the benefit of being transparent and easy to understand and are also preferred by a majority of workers in this context. To assess how supervisor discretion compares to such alternative selection methods, we simulate which workers would have been selected for promotion based on their seniority or based on a rules-based method that equally weights a worker's output, attendance, tenure, and disciplinary record. For supervisor selection, we pool referrals across Control and Incentivized supervisors. Note that we restrict selection to workers who apply for promotion, pooling together applications across Control and Discretionary groups.[5]

[4]Specifically, the instructions stated: "Please answer these questions as accurately as possible. For these questions only, you will earn 1,000 Tsh [0.37 USD] for each question you answer correctly."

[5]Recall that only workers who applied or who were referred for promotion were invited to take the leadership test. As workers who were referred by a supervisor but chose not to apply likely differ from other types of workers in important, unobservable dimensions, we restrict our analysis to workers who

Our benchmarking exercise reveals that supervisors select workers who score 9 points (21%) higher on the leadership test compared to rules-based selection by performance records and 10 points (24%) higher than selection based on seniority on average (Figure 1). This suggests that supervisor discretion leads to the selection of workers with significantly higher measured managerial quality relative to more objective selection methods available to the firm.

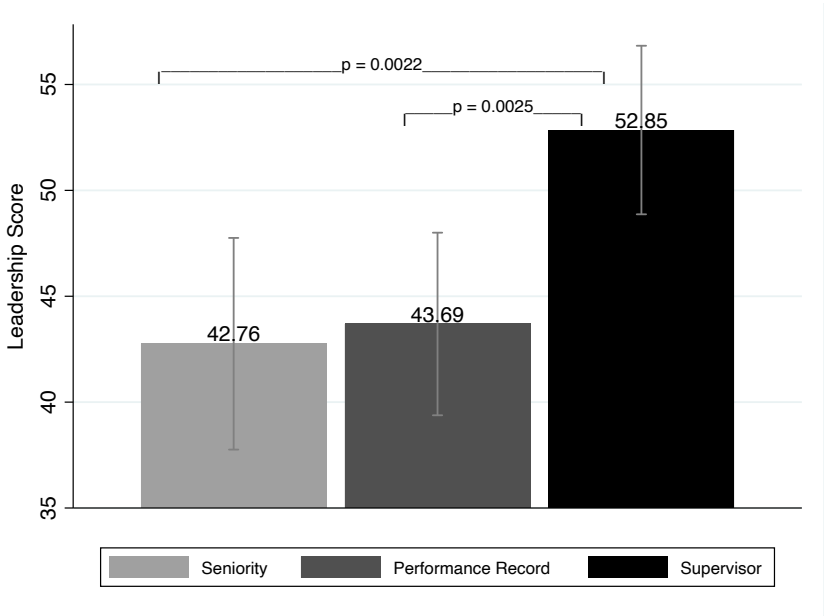


Figure 1: Average Leadership Scores of Selected Workers across Different Selection Methods

Notes: This figure illustrates the average leadership scores of workers selected by lottery (Random); selected by a rules-based method that equally weights a worker's past output/target, attendance, (inverse) KPIs, and tenure (Performance Record); and selected by a supervisor, pooling referrals across Control and Incentivized supervisors (Supervisor). We restrict selection to workers who apply for promotion, pooling together applications across Control and Discretionary groups. 95% confidence intervals are displayed. The p-values from the two-sided hypothesis tests of equality of sample means between random selection and selection by performance record, and between selection by performance record and supervisor selection, are also reported.

This finding is consistent with the fact that supervisor referrals are significant predictors of the leadership scores of workers, even after controlling for all observable worker characteristics and past performance (Table A.9). Specifically, we predict a worker's measured leadership ability using all observable data available to the firm and estimate the following regression:

$$M_i = \alpha + \beta Referred_i + P_i + X_i + \varepsilon_i \tag{5}$$

where M_i is the measured leadership ability of worker i; $Referred_i$ is an indicator variable for whether a worker is referred by any supervisor (pooling together Control and Incentivized referrals); P_i is the performance record of worker i in the year before the promotion-related opportunity, including output/target, individual bonus, group bonus,

chose to apply for promotion.

attendance, KPIs, and a quadratic for tenure; and X_i are demographic characteristics of worker i, including gender, religion, and marital status. We estimate Equation 5 using the leadership test scores from the 2023 selection round, the 2024 selection around, and pooling the two rounds together. In the pooled dataset, as some workers took the leadership test in both years, we cluster standard errors at the worker level. We restrict our analysis to workers who applied for the promotion-related opportunity across all specifications.

Our results from estimating Equation 5 are reported in Table A.9 and indicate that supervisor referrals significantly predict worker leadership ability, even after controlling for the available administrative performance record for each worker. Taken together, these patterns suggest that supervisors have valuable private information about worker leadership ability beyond what is observable to the firm from their existing data.

5.4 External Validity

One year after our main experiments, the firm conducted a second selection round to fill the remaining promotion openings for new supervisors for a new facility they were opening. 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, 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 were referred by at least one supervisor. Separately, all workers who were interested in the promotion opportunity were invited by the firm to take a new leadership test.

Our results show that managerial quality appears to be a significant predictor of naturally occurring, high-stakes supervisor referrals for promotion (Table A.7). A one standard deviation increase in leadership scores is correlated with a 25% increase in the probability that a worker is referred by a supervisor. Supervisors are also significantly more likely to refer workers with higher tenure. These results suggest that supervisors use their private information about worker quality in naturally occurring, high-stakes referrals beyond our experimental context.

6 Conclusion

Firms often rely on supervisors to make promotion decisions. Our results show that this can be explained by supervisors having informational advantages, despite the fact that discretion also generates costs to the firm. Using a series of field experiments with a large manufacturing firm in Tanzania, we find that discretion crowds in private information that supervisors have about the managerial quality of workers. Supervisors appear to have private information beyond what the firm could infer from existing performance records, workers' self-assessments, or asking coworkers. However, we also find that discretion generates costs for firms. Supervisor referrals do not appear to be perfectly aligned with the firm's objectives, and supervisors show preferences consistent with gender bias and favoritism. Furthermore, discretion is disliked by workers and reduces the number of workers who apply for promotion opportunities, directly reducing the number of high quality applicants that the firm receives.

As a result of these informational advantages, supervisors select workers with significantly higher measured leadership ability relative to more objective selection methods available to the firm. Supervisors refer workers who score on average 9-10 points higher on the leadership test relative to selection by seniority or observable performance metrics. Based on the correlation between the leadership test scores and observed performance of existing supervisors (Table 1), our results suggest that this difference in managerial quality across selection methods would correlate with a difference in daily worker productivity of 2-3%. This suggests that firms face meaningful trade-offs in using more subjective selection methods, which can select workers with higher managerial quality, against using more objective methods, which are transparent and preferred by workers.

Throughout our analysis, we use a written leadership test to proxy for managerial potential. While our leadership measure appears to significantly predict supervisor performance in this context, there are likely other aspects of managerial potential that are not captured by this measure. Future research should explore whether supervisors have valuable private information about managerial potential above what can be captured by state-of-the-art measures of soft skills and traits. Nevertheless, from a policy perspective, our results suggest that firms can bring supervisor decisions more into alignment with firm objectives by credibly announcing and implementing objective measures that proxy for otherwise unobservable qualities that are important to the firm.

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 based on CVs and written application materials. Second, how similar is the current position to the new position? The more similar the positions, the more likely existing information on worker performance will predict performance in the new role. Finally, how much does the firm care about matching workers to the positions they are best suited versus using promotions

as rewards for workers? The latter could dominate in contexts where the firm does not offer performance pay or other incentives for performance.

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Appendices

Appendix A Supplementary Graphs 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
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

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, Facility: B, and Facility: C are indicator variables for whether a worker or supervisor works in facility A, B, or C respectively; Female, Muslim, and Married are indicator variables for whether a worker or supervisor is female, Muslim, or married respectively. Tenure measures the number of years a worker or supervisor has been employed by the firm and Tenure as Supervisor measures the number of years a worker has been a supervisor in the firm. Team Size is the number of workers on a team, excluding the supervisors of that team. N. Supervisors is the number of supervisors assigned to a worker's team; N. Teams is the number of different teams that a supervisor manages; and N. Workers is the number of workers that a supervisor manages. All 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.

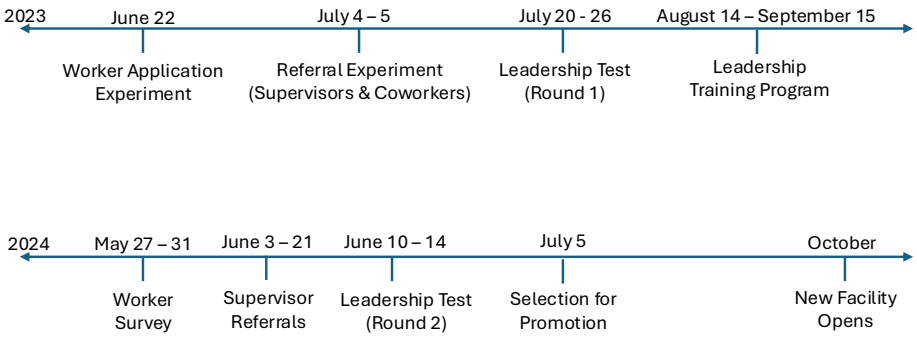


Figure A.1: Study Timeline

Table A.2: Summary of Administrative Data used for Analysis

	Round 1	Round 2
Selection for	Leadership Training Program	Supervisor Positions
Admin data used	May 2022 - June 2023	May 2023 - June 2024
Leadership Test Scores	All workers who apply All workers referred All supervisors	All workers who apply
Demographics	✓	✓
Tenure	✓	✓
Attendance	✓	✓
KPIs	✓	✓
Individual Bonus	✓	✓
Group Bonus	✓	✓
Output/Target	✓	
Discretion in KPIs	December 2022 - May 2022	December 2023 - May 2023
Discretionary Bonus	Percentile of Individual FEs	Individual bonus earnings

Table A.3: Balance Table - Supervisor Referrals Treatment Assignment

	Control		Incentivized		
	N	Mean	N	Mean	P-Value
Panel A: Demographics					
Female	56	0.61	58	0.57	0.682
Muslim	56	0.41	58	0.38	0.734
Married	56	0.14	58	0.07	0.202
Age	56	30.39	58	30.33	0.950
Panel B: Work Characteristics					
Facility: A	58	0.17	60	0.18	0.878
Facility: B	58	0.59	60	0.55	0.694
Facility: C	58	0.21	60	0.23	0.732
Tenure (Years)	56	5.63	58	5.80	0.744
Attendance (Days)	56	250.70	58	248.40	0.640
KPIs	56	3.00	60	2.68	0.684
Bonus Earnings (Tsh)	56	1,520,461	58	1,675,524	0.266

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 dummy variables equal to 1 if the supervisor is female, muslim, or married respectively, and equal to 0 otherwise. Facility: A, Facility: B, Facility: C are dummy variables equal to 1 if the supervisor works in facility A, B, or C respectively and are equal to 0 otherwise. Age and tenure are measured in years, attendance is measured in days for the year prior to the referrals experiment (May 2022 - May 2023), bonus earnings are the total bonus earnings that the supervisor earned in the year prior to the experiment (May 2022 - May 2023) measured in Tanzanian shillings, and KPIs indicate how many key performance indicators are on a supervisor's performance record for the nine months preceding the experiment (October 2022 - May 2023). *p $<$ 0.1, ** p $<$ 0.05, *** p $<$ 0.01.

Table A.4: Balance Table - Applications Experiment Treatment Assignment

	Control (N = 559)	**Treatment** (N = 559)	**P-Value** Control/Treat
Panel A: Demographics			
Female	0.85	0.86	0.58
	(0.36)	(0.35)	
Muslim	0.43	0.47	0.13
	(0.50)	(0.50)	
Married	0.11	0.10	0.72
	(0.31)	(0.30)	
Age	29.29	29.62	0.33
	(5.45)	(5.97)	
Panel B: Work Performance			
Facility: A	0.28	0.28	0.85
	(0.45)	(0.45)	
Facility: B	0.72	0.72	0.85
	(0.45)	(0.45)	
Tenure (Years)	3.22	3.46	0.12
	(2.45)	(2.72)	
Output/Target (Avg)	0.97	0.97	0.94
	(0.37)	(0.40)	
Attendance (Days)	225.93	227.14	0.73
	(58.43)	(56.92)	
KPIs	4.23	4.18	0.88
	(5.78)	(5.60)	
Individual Bonus (1000s Tsh)	443.08	450.34	0.82
	(508.44)	(550.78)	
Group Bonus (1000s Tsh)	365.69	366.81	0.91
	(174.72)	(167.34)	
Panel C: Supervisor Discretion			
Discretion in KPIs	1.50	1.39	0.54
	(2.92)	(2.71)	
Discretionary Bonus (Percentile FEs)	45.41	46.58	0.54
	(30.03)	(30.08)	
SupMatch Gender	0.65	0.67	0.26
	(0.35)	(0.34)	
SupMatch Religion	0.50	0.52	0.42
	(0.31)	(0.32)	

Notes: This table reports the average values and standard deviations in parentheses of observable characteristics across the Control and Discretionary groups that resulted from the randomization procedure for the worker application experiment as well as the p-value from the two-sided hypothesis test of equality of sample means. *p < 0.1, ** p < 0.05, *** p < 0.01.

Table A.5: Balance Table - Supervisor Referrals Experiment Attrition

	Referred N = 206	**Matched Roster** N = 166	**Not Matched** N = 40	**Took Test** N = 140	**Attrition** N = 66	**P-Value** Matched/Not Matched	**P-Value** Took Test/Attrition
Panel A: Supervisor Referral Experiment							
Treatment Assignment	0.51	0.51	0.55	0.50	0.54	0.61	0.64
	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)		
Panel B: Demographics							
Female	0.66	0.66		0.66	0.62		0.63
	(0.48)	(0.48)		(0.47)	(0.50)		
Muslim	0.41	0.41		0.40	0.46		0.54
	(0.49)	(0.49)		(0.49)	(0.51)		
Married	0.11	0.11		0.11	0.15		0.47
	(0.32)	(0.32)		(0.31)	(0.37)		
Age	29.51	29.51		29.67	28.50		0.32
	(5.54)	(5.54)		(5.68)	(4.53)		
Panel C: Work Performance							
Facility: A	0.18	0.21		0.21	0.09		0.03**
	(0.38)	(0.41)		(0.41)	(0.29)		
Facility: B	0.46	0.56		0.55	0.25		0.00***
	(0.50)	(0.50)		(0.50)	(0.44)		
Facility: C	0.17	0.21		0.23	0.03		0.00***
	(0.38)	(0.41)		(0.42)	(0.17)		
Tenure (Years)	4.12	4.12		4.10	4.24		0.79
	(2.55)	(2.55)		(2.50)	(2.88)		
Output/Target (Avg)	1.01	1.01		0.98	1.20		0.17
	(0.70)	(0.70)		(0.58)	(1.21)		
Attendance (Days)	241.26	241.26		243.64	226.50		0.04**
	(39.15)	(39.15)		(37.88)	(44.19)		
KPIs	3.69	4.47		4.44	1.88		0.00**
	(5.11)	(5.31)		(5.15)	(4.58)		
Individual Bonus (1000s Tsh)	705.26	705.26		731.51	546.78		0.22
	(717.41)	(717.41)		(740.12)	(546.17)		
Group Bonus (1000s Tsh)	323.61	323.61		325.80	310.37		0.82
	(315.93)	(315.93)		(332.00)	(196.47)		
Panel D: Supervisor Discretion							
Discretion in KPIs	1.36	1.65		1.53	0.94		0.10
	(2.47)	(2.64)		(2.16)	(3.08)		
Discretionary Bonus (Percentile FEs)	55.25	55.25		56.10	50.11		0.42
	(29.04)	(29.04)		(29.38)	(27.15)		
RefMatch Gender	0.71	0.71		0.71	0.71		0.97
	(0.46)	(0.46)		(0.46)	(0.46)		
RefMatch Religion	0.54	0.54		0.54	0.54		0.98
	(0.50)	(0.50)		(0.50)	(0.51)		

Notes: This table reports the average values and standard deviations in parentheses of observable characteristics of workers who were referred by a supervisor, and among those who were referred, who could be matched to the factory roster, who could not be matched to the factory roster, who took the leadership test, and who did not take the leadership test (attrition). The p-values from the two-sided hypothesis tests of equality of sample means between those that were matched and not matched to the roster, and between those that took the test and did not take the test, are reported. *p < 0.1, ** p < 0.05, *** p < 0.01.

Table A.6: Balance Table - Applications Experiment Attrition

	Apply = 1 (N = 592)		Took Test (N = 502)		Attrition (N = 90)		P-Value
	Mean	Sd	Mean	Sd	Mean	Sd	Took Test/Attrition
Panel A: Application Experiment							
Treatment Assignment	0.47	0.50	0.46	0.50	0.52	0.50	0.28
Panel B: Demographics							
Female	0.82	0.39	0.81	0.39	0.83	0.38	0.81
Muslim	0.43	0.50	0.42	0.49	0.47	0.50	0.48
Married	0.12	0.32	0.12	0.32	0.12	0.32	0.93
Age	29.32	5.78	29.30	5.75	29.45	6.00	0.82
Panel C: Work Performance							
Facility: A	0.25	0.44	0.26	0.44	0.23	0.42	0.63
Facility: B	0.75	0.44	0.74	0.44	0.77	0.42	0.63
Tenure (Years)	3.14	2.51	3.07	2.45	3.54	2.83	0.11
Output/Target (Avg)	0.98	0.41	0.99	0.43	0.96	0.28	0.53
Attendance (Days)	224.39	59.61	226.71	58.42	210.57	64.90	0.02**
KPIs	4.04	5.33	3.72	4.70	5.87	7.78	0.00***
Individual Bonus (1000s Tsh)	456.38	518.90	452.97	516.08	477.09	538.56	0.70
Group Bonus (1000s Tsh)	360.15	169.58	366.83	167.93	319.51	174.92	0.02**
Panel D: Supervisor Discretion							
Discretion in KPIs	1.48	2.62	1.48	2.35	1.48	3.78	1.00
Discretionary Bonus (Percentile FEs)	46.41	30.21	46.62	30.16	45.01	30.77	0.68
SupMatch Gender	0.65	0.34	0.65	0.33	0.63	0.38	0.62
SupMatch Religion	0.52	0.31	0.52	0.31	0.49	0.33	0.38

Notes: This table reports the average values and standard deviations of observable characteristics of workers who applied for the training, workers that applied and took the test, and workers that applied but did not take the test (attrition). The p-value from the two-sided hypothesis test of equality of sample means between workers who applied and took the test and workers who applied and did not take the test. *p < 0.1, ** p < 0.05, *** p < 0.01.

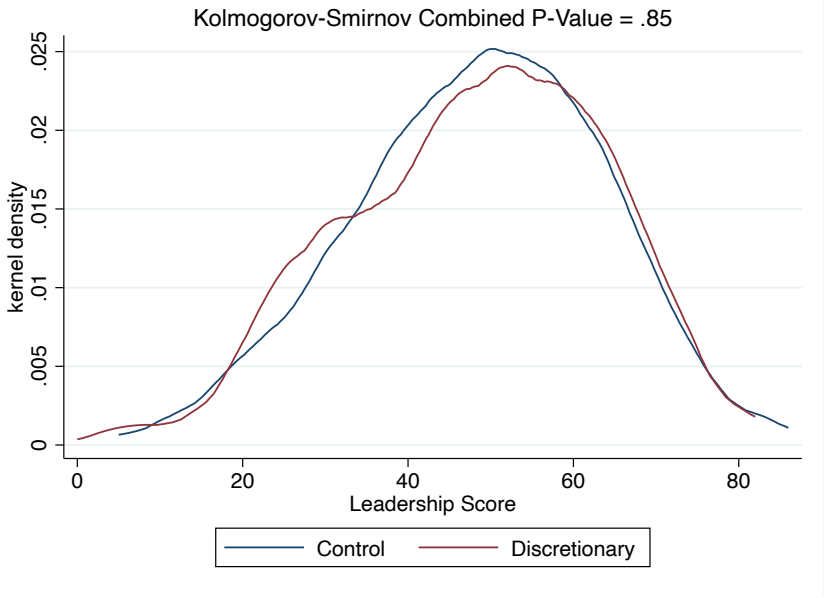


Figure A.2: Distribution of Leadership Scores among Applicants

Notes: This figure shows the kernel density of the distribution of leadership scores among workers who applied under Control and Discretionary applications specifically. The p-value from the combined two-sample Kolmogorov-Smirnov test for equality of distribution functions is reported.

Table A.7: Predictors of Supervisor Referrals

	2023 Selection				2024 Selection	
	(1) Referred Control	(2) Referred Control	(3) Referred Treatment	(4) Referred Treatment	(5) Referred	(6) Referred
Applied	0.030**		0.026**		0.025**	
	(0.012)		(0.012)		(0.012)	
Leadership Score		0.020*		0.025*		0.017**
		(0.012)		(0.013)		(0.008)
Output/Target	-0.004	-0.011	-0.001	-0.011		
	(0.010)	(0.018)	(0.015)	(0.012)		
Discretionary Bonus	0.005**	0.010**	0.008***	0.012***	0.019**	0.017
	(0.002)	(0.004)	(0.002)	(0.004)	(0.009)	(0.011)
Group Bonus	0.018	0.036	0.018	0.022	0.005	-0.001
	(0.011)	(0.025)	(0.012)	(0.018)	(0.008)	(0.011)
Attendance	-0.019	-0.029	-0.005	0.000	-0.018	-0.024
	(0.013)	(0.025)	(0.012)	(0.021)	(0.011)	(0.017)
KPIs	-0.002*	-0.002	-0.001	0.001	-0.000	0.000
	(0.001)	(0.002)	(0.001)	(0.002)	(0.002)	(0.003)
Tenure	0.027***	0.044**	0.002	0.003	0.039***	0.052***
	(0.010)	(0.018)	(0.010)	(0.017)	(0.012)	(0.019)
Tenure^2	-0.002**	-0.004**	0.000	0.000	-0.002**	-0.003*
	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)
Female	-0.043*	-0.078*	-0.050**	-0.055	-0.064***	-0.043
	(0.024)	(0.041)	(0.024)	(0.036)	(0.021)	(0.026)
Muslim	-0.021	-0.059**	-0.003	-0.012	-0.002	-0.000
	(0.013)	(0.024)	(0.012)	(0.021)	(0.012)	(0.017)
Married	0.012	0.012	-0.019	-0.005	0.007	0.024
	(0.024)	(0.042)	(0.017)	(0.034)	(0.016)	(0.026)
Mean	0.046	0.071	0.040	0.056	0.059	0.067
SD	0.210	0.258	0.197	0.230	0.235	0.251
N	1017	463	1017	463	1565	875
R^2	0.033	0.068	0.033	0.054	0.049	0.059

Notes: This table reports the regression coefficients of various worker characteristics on whether a worker is referred by a supervisor for the leadership training (Columns 1 - 4) or promotion to supervisor (Columns 5 & 6). Columns 2, 4 & 6 are restricted to workers who applied for the promotion-related opportunity. Leadership scores, output/target, group bonus, and attendance are standardized by the sample mean and standard deviation. Note that individual output data was not collected by the firm at the time of supervisor referrals for promotion, so Output/Target is not included as a control in Columns 5 & 6. Robust standard errors are reported in parentheses, *p $<$ 0.1, ** p $<$ 0.05, *** p $<$ 0.01.

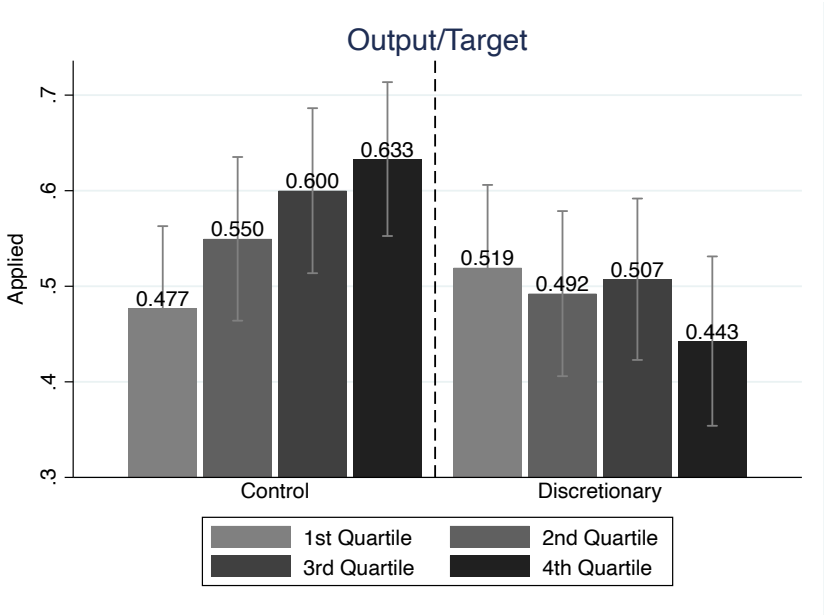


Figure A.3: Application Rates by Productivity

Notes: This figure illustrates the average application rates across Control and Discretionry application forms by quartiles of worker output, scaled to task-specific performance targets, with higher quartiles representing better performance. 95% confidence intervals are displayed.

Table A.8: Predictors of Applications across Treatment

	(1) Applied	(2) Applied	(3) Applied	(4) Applied	(5) Applied	(6) Applied	(7) Applied	(8) Applied	(9) Applied	(10) Applied	(11) Applied	(12) Applied	(13) Applied
Treatment	-0.075**	-0.072**	-0.072**	-0.065**	-0.065**	-0.063**	-0.048	-0.042	-0.059*	-0.059*	-0.075**	-0.065**	0.001
	(0.031)	(0.030)	(0.030)	(0.030)	(0.030)	(0.030)	(0.033)	(0.040)	(0.032)	(0.031)	(0.031)	(0.030)	(0.047)
Panel A: Work Performance													
Treat x Output/Target	-0.085***												-0.108***
	(0.030)												(0.033)
Treat x Individual Bonus		-0.033											-0.001
		(0.030)											(0.033)
Treat x Group Bonus			-0.065**										-0.053
			(0.030)										(0.043)
Treat x Attendance				-0.042									0.004
				(0.030)									(0.045)
Treat x KPIs					-0.026								-0.028
					(0.028)								(0.032)
Treat x Tenure						-0.017							-0.032
						(0.030)							(0.036)
Panel B: Demographics													
Treat x Male							-0.118						-0.086
							(0.080)						(0.089)
Treat x Muslim								-0.052					-0.059
								(0.060)					(0.063)
Treat x Married									-0.071				-0.137
									(0.095)				(0.102)
Panel C: Supervisor Discretion													
Treat x Supervisor Referral										-0.121			-0.115
										(0.099)			(0.101)
Treat x Discretionary Bonus											-0.019		0.008
											(0.031)		(0.033)
Treat x Discretion KPIs												-0.032	-0.035
												(0.030)	(0.034)
Control Mean	0.562	0.562	0.562	0.562	0.562	0.562	0.562	0.562	0.562	0.562	0.562	0.562	0.562
Control SD	0.497	0.497	0.497	0.497	0.497	0.497	0.497	0.497	0.497	0.497	0.497	0.497	0.497
N	1,045	1,084	1,084	1,102	1,119	1,106	1,106	1,106	1,106	1,119	1,023	1,119	1,020

Notes: This table reports heterogeneous treatment effects of Discretionary applications on worker applications by various worker characteristics, including work performance variables in Panel A, worker demographics in panel B, and a worker's experience of supervisor discretion in Panel C. 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.

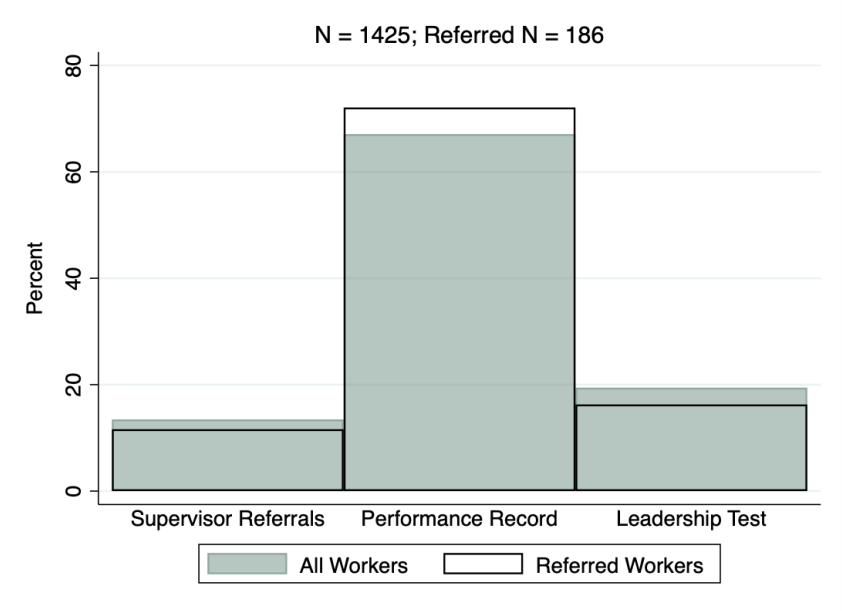


Figure A.4: Worker Preferences over Promotion Selection Criteria

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?" with 1,425 survey responses from workers from the two main production facilities of the factory prior to the 2024 promotion selection process.

Table A.9: Predictors of Measured Leadership Ability

	(1) Leadership Score Training	(2) Leadership Score Promotion	(3) Leadership Score Pooled
Supervisor Referral	5.116**	3.521**	4.549***
	(2.193)	(1.723)	(1.466)
Output/Target	-0.210		
	(0.674)		
Individual Bonus	0.435	0.031	-0.558
	(0.773)	(0.397)	(0.357)
Group Bonus	-0.631	1.020**	-0.767*
	(0.970)	(0.476)	(0.397)
Attendance	0.691	0.442	-0.608
	(1.079)	(0.897)	(0.702)
KPIs	0.111	-0.109	0.065
	(0.151)	(0.105)	(0.106)
Tenure	-0.394	-1.039	1.810***
	(1.140)	(0.797)	(0.616)
Tenure^2	-0.002	0.052	-0.191***
	(0.116)	(0.072)	(0.063)
Female	-5.698***	-4.742***	-6.115***
	(1.932)	(1.165)	(1.126)
Muslim	0.842	0.199	0.055
	(1.407)	(0.853)	(0.809)
Married	-4.853**	-0.437	-2.212*
	(2.196)	(1.293)	(1.317)
Mean	48.619	40.214	43.190
SD	15.200	12.595	14.170
N	475	871	1363
R^2	0.063	0.039	0.053

Notes: This table reports the regression coefficients of various worker characteristics on a worker's overall leadership test score from the selection round for the leadership training in 2023 (Column 1), the selection round for promotion openings in 2024 (Column 2), and pooling the two rounds together (Column 3). Output/Target, Individual Bonus, Group Bonus, and Attendance have been standardized by their mean and standard deviation. We restrict our analysis to workers who applied for the promotion-related opportunity across all specifications. Standard errors are reported in parentheses and are clustered at the individual level in Column 3. *p $<$ 0.1, ** p $<$ 0.05, *** p $<$ 0.01.

Table A.10: Balance Table - Selection of Coworker Sample

	Not Selected		Selected		
	N	Mean	N	Mean	P-value
Panel A: Application Experiment					
Application Treatment	805	0.50	292	0.51	0.799
Applied	805	0.53	292	0.55	0.448
Panel B: Demographics					
Female	804	0.84	292	0.88	0.105
Muslim	804	0.46	292	0.42	0.223
Married	804	0.11	292	0.09	0.356
Age	804	29.36	292	29.79	0.279
SupMatch Score	805	0.40	292	0.41	0.256
Panel C: Work Characteristics					
Factory: 1	804	0.28	292	0.27	0.792
Factory: 2	804	0.72	292	0.73	0.792
Tenure	804	3.35	292	3.32	0.845
Output/Target	754	0.97	281	0.97	0.725
Attendance	801	226.01	291	228.30	0.561
Disciplinary Issues	805	4.41	292	3.90	0.188
Total Bonus Earnings (Tsh)	787	825,461	287	806,142	0.637

Notes: This table reports the average values of key covariates across the workers randomly selected and not selected to participate in the Coworker Referral Experiment as well as the p-value for each covariate from the two-sided hypothesis test of equality of sample means. *p $<$ 0.1, ** p $<$ 0.05, *** p $<$ 0.01.

Table A.11: Balance Table - Coworker Sample Attrition

	Did Not Participate		Participated		
	N	Mean	N	Mean	P-value
Panel A: Application Treatment					
Application Treatment	57	0.53	235	0.50	0.744
Applied	57	0.58	235	0.54	0.642
Panel B: Demographics					
Female	57	0.84	235	0.89	0.278
Muslim	57	0.44	235	0.42	0.768
Married	57	0.19	235	0.07	0.003***
Age	57	30.21	235	29.69	0.568
SupMatch Score	57	0.37	235	0.42	0.025**
Panel C: Work Characteristics					
Factory: 1	57	0.18	235	0.29	0.072*
Factory: 2	57	0.82	235	0.71	0.072*
Tenure	57	3.40	235	3.29	0.771
Output/Target	53	1.02	228	0.95	0.217
Attendance	56	226.16	235	228.81	0.751
Disciplinary Issues	57	5.58	235	3.49	0.002***
Total Bonus Earnings (Tsh)	56	929,373	231	776,268	0.060*

Notes: This table reports the average values of key covariates among respondents in the coworker sample who choose to participate or not in the referrals experiment, as well as the p-value for each covariate from the two-sided hypothesis test of equality of sample means. *p $<$ 0.1, ** p $<$ 0.05, *** p $<$ 0.01.

Table A.12: Balance Table - Coworker Referrals Treatment Assignment

	Control		Incentivized		
	N	Mean	N	Mean	P-value
Panel A: Application Experiment					
Application Treatment	114	0.50	122	0.50	1.000
Applied	114	0.56	122	0.53	0.661
Panel B: Demographics					
Female	114	0.88	123	0.91	0.405
Muslim	114	0.40	123	0.43	0.671
Married	114	0.07	123	0.07	0.929
Age	114	29.46	123	29.85	0.630
Panel C: Work Characteristics					
Factory 1	114	0.31	123	0.29	0.811
Factory 2	114	0.69	123	0.71	0.811
Tenure	114	3.41	123	3.21	0.554
Output/Target	112	0.93	118	0.98	0.285
Total Attendance	114	230.01	123	227.98	0.789
Discplinary Issues	114	3.18	123	3.90	0.179
Total Bonus Earnings (Tsh)	113	746,984	120	806,423	0.360

Notes: This table reports the average values of key covariates across the Control and Treatment groups that resulted from the randomization procedure for the coworker referrals experiment, as well as the p-value for each covariate from a two-sided hypothesis test of the equality of sample means. *p $<$ 0.1, ** p $<$ 0.05, *** p $<$ 0.01.

Table A.13: Balance Table - Coworker Referrals Experiment Attrition

	Referred N = 378	**Matched Roster** N = 294	**Not Matched** N = 84	**Took Test** N = 250	**Attrition** N = 128	**P-Value** Matched/Not Matched	**P-Value** Took Test/Attrition
Panel A: Coworker Referral Experiment							
Treatment Assignment	0.53	0.54	0.50	0.55	0.49	0.52	0.24
	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)		
Panel B: Demographics							
Female	0.85	0.85		0.87	0.77		0.08*
	(0.35)	(0.35)		(0.34)	(0.42)		
Muslim	0.44	0.44		0.44	0.46		0.76
	(0.50)	(0.50)		(0.50)	(0.50)		
Married	0.10	0.10		0.10	0.15		0.31
	(0.31)	(0.31)		(0.30)	(0.36)		
Age	29.23	29.23		29.08	30.21		0.17
	(5.27)	(5.27)		(5.21)	(5.59)		
Panel C: Work Performance							
Facility: A	0.23	0.29		0.29	0.11		0.00***
	(0.42)	(0.45)		(0.45)	(0.31)		
Facility: B	0.55	0.70		0.71	0.22		0.00***
	(0.50)	(0.46)		(0.46)	(0.42)		
Facility: C	0.01	0.01		0.01	0.01		0.94
	(0.08)	(0.09)		(0.08)	(0.08)		
Tenure (Years)	3.60	3.60		3.45	4.57		0.01**
	(2.64)	(2.64)		(2.57)	(2.91)		
Output/Target (Avg)	0.96	0.96		0.96	0.96		0.96
	(0.41)	(0.41)		(0.42)	(0.34)		
Attendance (Days)	229.63	229.63		229.31	231.74		0.78
	(56.22)	(56.22)		(57.49)	(47.51)		
KPIs	3.21	4.02		3.83	1.83		0.00***
	(4.94)	(5.23)		(5.06)	(4.38)		
Individual Bonus (1000s Tsh)	481.83	481.83		468.67	566.99		0.25
	(544.72)	(544.72)		(530.73)	(627.46)		
Group Bonus (1000s Tsh)	373.78	373.78		378.09	345.87		0.23
	(169.30)	(169.30)		(165.76)	(190.23)		
Panel D: Discretion							
RefMatch Gender	0.85	0.85		0.86	0.81		0.42
	(0.36)	(0.36)		(0.35)	(0.39)		
RefMatch Religion	0.55	0.55		0.57	0.42		0.04**
	(0.50)	(0.50)		(0.50)	(0.50)		
Discretion in KPIs	1.08	1.36		1.41	0.37		0.00***
	(2.52)	(2.76)		(2.55)	(2.31)		
Discretionary Bonus (Percentile FEs)	47.30	47.30		47.23	47.94		0.89
	(28.64)	(28.64)		(28.58)	(29.56)		

Notes: This table reports the average values and standard deviations in parentheses of observable characteristics of workers who were referred by a coworker, and among those who were referred, who could be matched to the factory roster, who could not be matched to the factory roster, who took the leadership test, and who did not take the leadership test (attrition). The p-values from the two-sided hypothesis tests of equality of sample means between those that were matched and not matched to the roster, and between those that took the test and did not take the test, are reported. *p < 0.1, ** p < 0.05, *** p < 0.01.

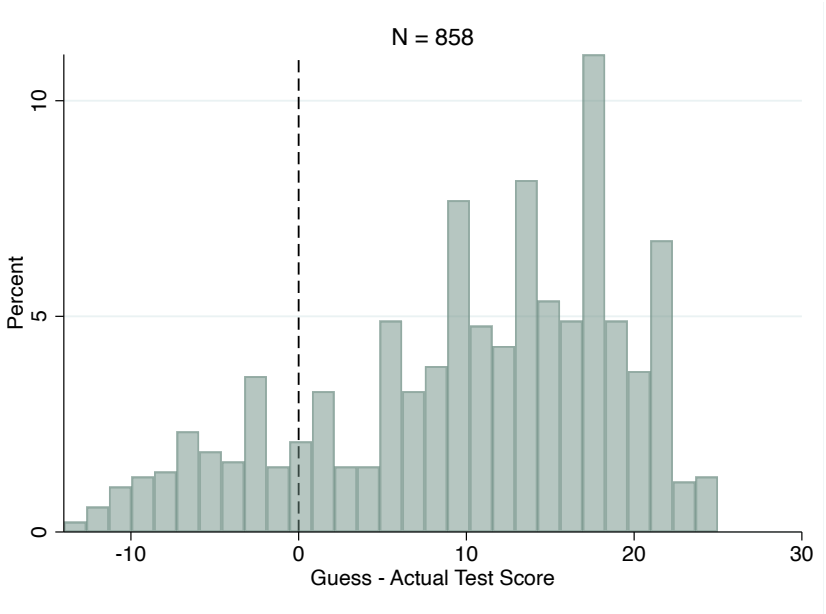


Figure A.5: Average Leadership Scores of Selected Workers across Different Selection Methods

Notes: This figure illustrates the distribution of responses to the question "The first 26 questions on this test were technical. How many of these technical questions do you think you answered correctly?," reporting the difference between each respondent's guess and the actual number of questions they answered correctly. Values greater than zero indicate overconfidence.

Table A.14: Effect of Referral Bonus - Coworker Referral Experiment

Panel A: Leadership Score	(1)	(2)	(3)	(4)
	Total Score	Production Score	Traits Score	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 Referred Workers	308	308	308	308
Panel B: Demographics	(1)	(2)	(3)	(4)
	Female	Muslim	Married	Tenure
Incentivized Coworker Referral	0.040	-0.043	-0.004	0.628**
	(0.038)	(0.056)	(0.034)	(0.242)
Control Mean	0.818	0.448	0.103	3.434
Control SD	0.387	0.499	0.305	2.595
Coworker Controls	✓	✓	✓	✓
N Referred Workers	356	356	356	356
Panel C: Work Performance	(1)	(2)	(3)	(4)
	Output/Target	Individual Bonus	Attendance	KPIs
ncentivized Coworker Referral	0.074	0.297	0.869	0.273
	(0.049)	(0.608)	(6.321)	(0.482)
Control Mean	0.925	4.809	231.366	3.052
Control SD	0.263	5.787	53.298	5.014
Coworker Controls	✓	✓	✓	✓
N Referred Workers	335	351	355	448
Panel D: Favoritism	(1)	(2)	(3)	
	RefMatch Gender	RefMatch Religion	Discretionary Bonus	Discretion in KPIs
Incentivized Coworker Referral	0.014	0.062	0.697	0.169
	(0.038)	(0.056)	(3.656)	(0.258)
Control Mean	0.830	0.533	47.753	0.972
Control SD	0.377	0.500	27.885	2.753
Coworker Controls	✓	✓	✓	✓
N Referred Workers	356	356	325	448

Notes: This table reports the effects of randomized referral incentives on the average characteristics of the workers referred by coworkers. The omitted category in all specifications is Control coworker referrals. Coworker controls, including the coworkers's gender, religion, tenure, and marital status, are included in all regressions. Standard errors are clustered by coworker. *p < 0.1, ** p < 0.05, *** p < 0.01.

Table A.15: Predictors of Coworker Referrals

	(1) Referred by Coworker	(2) Referred by Coworker
Applied	0.093***	
	(0.026)	
Leadership Score		0.002
		(0.001)
Output/Target	-0.080**	-0.139***
	(0.032)	(0.045)
Discretionary Bonus	0.000	0.004
	(0.004)	(0.007)
Group Bonus	0.001	0.002
	(0.001)	(0.002)
Attendance	0.002	0.004
	(0.002)	(0.003)
KPIs	-0.002	-0.004
	(0.002)	(0.004)
Tenure	0.011	-0.010
	(0.021)	(0.035)
Tenure^2	-0.001	0.001
	(0.002)	(0.003)
Female	0.057	0.040
	(0.036)	(0.056)
Muslim	0.013	-0.048
	(0.027)	(0.042)
Married	-0.031	-0.029
	(0.044)	(0.067)
N	1018	463
R^2	0.023	0.035

Notes: This table reports the regression coefficients of various worker characteristics on whether a worker is referred by a coworker for managerial training. Column 2 is restricted to workers who applied for the leadership training program. Column 4 is restricted to workers who applied for promotion. Note that individual output data was not collected by the firm at the time of supervisor referrals for promotion, so Output/Target is not included as a control in Columns 3 & 4. Robust standard errors are reported in parentheses, *p $<$ 0.1, ** p $<$ 0.05, *** p $<$ 0.01.

Appendix B Measuring Supervisor Discretion

Supervisor discretion is a regular part of a worker's experience on the job. Many status quo decisions in the factory rely on supervisor discretion, including a variety of personnel decisions. The factory relies almost solely on supervisors to choose which workers to hire, allocate workers to tasks, and select workers for promotion. While the factory has some

rules-based procedures for how to reward worker effort and discipline shirking, supervisors also have some discretion in these domains.

Throughout our analysis, we use two measures to capture the degree of favoritism that workers experience from supervisor discretion across various workplace domains. The first measure, "Discretion in KPIs," captures how much workers benefit from supervisor discretion in tracking Key Performance Indicators (KPIs). KPIs include late arrivals, unexcused absences, permission leave, sick leave, and warning letters from breaking the firm's rules and policies. When making important personnel decisions, the factory will often take into consideration a worker's KPIs from the past nine months. Late arrivals, unexcused absences, and warning letters are particularly serious and can potentially result in terminations.

Four KPIs are attendance-related and can therefore be verified against the raw daily attendance record. This reveals significant discrepancies. Systematically fewer KPIs are reported relative to the actual attendance data for issues that have more severe consequences for workers, particularly late arrivals and unexcused absences (Figure B.6). These patterns suggest supervisors exercise at least some discretion in how they choose to discipline workers, beyond just mistakes or measurement errors that would affect all attendance-related KPIs. To measure discretion in KPIs, we subtract the number of attendance-related KPIs from the actual number of corresponding issues recorded in a worker's daily attendance record in the nine months prior to each selection round (Equation B.1). A positive value in this measure indicates that a worker benefits favorably from supervisor discretion in their KPIs.

$$KPIDiscretion_i = AttendanceIssues_i - AttendanceKPIs_i \tag{B.1}$$

We also measure supervisor discretion in the allocation of individual performance bonuses. As discussed above, workers earn performance bonuses based on their individual output. Most tasks have their own bonus schedule, where workers earn a set bonus amount if they meet the daily production target for their task, as well as a piece rate bonus for additional units they produce above their target. However, supervisors also allocate additional individual bonuses to workers at their discretion, purportedly to motivate workers to reach their team-level targets. Comparing the actual amount of individual bonus that a worker earns to the rules-based amount of bonus they should have earned reveals that such discretionary bonuses appear to be widespread (Figure B.7). In the year prior to the study, workers appear to earn positive discretionary bonuses approximately 67% of the time, earning exactly the rules based amount 27% of the time, and earning less than the rules based amount around 6% of the time.

To construct our measure of "Discretionary Bonus" we first estimate the following:

$$ActualBonus_{it} - RulesBasedBonus_{it} = \delta_i + \gamma_t + \varepsilon_{it} \tag{B.2}$$

where $ActualBonus_{it}$ is the amount of individual bonus worker i actually receives for week t; $RulesBasedBonus_{it}$ is the amount of individual bonus worker i should have earned in week t based on their output and the bonus schedule for their task; δ_i are worker fixed effects; and γ_t are week fixed effects. We then use the percentile of the estimated fixed effect for each worker from estimating Equation B.2 as our measure of "Discretionary Bonus," which ranges from 0 to 100, where higher values indicate workers benefit relatively more from discretionary bonuses. After September 2023, the factory removed all rules-based individual bonuses so that all individual bonuses were solely allocated at the discretion of supervisors. Therefore, in our analysis prior to September 2023, we use the percentile of worker fixed effects from estimating Equation B.2 as our measure of Discretionary Bonus. In analysis of events that occur after September 2023, we simply use individual bonus earnings as our measure of Discretionary Bonus.

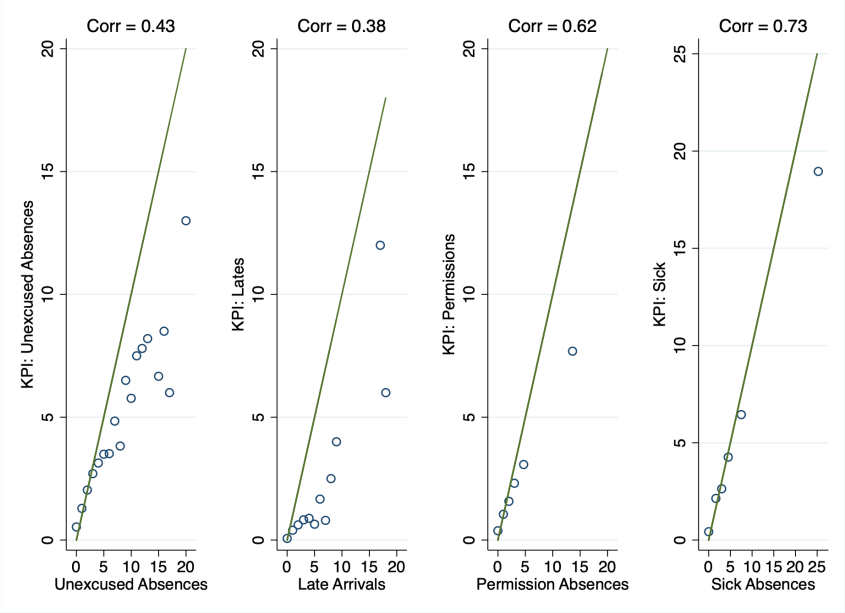


Figure B.6: Discretion in KPIs

Notes: This figure shows binned scatterplots of the correlation between a worker's raw daily attendance record and their official Key Performance Indicators (KPIs) record for four types of attendance-related issues: unexcused absences, late arrivals, permission leave, and sick leave. Correlation coefficients are reported. Data is drawn from the nine month period prior to the referrals and application experiments (October 2022 - June 2023). Observations below the green 45 degree line indicate that there are more issues in a worker's daily attendance data than what is recorded on their KPI record, consistent with beneficial supervisor discretion.

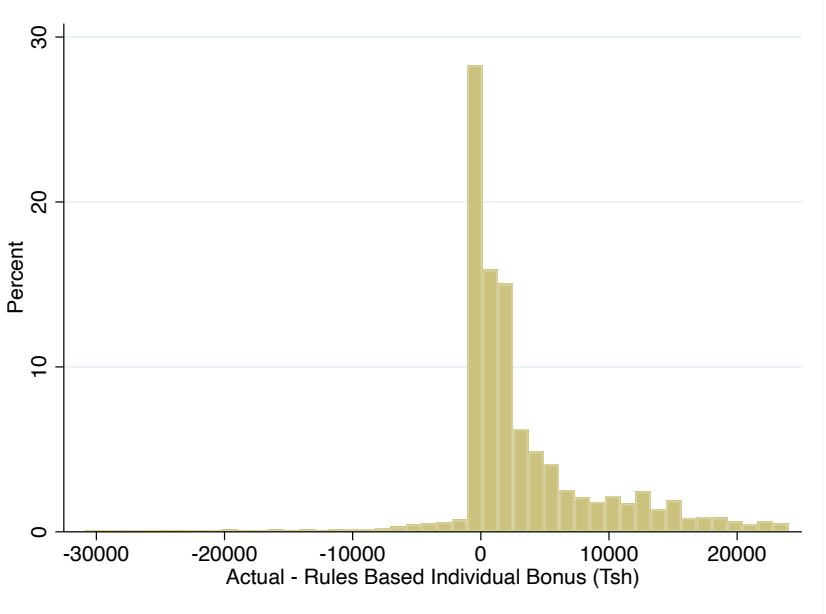


Figure B.7: Discretion in Individual Bonus Payments

Notes: This figure shows the distribution of discretionary individual bonus payments to workers, calculated as the difference between the actual amount of individual bonus a worker receives and the rules-based amount of bonus they earned based on their task-specific bonus schedule, trimmed at the 1st and 99th percentiles. Individual bonuses are paid at a weekly level in Tanzanian shillings. Data is drawn from the period when the factory collected individual output data and implemented a rules-based bonus system (June 2022 - September 2023).

Appendix C Conceptual Framework

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

Supervisor i has the opportunity to refer a worker for promotion. In making a referral, i chooses among the workers that supervisor i knows in the firm. Each worker j has an inherent ability at the promotion position, $\theta_j \in \{\theta^H, \theta^L\}$. i is offered a referral bonus P_i, where she will receive P_i if she correctly selects a high-ability worker ($\theta_j = \theta^H$). The supervisor observes a signal of each worker's ability, $\hat{\theta_j} \in \{\theta^H, \theta^L\}$, which is accurate with probability $\beta_i = P(\theta = \theta^H | \hat{\theta} = \theta^H, i) = P(\theta = \theta^L | \hat{\theta} = \theta^L, i)$, where $beta_i \in [0.5, 1]$. i also gains personal benefits σ_{ij} from referring worker j, which could be interpreted as an actual cash transfer or as a weighted inclusion of j's welfare in i's utility. Suppose the effort of making a referral will cost her c_i.

Since there are two ability types of workers, it is without loss of generality to focus on the decision between worker 1, for whom $\sigma_{i1} \in argmax(\sigma_{ij} | \hat{\theta}_j = \theta^H)$ and worker 2, for whom $\sigma_{i2} \in argmax(\sigma_{ij} | \hat{\theta}_j = \theta^L)$. If i selects worker 1, then she will receive in expectation $\beta_i P_i + \sigma_{i1} - c_i$. If i selects worker 2, she will receive in expectation $(1 - \beta_i) P_i + \sigma_{i2} - c_i$.

Comparing these two expressions, i will select worker 1 if

$$P_i > \frac{\sigma_{i1} - \sigma_{i2}}{2\beta_i - 1}$$

In our referral experiment, we randomly vary whether $P_i = 0$ or $P_i = 20,000 Tsh$. An empirical implication of the model is that there are four necessary characteristics for a referral bonus to increase the quality of the referred worker: (i) workers must be heterogeneous, so that i observes workers with both types of signals; (ii) there must be trade-offs between a supervisor's personal incentives and the firm's incentives ($\sigma_{i2} - \sigma_{i1} > 0$); (iii) the trade-offs must not be too large relative to P_i; and (iv) supervisor i gets at least weakly informative signals about the quality of workers, so that $\beta_i > 0.5$.

In the experiment, if we observe an increase in the quality of referred workers in response to the referral bonus, we will be able to conclude that supervisors have all four of those characteristics. If the referral bonus does not change the quality of referred workers, then we cannot distinguish between mechanisms.

Appendix D Sentiment Analysis

During the supervisor referral experiment, we asked supervisors a series of open-ended questions, including "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 stentiments from supervisors' responses to this question, we use the state-of-the-art GPT-4o model developed by OpenAI. Specifically, 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 corresponding word cloud and frequency counts of key phrases identified by GPT-4o are reported in Figure D.8 and in Table D.16. The results suggests that problem solving, leadership, communication, and discipline are some of the most frequent responses from supervisors, corresponding with soft skills often identified in the management literature (Hurtz and Donovan, 2000; Borghans et al., 2008; Becker et al., 2012).

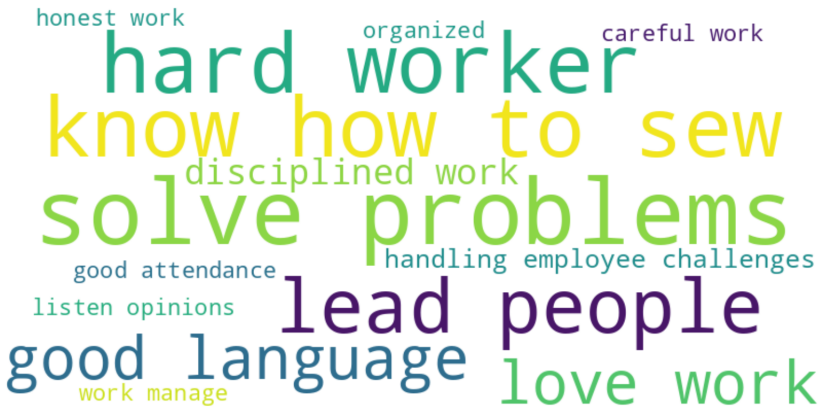


Figure D.8: Supervisor Beliefs About Skills/Traits Necessary for their Role

Notes: This figure illustrates the most common sentiments extracted from open-text responses from supervisors 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]?" using the state-of-the-art GPT-4o model from OpenAI.

Table D.16: Frequencies of sentiments in supervisor responses

Solves problems: 12	Hard worker: 10
Knows how to sew: 10	Leads people: 8
Loves work: 5	Good language: 5
Disciplined work: 4	Handling employee challenges: 4
Organized: 3	Listens to opinions: 3
Careful work: 3	Honest work: 3
Good attendance: 3	Work manage: 3

Notes: This table reports the most frequent sentiments and their frequency counts extracted from open-text responses from supervisors 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]?" using the state-of-the-art GPT-4o model from OpenAI.

During the worker application experiment, we also asked workers who applied for the leadership training to answer the open response question "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 use the spacy package in Python to calculate the cosine similarity between worker and supervisor responses for these chosen phrases. Our results are reported in Figure D.9. Our results suggest that while workers and supervisors appear to value experience similarly, workers are significantly more likely to mention hard work, while supervisors are significantly more likely to mention specific soft skills such as communication, managerial ability, and discipline.

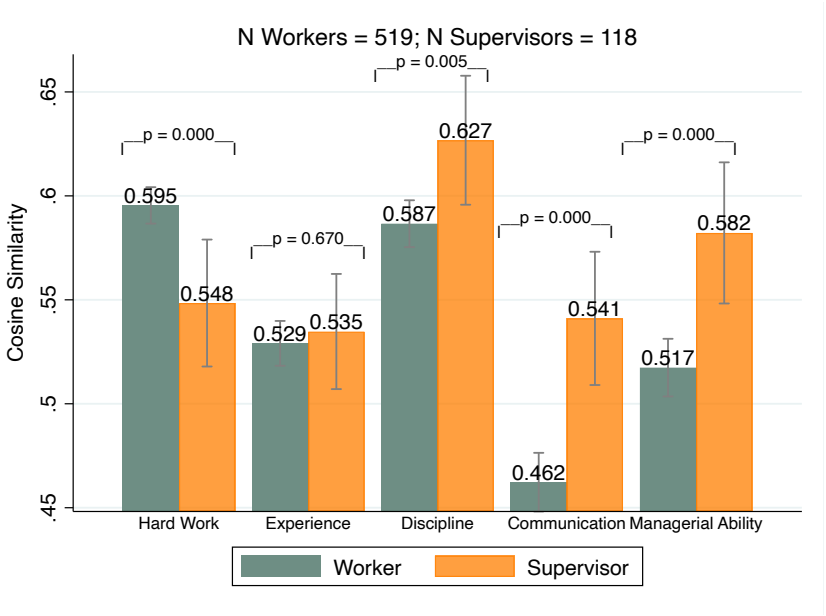


Figure D.9: Sentiment Analysis of Worker versus Supervisor Responses

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.

Appendix E

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?

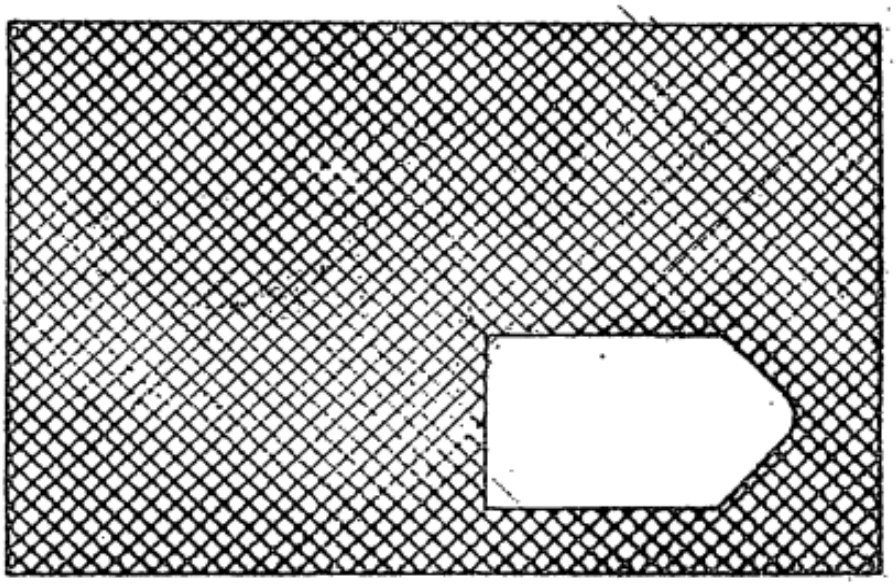
Answer: _____

Section E – Graphic Puzzles

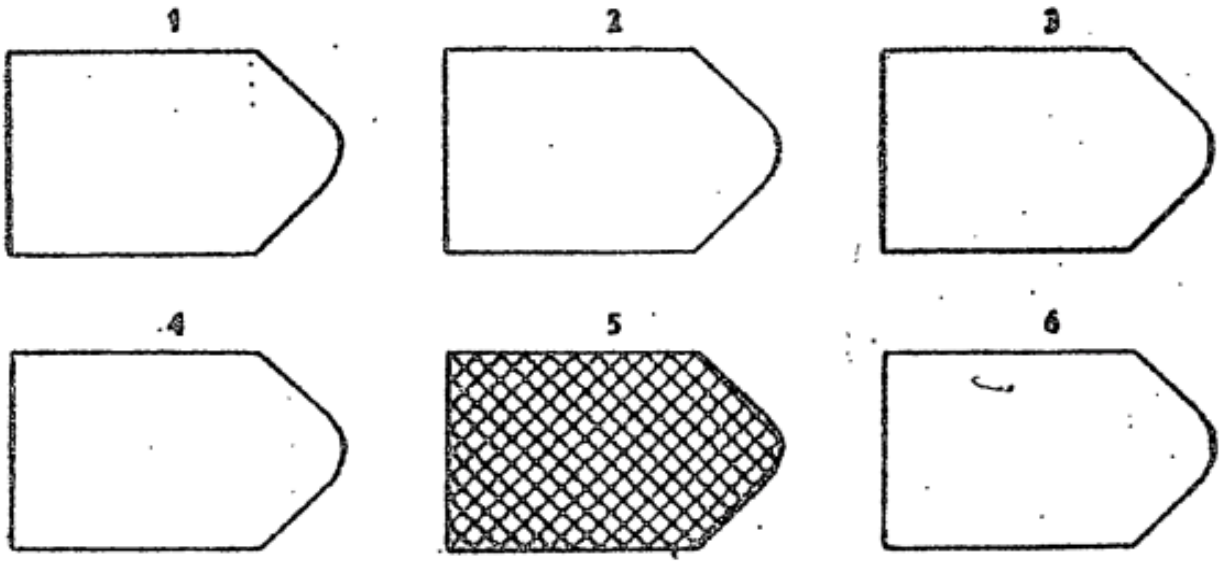
For the following questions, please indicate your answer by writing the number of the piece that completes the diagram correctly among the pieces numbered 1, 2, 3, 4, 5, and 6 in the brackets (parentheses) placed in front of the diagram.

Example

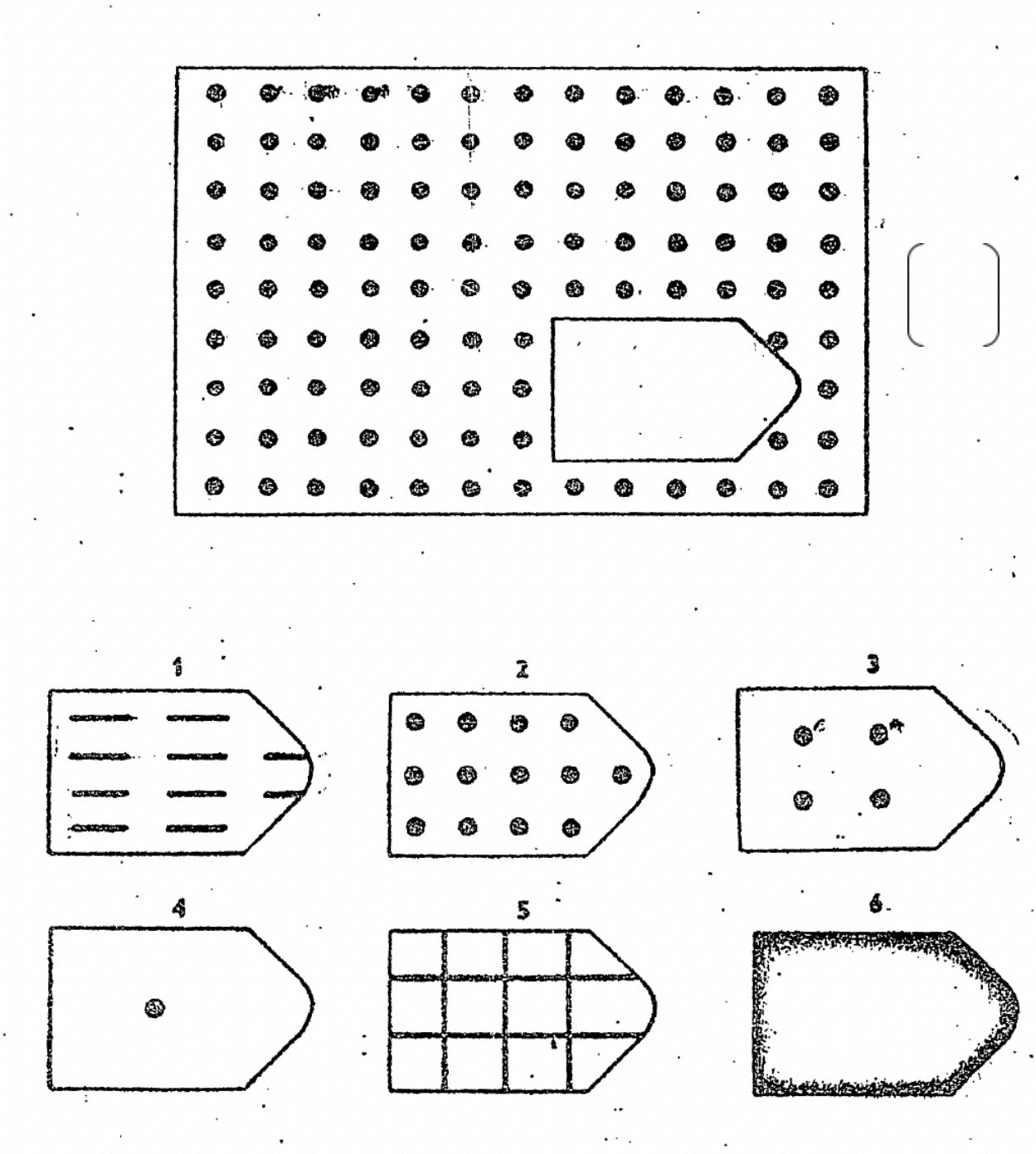
For this diagram, piece "5" best fits the overall pattern



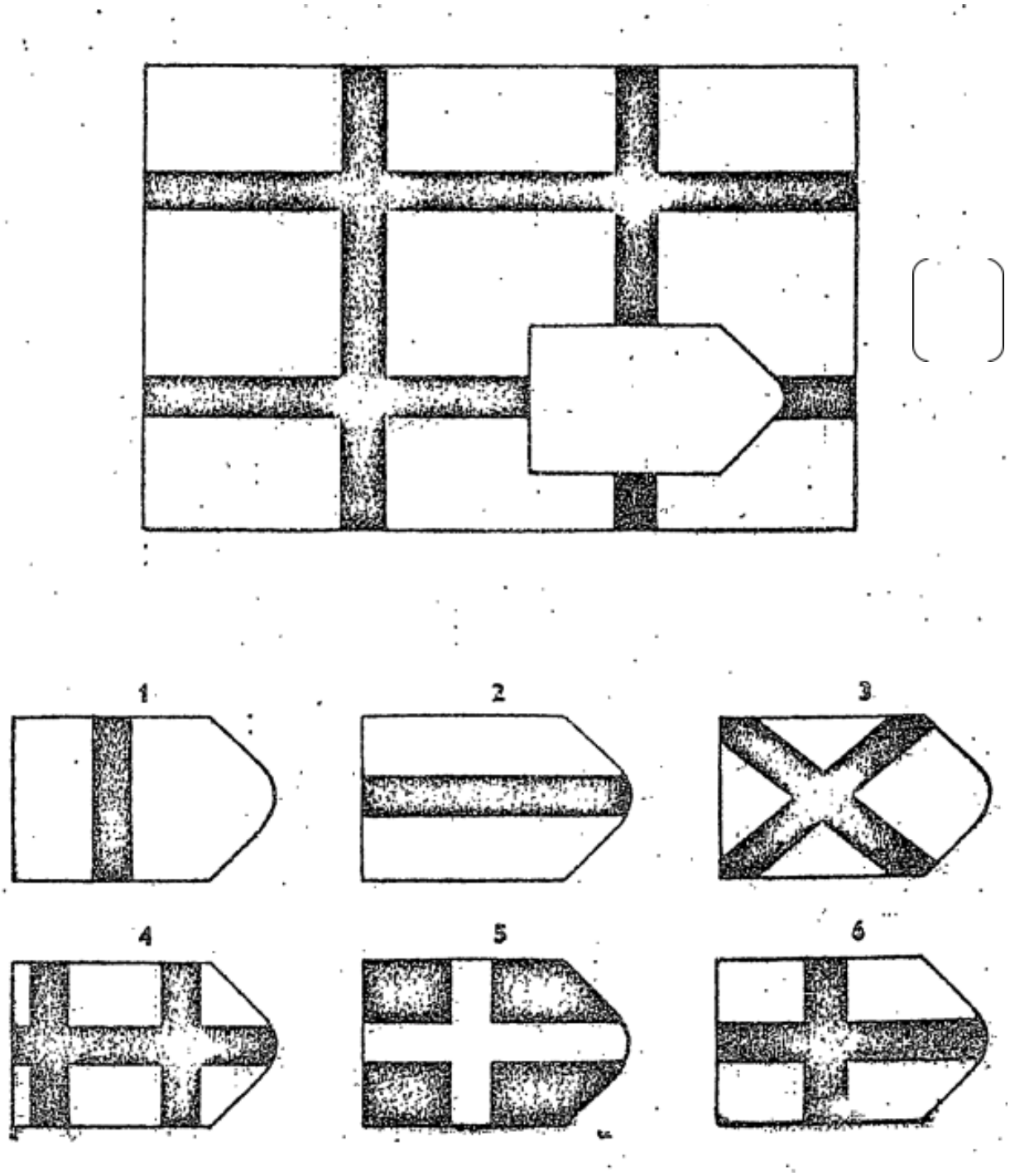
(5)



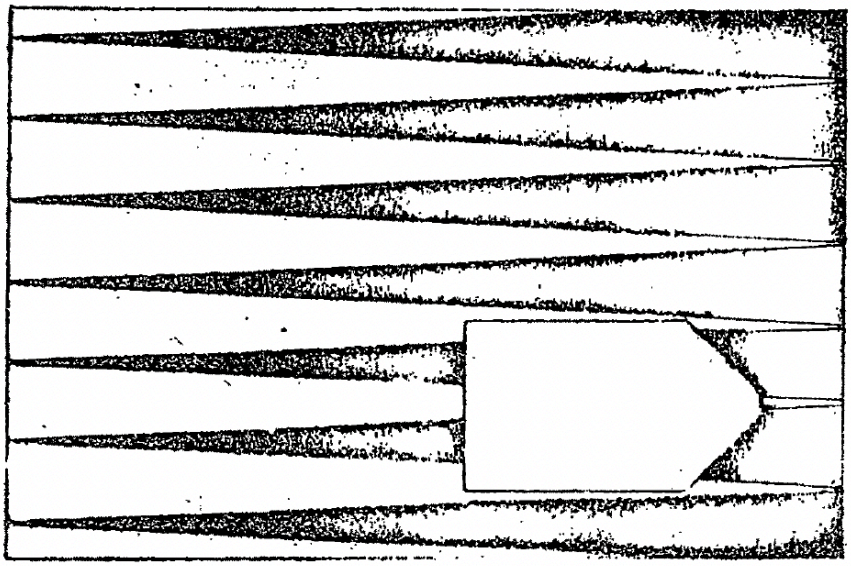
E1

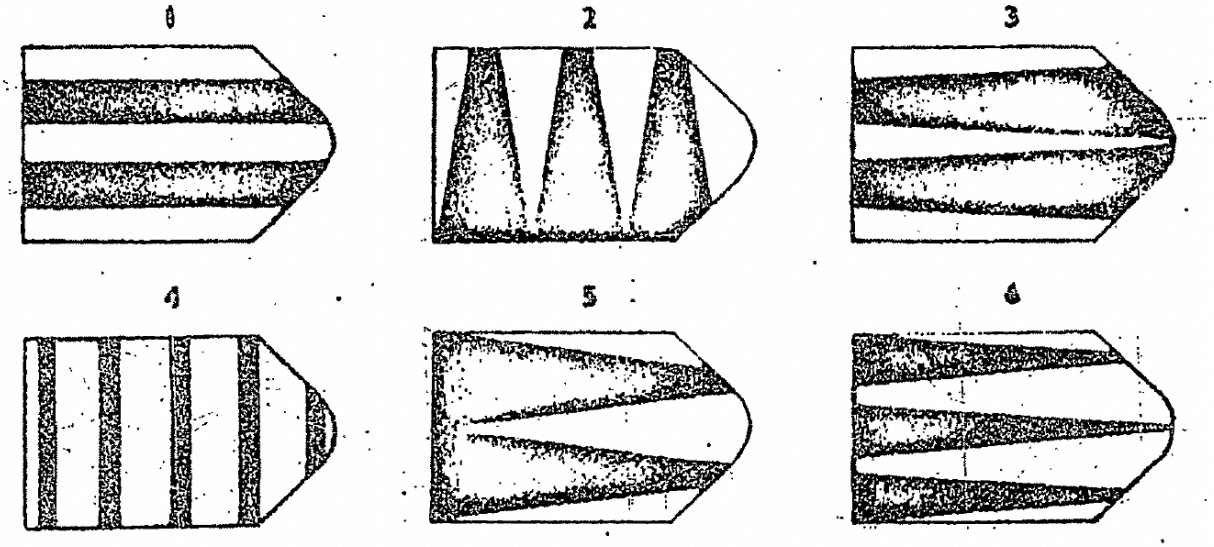


E2

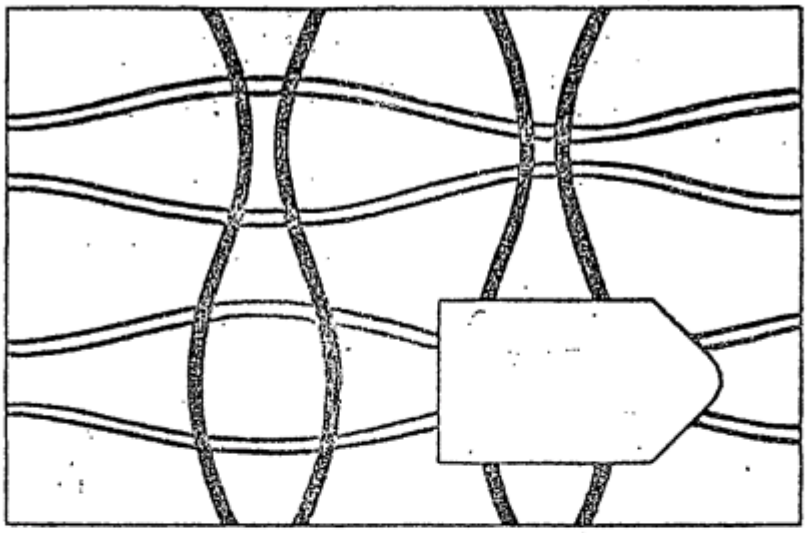


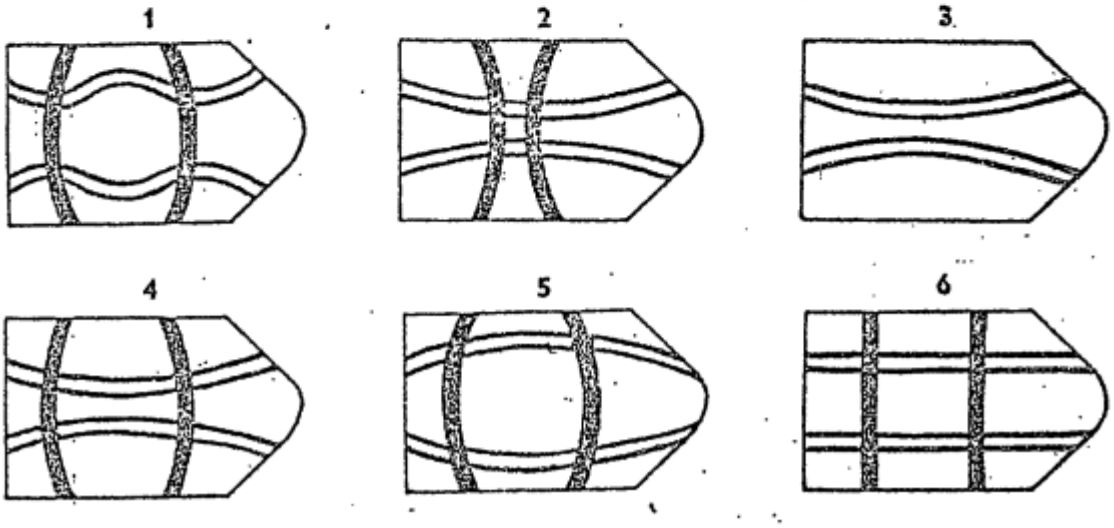
E3



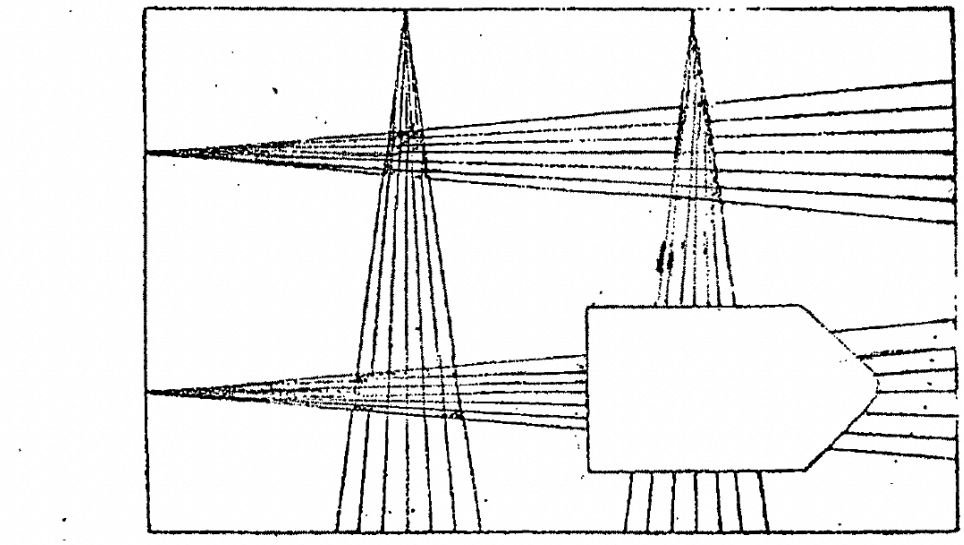


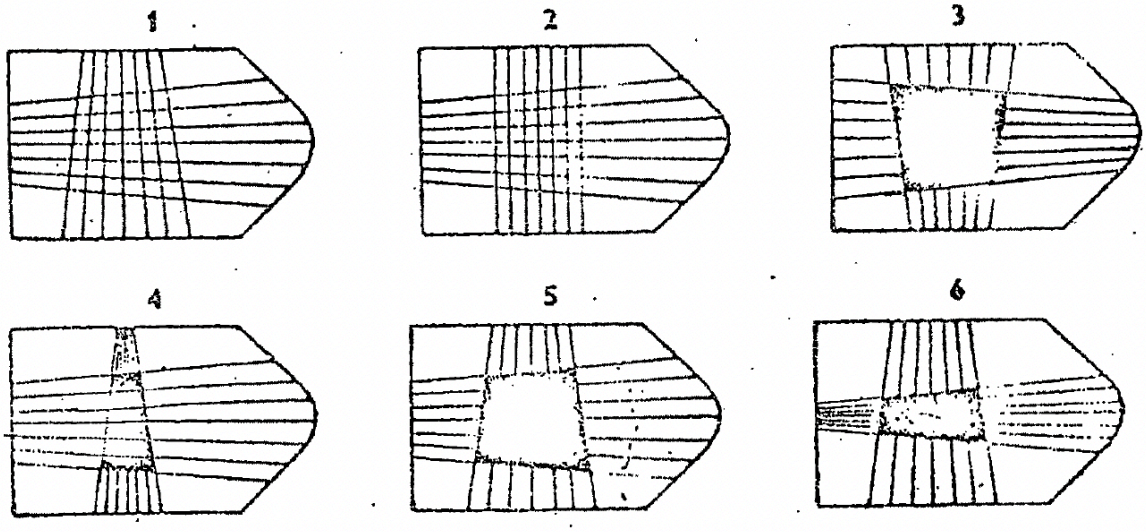
E4





E5





Appendix F

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 G

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 H

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?

_____

_____

_____

_____

_____

_____