

Call Me Maybe: Does Customer Feedback Seeking Impact Nonsolicited Customers?

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Abstract. Academics and practitioners acknowledge the value of customer feedback in improving firm performance. Companies routinely solicit feedback from different customer subsets. However, the extent to which this feedback impacts nonsolicited customers depends on whether firms implement meaningful business-level changes that resonate with customers. This paper assesses customer feedback's impact on firm learning and business improvements as well as its spillover effects on nonsolicited customers using a randomized, controlled field experiment conducted in Rwanda over two years. We hypothesize that private feedback seeking could operate through two broad mechanisms: (a) directly influencing solicited customers and/or (b) prompting firms to improve their offerings, leading to spillover effects on other customers. Our results demonstrate a 38.2% increase in recall and a 77.4% increase in purchases for customers not engaged in the feedback process. The analysis further suggests that business-level changes driven by customer feedback fuel these spillovers. Additionally, customer feedback seeking significantly improves treatment firm performance, resulting in a 62.0% revenue increase and 54.5% profit increase compared with control firms. Our study also introduces a basic customer feedback-seeking technology for small businesses to improve performance. These findings can guide firms in leveraging customer feedback to undertake business changes and generate greater revenues/profits.

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1. Introduction

Companies across industries are increasingly focusing on their customers. Business executive surveys reveal that more than 70% of organizations use customer feedback tools to collect postpurchase feedback (Bose 2021). Recent research investigates the effects of mitigating demand-side information frictions when customers have limited information about product quality and on firm reputation and quality improvements (Bai 2021,

Donati 2022, Farronato and Zervas 2022). However, little is known on the role of customer feedback in alleviating information frictions on the supply side when firms have limited information about customer preferences and satisfaction. The existing literature lacks comprehensive insights into the extent and impact of private feedback seeking on overall firm revenues and profits as well as on firm learning and its subsequent effects on customers.

Addressing this gap, our study relies on a field experiment with 274 small businesses, exogenously introducing formal feedback processes into the firms and varying the intensity of feedback solicitation across them. The experiment examines the influence of private feedback seeking on small firms in emerging markets. Private feedback encompasses interactions such as emails, phone calls, or personal messages when customers provide feedback straight to the company rather than through publicly visible channels. By exploring bidirectional private communication between customers and firms, this paper offers new perspectives on enhancing firm learning, firm performance, and its broader impact across all customers. The randomized, controlled experiment allows us to causally identify the impact of feedback on customers and firms and also quantify their effect sizes.

When a firm solicits feedback from a customer subset and acts on it by making changes, it is unclear how customers might respond: those who are solicited for feedback (i.e., tapped customers) and those who are not asked for feedback but are nevertheless exposed to any business-level changes (i.e., untapped customers). Thus, there are two different channels through which customer feedback seeking might have an effect.

First, solicitation itself may have an effect on customers (Bone et al. 2017). Existing literature indicates the presence of a mere measurement effect under which simply asking for a customer survey could change their subsequent behavior (Morwitz et al. 1993, Morwitz 2005). Studies reveal that the mere act of having customers fill out a closed-ended survey has the potential to impact subsequent behaviors (Fitzsimons and Morwitz 1996). Soliciting feedback may make customers feel valued or provide a signal that firms are of high quality because they invest in collecting customers' opinions (Morrison and Bies 1991). It could also remind customers of the firm and its products, leading to enhanced product recall/consideration¹ and repeat purchases (Sara 2000). Alternatively, the solicitation could make customers critical of firms through negativity enhancement, prompting them to recall flaws in the purchase experience (Ofir and Simonson 2001), or cause irritation from repeated feedback solicitation. Firms' direct response (or nonresponse) to individual customers on their feedback could also positively (or negatively) influence future purchase behavior. The solicitation effect, along with the firm's direct response, however, could have a potential impact only on tapped customers.

Second, firm learning may have an effect. Once the firm receives feedback from customers, it can identify necessary changes in its business based on that feedback. When considering whether to respond to the feedback, a firm's primary incentive is profit maximization. Therefore, if addressing customer concerns raised during the feedback process could result in higher revenues and profits, then it justifies the costs incurred in

making those changes. In contexts in which competing firms coexist and consumers face relatively low switching costs (such as the consumer retail sector), enhancing the purchase experience can attract higher sales, ultimately boosting profits. This aligns with extant literature focused on ways companies can leverage insights from customers and enhance their product development process (Griffin and Hauser 1993, Berry and Parasuraman 1997, Krishnan and Ulrich 2001). That said, such a firm-learning channel is conditional on firms uncovering gaps or opportunities through the customer feedback process and subsequently implementing business-level changes in response (Parasuraman et al. 1991, Berry and Parasuraman 1997, Ananthakrishnan et al. 2023). For example, customers may share disappointment about an offering's quality or inconvenient store hours with the firm responding through product or operational changes. Note that the learning effect can impact not only tapped customers, but also untapped customers. This second indirect channel constitutes a potential spillover effect across customers driven by overall business changes (Wang et al. 2019).

Even if firms make product or customer experience changes based on feedback, it is unclear *ex ante* whether any spillover effects will materialize. Untapped customers might not be sensitized to or bothered by the issues emerging from the feedback. Thus, business-level changes aiming to address the issues may have no effect on untapped customer behavior. Moreover, firm changes based on feedback from a vocal minority could have a negative effect. Firms receiving negative feedback from a small group may not have a complete or representative view of customer needs. Subsequent business changes could, therefore, be misguided. Firms may also miss out on positive feedback from a customer majority that is satisfied with their offerings.

In addition to the two channels described above, there do exist other potential channels through which customer feedback can impact both tapped and untapped customers. These channels mainly encompass information sharing among customers, which can transpire through word of mouth or the public display of feedback alongside the firm's response to it with either acting as a source of information for customers. In fact, most of the existing work related to online reviews lies in this domain (Chevalier and Mayzlin 2006, Godes and Silva 2012, Luca 2016). The growing marketing literature on online reviews, however, is distinct from our research on off-line private postpurchase feedback. Online reviews are typically publicly viewable, including by competitors and potential customers in the market, which facilitates customer-to-customer information sharing. It also influences firms to use their response to a public review as a signal for other customers who would be able to view it online. The dissemination of public reviews equips consumers with

additional product information, consequently fueling incentives for firms to elevate their quality as they strive to build a positive reputation. By contrast, firms actively seek off-line, direct, postpurchase feedback among specific customers tapped for their insights. Further, the audience of this feedback is typically limited to the focal firm (and its staff), and the information is kept mostly private and confidential. Private feedback minimizes information frictions for the firms, aiding them in learning the specific quality dimensions they need to improve. Thus, the context of off-line private feedback enables the identification of feedback spillovers resulting solely from firm learning because, in the absence of online reviews, it effectively shuts off the public customer-to-customer information-sharing channel.

A context of increasing importance to marketers and one in which we can implement off-line-only systems for seeking customer feedback, is small firms in emerging markets.² This setting is ideal for our study as such firms generally have low or nonexistent levels of organic feedback-seeking behavior *a priori*. By nudging them to activate separate feedback channels, we can reliably measure the impact of customer feedback solicitation distinct from that of firm learning. While formal feedback processes might be more common in medium-to-large companies, such approaches are not prevalent in small, entrepreneur-led businesses, especially in emerging markets, because of constrained financial resources (Banerjee and Duflo 2005, De Mel et al. 2008) and lack of managerial skills (Bloom and Van Reenen 2010, Bruhn et al. 2010, Anderson et al. 2018). However, if we encourage these small firms to adopt a customer feedback solution, it still remains uncertain how entrepreneurs will utilize the information gathered from their customers. They could (a) simply ignore the feedback, (b) respond solely to those providing the feedback, or (c) use it to make changes across the business that lead to overall improvements.

Prior work suggests these firms should gather and respond to customer feedback as it can create value (Fornell and Westbrook 1984, Sulek et al. 1995, Berry and Parasuraman 1997). However, there is no extant study that measures the impact of customer feedback seeking on a firm's overall revenues and profits nor one that empirically isolates the solicitation effect from the firm learning effect. Our paper addresses these gaps and tackles three novel research questions. One, if firms obtain feedback only from a customer subset, do changes made in response impact the recall and purchase behavior of customers from whom feedback was (a) sought (i.e., the solicitation and direct response effect of tapped customers) and (b) not sought (i.e., the effect of firm learning on untapped customers)? Two, what is customer feedback seeking's impact on overall firm financial performance (e.g., revenues, profits)? Three, if the effect is positive, how intensively must firms seek

feedback to realize improvements in their products and experiences as well as overall performance?

To answer these research questions, we implement a randomized, controlled field experiment with a sample of 274 small firms and 3,937 of their customers in Rwanda. Given the low rate of organic feedback seeking by the firms, our design allows us to (a) assign some firms to a control group that lacks any formal customer feedback solution *a priori*, (b) randomly introduce a formal feedback process for a treatment group, (c) exogenously vary treatment firms' feedback-seeking intensity at either 70% (high-intensity feedback) or 30% (low-intensity feedback) of customers, and (d) identify random customer subsets within each high- and low-intensity treatment firm designated as tapped (solicited for feedback) versus untapped customers (not solicited for feedback). As these small firms typically lack websites or digital systems for accessing online reviews, the holdout group of untapped customers is not contaminated through public feedback (unlike the relatively larger firms in developed markets) and is not likely to interact with tapped customers.

Our study spanned a total of 23 months from April 2020 until February 2022. It commenced in April 2020 with outreach to 300 small firms in Rwanda, leading to the formation of a sample of 274 businesses. The timeline includes a baseline survey in August 2020, a 12-month customer feedback intervention period from September 2020 to August 2021, and subsequent endline surveys with firms and customers conducted 12 and 15 months postbaseline, respectively (more details are provided in Section 3.2).

The analysis yields three main findings. One, customer feedback seeking has a positive and significant impact on tapped customers over and above the untapped customers, supporting a solicitation effect. Compared with the untapped customers, tapped customers display a 19.9% higher focal firm recall rate, and their average quarterly spending with the focal firm increases by 5,020 Rwandan Francs (RWF), which represents a 27.0% effect size.³ We also see positive spillover for untapped customers. These customers show a 38.2% higher focal firm recall rate versus control firm customers, and their average quarterly focal firm spending increases by 8,097 RWF (a 77.4% improvement) over control firm customers.⁴ Two, our field experiment demonstrates that customer feedback seeking has a significant positive impact on overall financial performance. On average, treatment group firms increase monthly revenue by 219,100 RWF (a 62.0% improvement) versus control group firms. Treatment firms also make 63,963 RWF more in monthly profit compared with those in the control group, which represents a 54.5% effect size for our customer feedback-seeking intervention and is equivalent to 1.2 paid employees' monthly salary.⁵ We also find that treated firms are

118.4% more likely, on average, to make changes in the business areas that had high resonance with the nature of customer feedback as compared with the control firms. In fact, treated firms that engage in actions based on their customers' feedback perform better financially than treated firms engaging in actions not necessarily based on the feedback. Three, we find that treatment firms in both the high- and low-intensity feedback groups significantly improve business changes (because of firm learning) and overall financial performance. However, we find evidence of diminishing returns to increasing feedback intensity. This finding suggests that seeking feedback from a small, representative customer subset may be sufficient.

Our paper aims to make contributions to the marketing literature on customer feedback and firm learning as well as the firm growth literature in development economics. First, we present novel evidence showing that small firms learn and respond to customer feedback by making fundamental, long-lasting improvements. In doing so, our research establishes an important link between seeking customer feedback and enhancing consumer welfare. Second, our study is the first to demonstrate that positive spillover can occur from tapped to untapped customers as a result of feedback seeking. We measure the spillover effects using a field experiment with hundreds of firms and thousands of customers and then link the effects to overall financial performance. The lessons learned can inform marketers' choices as they invest in understanding and implementing feedback-related business strategies. Third, our paper adds to work on business practices and small firm growth (Bloom et al. 2013, McKenzie and Woodruff 2017, Anderson et al. 2018) by introducing a new tool (feedback seeking) that small firms can leverage to enhance performance and improve customer outcomes. Thus, we offer policymakers an option for shoring up the marketing and sales practices that entrepreneurs lack in developing economies, including soliciting preferences from the market.

The rest of the paper proceeds as follows. Section 2 reviews relevant literature and develops hypotheses on the impact of customer feedback seeking. We then describe our research design and data-collection methods in Section 3. We present our results in Sections 4 and 5. Finally, Section 6 concludes with implications for research and practice.

2. Literature and Hypotheses

Aligned with our research questions, we next review the relevant literature and formulate hypotheses on the effects of customer feedback seeking. Additionally, we develop a theoretical framework to provide intuition for the firms' feedback-seeking activities and their responses (see the appendix for the theoretical model). Based on this framework, we derive our hypotheses.

The first set of predictions focuses on customers, exploring both the direct and indirect effects of feedback. The subsequent hypotheses address firms, investigating the impact of customer feedback on overall performance.

2.1. Feedback and Customers

Existing literature exploring feedback seeking and its effects mainly focuses on customers from whom feedback is sought (i.e., tapped customers). Multiple studies emphasize that customer satisfaction, as a strategic lever for enhancing business performance, is a widespread business practice (Anderson et al. 1994, 1997; Mittal et al. 1998; Bolton et al. 2008; Van Doorn and Verhoef 2008; Grewal et al. 2010; Lund and Marinova 2014; Cho et al. 2023). A common way of measuring customer satisfaction is by surveying customers on their purchase feedback. Research demonstrates that simply administering a survey to customers possesses the capability to influence their subsequent behaviors (Morwitz et al. 1993, Fitzsimons and Morwitz 1996). Tapped customers engage with firms on provision of feedback, either by sharing their views about products or experiences or by receiving a feedback request. In addition to business-level changes, positive benefits may materialize simply from feedback solicitation, including quality signaling by the firm (Morrison and Bies 1991) and enhancing customer recall (Bone et al. 2017). Tapped customers could also be impacted if firms directly reply to the individuals and/or make business improvements in response to them. On the other hand, feedback seeking could also result in tapped customers becoming critical of the firm if they expect to evaluate the product quality later (Ofir and Simonson 2001). In our study, however, the customers were not primed in advance that feedback would be sought from them post-purchase. Thus, we anticipate that feedback solicitation will yield a net positive impact on customers as reflected in our first hypothesis.

Hypothesis 1. *Customer feedback seeking by firms leads to greater recall and purchases for their tapped customers (compared with untapped customers).*

Next, we focus on customers not directly solicited for feedback (i.e., untapped customers). The solicitation effect and direct firm responses to feedback are not likely to impact untapped customers. However, no extant paper studies the spillover effects from tapped to untapped customers in a way that can guide hypothesis development. We, therefore, propose a novel mechanism through which feedback could impact untapped customers: firm learning. The existing empirical marketing and economics literature on learning primarily focuses on customers rather than firms. Moreover, prior studies suggest that firms learn by monitoring demand and using the data to make pricing and product portfolio decisions (Hitsch 2006, Huang et al. 2022).

An alternative firm learning model, however, could use customer inquiry as a source for insight (Morgan et al. 2005, Kumar et al. 2010). In the model, firms engage directly with customers, seek their feedback on areas for improvement, and take action accordingly (Ashford et al. 2016). The marketing literature has not explored this approach extensively, particularly in the context of customer feedback seeking.

The indirect improvement channel works via knowledge acquisition and response. Specifically, a firm can uncover new information about potential gaps or opportunities through customer feedback. The firm can then make business-level changes to improve its products or experiences in general and align with customer desires (Fornell and Westbrook 1984, Rust and Zahorik 1993, Kyriakopoulos and Moorman 2004). The offering improvements can spill over to benefit untapped customers, favorably impacting their attitudes and behaviors toward the focal firm.

However, it is crucial to acknowledge the potential impact of customer heterogeneity on the effectiveness of the spillover effect through firm learning. This effect hinges significantly on the similarity between tapped and untapped customers. If these customer groups exhibit considerable differences, the existence of common concerns facilitating the spillovers might be limited. In such instances, the learning acquired from one customer group may not necessarily translate into benefits for the other. We acknowledge the importance of customer homogeneity in this context and recognize that dissimilarities between tapped and untapped customers could pose challenges to the anticipated spillover dynamics. Our forthcoming study design explicitly addresses this consideration by selecting a representative group of customers for feedback seeking (rather than a convenient sample).

Importantly, the firm learning effects would also enhance products and experiences for tapped customers, compounding any positive response from being solicited for feedback. Given that tapped customers potentially experience benefits from both the solicitation and firm learning effect, whereas untapped customers benefit only from firm learning, we expect customer feedback seeking's overall impact to be lower for untapped customers than tapped customers. We, therefore, make three further predictions.

Hypothesis 2. *Customer feedback seeking by firms leads to greater recall and purchases for their untapped customers (compared with customers of firms that do not seek feedback) although this effect is lower compared with their tapped customers.*

Hypothesis 3. *Customer feedback seeking leads to firms making business changes as a result of learning from the received feedback.*

Hypothesis 4. *The impact of customer feedback seeking on untapped customers is driven by the business-level changes made by firms in response to the feedback they receive.*

2.2. Feedback and Firm Performance

In addition to influencing customer behavior, feedback seeking could impact a firm's financial performance. Feedback solicitation may be harmful if it makes tapped customers more critical of firms by prompting them to recall flaws; causes irritation because of repeated requests; or creates the expectation of an immediate, direct response that the firm is unable to fulfill (Ofir and Simonson 2001). Moreover, the firm learning channel may lead to negative or no spillover for untapped customers; for example, a firm seeking feedback might over-optimize for a small, vocal customer subset and leave customers with different preferences dissatisfied. Generally, vocal minorities highlighting concerns are not representative of firms' broader customer bases. They might exhibit an extreme product or experience preference.⁶ Thus, if firms make changes based on areas highlighted in the feedback received from a vocal minority, they could leave the majority dissatisfied, leading to reduced sales. Further, a strand of literature suggests consumer-stated preferences are unclear and, consequently, lead to misinformation (Simonson 1989, Bettman et al. 1998). Firms making changes in their business based on such feedback might therefore inadvertently hurt their overall financial performance.

On the other hand, some marketing studies suggest that customers solicited for feedback subsequently purchase more from focal firms (Sulek et al. 1995, Bone et al. 2017). This could happen when benefits from the solicitation effect are realized, such as the customer feeling valued by the firm, viewing the feedback process as a signal of a higher quality business, or being reminded about the firm's products so they remain in the buying consideration set (Morrison and Bies 1991, Sara 2000). Firms' direct response to tapped customers, especially when addressing specific complaints or grievances, could also positively influence their subsequent purchases. In addition, firm learning effects could stimulate greater purchases by untapped customers if firms first uncover gaps or opportunities through the customer feedback process and then respond by making business-level changes (Parasuraman et al. 1991, Berry and Parasuraman 1997). This can generate positive spillover for the untapped customers as they indirectly benefit from improved products and experiences across the business that, in turn, encourages them to buy more from the focal firm (Wang et al. 2019). Taken together, the positive effects can increase repeat purchases by tapped and untapped customers and drive increased revenue and profit for the firm.

Considering that the firm learning literature suggests a positive impact of feedback seeking on customers

(Hypotheses 2 and 3) and we also predict a positive impact of feedback solicitation on customers (Hypothesis 1), these overall customer-related benefits should translate into a positive impact for the focal firm. We, therefore, anticipate a net positive effect of feedback seeking on the firm's financial performance.

Hypothesis 5. *Firms engaged in customer feedback seeking earn higher revenue and profit (compared with firms that do not seek feedback).*

Finally, although we expect customer feedback seeking to generally yield positive firm outcomes, there is no practical guidance on whether the number of customers solicited for feedback matters. For instance, if feedback seeking is beneficial for firms, managers might believe that the ideal strategy is to gather feedback from all of their customers. Such an approach, however, may not be feasible or optimal for a firm aiming to improve its products and experiences because of the diminishing returns of feedback seeking on firm learning. To delve deeper into this, we empirically investigate how different feedback intensities affect firm performance.

3. Research Study

Empirically studying the causal link between customer feedback seeking and firm and customer outcomes is challenging. The customer feedback decisions most firms make can be linked to various internal characteristics (e.g., firm-specific factors) or external situations (e.g., environmental factors). If the internal or external factors correlate with customer behavior or firm performance, they create endogeneity concerns. We must also observe outcomes for firms with no existing formal feedback-seeking strategy, which can act as a valid counterfactual when comparing effects against firms seeking customer feedback. Additionally, to identify feedback's spillover effects, we require both a tapped customer group and a comparable group of untapped customers for all of the feedback-seeking firms in the data set. But the set of customers generally untouched by the feedback process might not be similar to the customers targeted to provide feedback. Even if we are able to identify a comparable holdout customer group never solicited for feedback, they are likely to have been exposed to feedback forums through the firm's website, online review platforms, or social media. Finally, to study the existence (and impact) of customer feedback spillover, we require behavioral and outcome measures not only for the tapped customers, but also for those untapped.

To tackle these empirical challenges, we conduct a randomized, controlled field experiment with small firms in Rwanda. Our study is designed to identify feedback's direct effect on tapped customers and spillover effects on untapped customers. Importantly, to the best of our knowledge, the experimental design is the first to examine the causal effect of feedback externalities by

measuring it across hundreds of firms and thousands of customers and linking it to firm performance.

3.1. Experimental Design

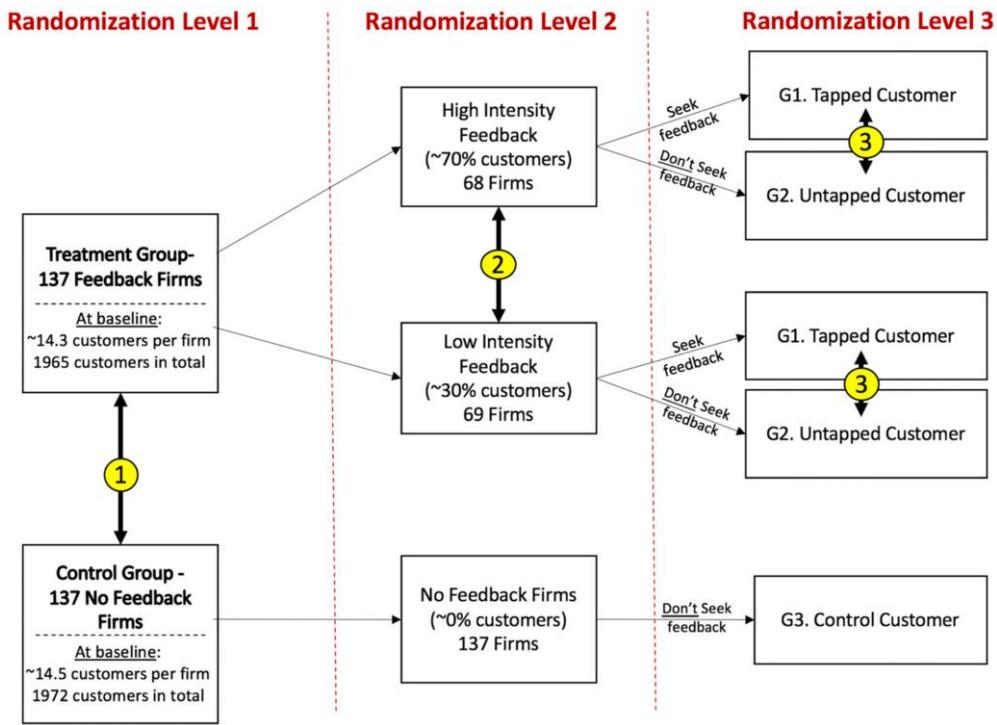
We start with a sample of 274 small firms and 3,937 of their customers across three Rwandan cities: Kigali, Muhanga, and Muanze. The businesses are prescreened to ensure they (a) do not have formal feedback-seeking methods in place and (b) do not have a presence on online review platforms or websites on which customers can post testimonials. We can, therefore, construct a clean control group of firms without formal feedback solutions and a holdout group of customers without deliberate exposure to other people's feedback about the focal firm. It also allows us to answer research questions related to the overall impact of customer feedback seeking on firm performance as well as the intensity level required for the feedback to be effective. Figure 1 depicts the experimental design and its three randomization levels.

3.1.1. Randomization Level 1. We first randomly assign the 274 sample firms equally into a treatment or control group.⁷ Thus, there are 137 treatment firms (with 1,965 customers) that are nudged to establish and regularly use a formal customer feedback-seeking process, whereas the 137 control firms (and their 1,972 customers) do not receive any such nudge. This treatment versus control group comparison lets us identify the effect of feedback-seeking on overall firm performance in revenues and profits (Hypothesis 5). The randomization level also allows us to test for firm learning effects by examining if feedback-seeking firms use the customer insights to make business-level changes to improve products or experiences in ways benefiting their customers (Hypothesis 3).

3.1.2. Randomization Level 2. At the second randomization level, we exogenously vary each treatment firm's feedback-seeking intensity. The 137 treatment firms are randomly assigned into two subgroups of equal size: (a) a high-intensity feedback group in which firms seek feedback from 70% of their recorded customers and (b) a low-intensity feedback group in which firms seek feedback from 30% of their recorded customers. Here, "intensity" denotes the proportion of unique customers firms select to contact for feedback.⁸ This randomization level lets us test how much feedback firms should seek for them to realize positive firm learning and performance outcomes. Comparing the high- and low-intensity feedback groups allows us to measure the incremental value of seeking feedback from more versus fewer customers and examine any diminishing returns beyond a certain threshold.⁹

3.1.3. Randomization Level 3. To study spillover effects, we identify random customer subsets within each treatment firm that are designated as tapped

Figure 1. (Color online) Experimental Design



customers (solicited for feedback) or untapped customers (not solicited for feedback). This level of randomization, therefore, results in three different customer groups: tapped customers (G1), untapped customers (G2), and control customers (G3). For each firm in the high-intensity feedback group, their customers are randomly assigned as either tapped (G1) or untapped customers (G2). The same randomization process is repeated for each firm's customers in the low-intensity feedback group with 30% of customers designated as tapped (G1) and the remaining 70% as untapped (G2). All the customers of control firms (not nudged to use a formal feedback-seeking process) represent a group of control customers whose feedback is not sought (G3). It might seem as if the G2 (untapped) and G3 (control) customer groups are identical as the firms are not seeking feedback from either of those two customer groups. However, G2 customers, despite never being asked for feedback, are exposed to a focal firm seeking feedback from tapped customers. Hence, these untapped G2 customers could be affected by any changes undertaken by the focal firm because of the feedback received from the tapped G1 group. If there is a firm learning effect of feedback that causes the firms who sought feedback to improve their offerings, then the G2 customers could experience a spillover effect. The G3 customers, on the other hand, are not asked for feedback, and the firms at which they shop do not seek feedback from any other customers. Hence, G3 customers would not experience

spillover effects as there should be no feedback-driven firm learning at play.

Additionally, the random selection of customers into the tapped and untapped groups is essential to ensure that the two groups are balanced on customer characteristics. This homogeneity of characteristics is crucial for the feedback to be representative and the firm learning to be relevant across the customer groups as disparities between tapped and untapped customers could otherwise hinder the anticipated spillover dynamics.

Three comparisons at the third randomization level allow us to study feedback seeking's effect on customers. First, comparing the tapped G1 and control G3 groups yields feedback's overall effect on customers. G1 is exposed to the potential firm learning effect of feedback as well as the direct effect of feedback seeking. Note that the direct effect of feedback seeking is experienced only by tapped customers as they are being contacted by the firm for their feedback. The combination of this direct feedback-seeking effect and the firm learning effect provides the total effect of feedback on customers. As the G3 group experiences neither the firm learning effect nor the direct effect of feedback seeking, it is an ideal counterfactual group for this comparison.

Second, the comparison of the G2 and G3 groups yields the spillover effect of feedback. As the G2 group consists of customers not selected for feedback, they are impacted by the spillover effect of firm learning due to feedback but not the direct effect of feedback

seeking. Hence, this comparison of G2 and G3 groups gives us only the spillover effect due to firm learning (Hypothesis 4).

Finally, comparing G1 and G2 yields the direct effect of feedback-seeking alone. Both G1 and G2 are exposed to the same focal firm, meaning any customer effects due to the firm's learning to produce better products/experiences are the same for both groups. G1 experiences an additional direct impact of feedback seeking over and above the firm learning impact. This direct effect of feedback seeking includes customers building awareness/consideration toward the firm and also getting signals of firm quality or annoyance. It is this effect of feedback seeking (over and above the firm learning effect) that G1 and G2 help us measure. Note that any feedback-linked firm response to the individual customer who provided the feedback (e.g., apologizing for the inconvenience, etc.) is also a part of this solicitation effect.¹⁰ Together, these comparisons help test Hypotheses 1 and 2.

3.2. Sample Recruitment and Timeline

We began our study in April 2020 by reaching out to 300 small firms in Rwanda. Online Figure A1 explains how we identified the firms. Of the 300, 274 businesses were willing to participate and now form our study's sample. Online Figure A2 shows the 274 firms' geographic spread. The firms are operating across a range of subsectors in retail and services. This variation enhances our results' generalizability (see Online Figure A3).¹¹

After completing registration for the 274 firms, we conducted a baseline survey in August 2020 and randomized the firms along with their customers into experimental groups as described above. The randomization is also stratified by location (North Kigali, South Kigali, Muhanga, and Musanze). We launched our customer feedback intervention in September 2020 and conducted it for 12 months until August 2021 (see Online Figure A4 for the full timeline). Next, we conducted an endline survey with the firms (12 months postbaseline) and their customers (15 months postbaseline).

3.3. Intervention Description: Customer Feedback Solution

Beginning in September 2020, we provided firms with a customer feedback solution that included three components: (a) a basic and scalable customer management technology (accessible via a mobile application), (b) technical support (from an on-ground intervention agent), and (c) tracking templates for recording customer feedback (on physical sheets of paper). This intervention continued until August 2021.

3.3.1. Technology. For firms to begin seeking feedback, they had to first record their customers' contact information—a practice not conducted by the majority

of sample firms at baseline. We, therefore, provided a basic and free mobile application (called Contacts+) to enable firms to maintain customer records. Most firms in the sample owned simple feature phones at the time, which are not ideal for using applications such as Contacts+ or Gmail. We, therefore, provided the firms with a smartphone (Android Itel A14), new SIM card, and monthly data plan worth 1,500 RWF for internet access. The technology ensured that firms had the ability to record customer contact details, so treatment firms could subsequently seek feedback. Importantly, we provided the same technology bundle to both the treatment and control firms to maintain uniformity across experimental groups.

3.3.2. Technical Support. We also provided technical support via an on-ground intervention agent (allocated to all treatment and control firms). Each firm maintained the same agent throughout the study period. Intervention agents visited firms multiple times per month to provide in-person support for using the Contacts+ application and smartphone. They also physically distributed the feedback tracking templates to entrepreneurs during these business visits.

3.3.3. Tracking Templates. After one month of firms initially recording customer contact information, we accessed the Contacts+ customer list of each treatment firm and randomized their customers into either the tapped or untapped group as described in level three of our experimental design (Figure 1). Next, we added the tapped customers to a feedback tracking template to guide entrepreneurs in their customer feedback-seeking process and facilitate recording of the information they learned. These activities were closely monitored and supported by the intervention agents.¹²

Online Figure A5 displays an example tracking template for recording customer feedback. The feedback template included two prompts for firms to ask their customers: (a) rate your purchase experience and (b) provide any feedback for improvement. Online Figure A6 shows a feedback template completed by an entrepreneur in the treatment group. Note that prompt (b) encapsulates key areas that customers have identified in their responses to firms as areas for improvement and, thus, by construction, did not include positive aspects of the business. Entrepreneurs made the tracking template entries independently and based on their private feedback conversations with customers.

The intervention agents provided treatment firms with new tracking templates once every two weeks to nudge them to seek formal feedback from tapped customers. For each firm, we collected a digital image of all feedback tracking templates at the end of each month. Note that no direction was given to the firms on how to record or use the feedback they received from their

customers. We did not guide them to implement any changes in their business or provide a prioritization of the changes. Such decisions were made solely by the entrepreneurs (we discuss the firm changes in response to feedback in Section 5.1).

Our intervention managers also visited firms in the control group every two weeks to provide a data plan recharge for their smartphones and assist them with customer entry into the Contacts+ application. Critically, however, these control firms did not receive the feedback intervention (i.e., tracking templates with nudges to contact customers and record feedback).

3.4. Data Collection

We implemented two data-collection rounds: a baseline firm survey conducted preintervention and an endline firm and customer survey conducted postintervention. The firm surveys contain some business background questions (e.g., firm's age, employees, products, customers) but mainly gather firm performance information (e.g., monthly revenue and profit estimates as reported by the firms as a part of the survey) at baseline before the feedback treatment and at endline after the intervention. The endline customer survey includes basic customer background questions (e.g., age, family size) as well as outcome measures related to customer behaviors. Details on our key dependent variables (obtained via the firm and customer endline surveys) are outlined below.

3.4.1. Measuring Customer Recall and Purchase. Firms consider customer recall a crucial metric as customers' purchase decisions are typically limited to the brands that buyers can recall or consider (Roberts and Lattin 1991). To capture feedback's effect on customer recall of focal firms from which they would consider purchasing, we obtain three measures in the endline customer survey. These are unaided recall (with no external cue), lightly aided recall (being provided the firm's name), and heavily aided recall (being provided the firm's name, location, owner's name, and product category).

To capture feedback's effect on customer purchases, we obtain two more measures, reported by the customers as a part of the endline customer survey: (a) customers' quarterly purchases at focal firms over the previous three months and (b) a measure of the basket value of the latest purchase made by the customer from the focal store. It represents the average basket value of the customer at the focal store in a single visit. Dividing the first measure by the second gives us the number of visits customers made at the focal firm in the previous quarter.

3.4.2. Measuring Firm Learning. Our endline firm survey includes an audit conducted at the store level to measure business changes undertaken by entrepreneurs

across areas both related and unrelated to customer feedback. We audit the treatment and control firms across 48 areas to measure changes made since the intervention launched, coding each of the 48 dummy variables as yes (1 = the change was implemented in the business) or no (0 = it was not). The 48 areas are divided into two parts: 31 areas related to the customer feedback obtained by firms (see Table 1) and 17 areas unrelated to such feedback (see Online Table A2). The 31 areas representing feedback-related topics were selected directly via text mining, using machine learning tools and manual labeling of the feedback received by the treated businesses (refer to Online Table A3 for the steps followed). These 31 feedback-related areas represent the key topics that customers have highlighted as improvement areas in their feedback responses to the firms, thereby identifying gaps in the business. The remaining 17 areas were selected from a popular process benchmarking survey from the American Productivity and Quality Center.¹³ Note that these 17 areas were not a part of the customer feedback collected by the treated firms as they were picked from a separate external benchmarking survey. Thus, these 17 unrelated areas act as a placebo test to determine whether the firms' changes are driven by our proposed mechanism.

3.4.3. Measuring Firm Revenues and Profits. To precisely capture changes in financial performance due to our customer feedback intervention, we obtain two measures in our endline firm survey: (a) a firm's overall monthly revenues in each of the previous two months and (b) a firm's overall monthly profits in each of the previous two months. Combining outcomes can improve statistical power to detect effects that move in the same direction (Drexler et al. 2014).

Thus, our main *Monthly Revenues* and *Monthly Profits* variables are both calculated as the average of two winsorized (1% on both tails) monthly estimates.

3.5. Randomization Checks

We find evidence that our randomization was effective among our firm and customer samples using multiple balance checks. The 274 sample firms are randomized at two levels. Online Table A5 shows the checks for the first randomization level into our treatment (137 firms) and control (137 firms) groups. Across 15 tests, we reject only one null hypothesis of mean equality at the 10% level, which can be expected due to random chance. We conclude that the treatment and control groups were balanced on observable characteristics. Similar evidence for balance is shown for the second level of firm randomization based on treatment intensity (Online Table A6).

We also check for attrition and survival of firms by the endline. The attrition levels are low with only two firms dropping off from our study by the endline.

Table 1. Final List of 31 Topics Identified in the Customer Feedback

Category	Label	Label explanation for the endline firm audit
Product management	Add products	Do a product portfolio change by adding some products?
Product management	Drop products	Do a product portfolio change by dropping some existing products?
Product management	Improve packaging	Make any product packaging improvements?
Product management	Change price	Change price of your products or offer discounts?
Product management	Provide product info	Providing product related information to customers such as uses, benefits, features?
Product management	Manage product quality	Invest time and effort in product quality management?
Product management	Products (other)	Do anything else within this category of developing and managing products?
Supply and Logistics	Adjust shop time	Adjust shop timings to better suit customer needs?
Supply and Logistics	Inform shop changes	Inform your customers about any shop location, timings, and other changes?
Supply and Logistics	Manage stocks	Take steps to better manage stocks of products at your business?
Supply and Logistics	Alter shop presentation	Change the presentation of your shop? For example, modernizing the look of the shop?
Supply and Logistics	Change location	Change the location of your shop from where you run your business?
Supply and Logistics	Space to access products	Set up a dedicated space for customers to access/look at/consume products?
Supply and Logistics	Supplier management	Invest effort in managing existing suppliers to maintain good quality stock at all times?
Supply and Logistics	Change supplier	Add/drop any suppliers from which you purchased materials for your products?
Supply and Logistics	Logistics (other)	Do anything else within this category of supply and logistics?
Order and Delivery	Address fulfillment delays	Take any steps to address fulfillment delays in providing products to customers?
Order and Delivery	Manage measurements	Address product measurement issues when selling them to customers?
Order and Delivery	Manage delivery	Offer delivery as a service to your customers?
Order and Delivery	Remote ordering	Allow your customers to place orders through phone?
Order and Delivery	Mobile payments	Accept mobile (Momo) payment from customers or suppliers?
Order and Delivery	Credit provision	Provide credit to certain customers?
Order and Delivery	Delivery (other)	Do anything else within this category of order and delivery?
Customer service	Focus on customers	Focus more on customers' needs and expectations?
Customer service	Conduct with customers	Change the way you greet or treat customers when they are in your shop?
Customer service	Assist purchases	Providing prompt customer service during/after the purchase process.
Customer service	Manage customer complaints	Focus on resolving product complaints more promptly?
Customer service	Training customer service	Invest in employees lacking training to ensure that they provide better service to customers?
Customer service	Customer service (other)	Do anything else within this category of managing customer service?
COVID related	Manage COVID curfews	Invest in any activities to reduce the impact of COVID lockdowns on customers?
COVID related	Manage COVID risk	Invest in COVID risk management: wearing masks, social distancing, sanitizing shop, etc.?

Next, we test for balance across the customer groups. The average number of customers that each firm recorded in the Contacts+ application as at baseline (i.e., by the end of September 2020 before the start of the feedback intervention) was ~14.5, and it was balanced across both the treatment and control firms. To conduct the endline customer survey, customers were randomly selected from the final list of all customers entered by the entrepreneurs on their Contacts+ application (as at the end of the intervention phase). We randomly chose four customers per firm per experimental (customer) group with whom to conduct the endline customer survey. Thus, for each treatment firm, we selected four customers from its tapped group (G1) and four customers from its untapped group (G2). And, for each control

firm, we chose four customers from its customer list (G3). The response rate for this customer survey was about 87%. All customers agreeing to participate in the survey were given 2,000 RWF (US\$2) as a gift, which may have contributed to the high response rate. Importantly, the response rate is balanced across the tapped, untapped, and control groups of customers (see Online Table A7). In addition, Online Table A8 presents balance checks for the three customer groups. Across the five balance tests, we reject none of the null hypotheses, concluding that the three customer groups are balanced on observable characteristics.

It is important to note that the self-selection of customers in providing survey responses could potentially pose a challenge when investigating the impact of

customer feedback (Mithas et al. 2005, Flynn et al. 2017, Cho et al. 2023). However, in our study, we've mitigated this concern by achieving a high response rate for the surveys, which is consistent across all experimental groups. Furthermore, our study employs an across-firm design and includes a randomized control group, providing a robust comparison group for accurately estimating the impact of feedback.

3.6. Intervention Checks

We conduct multiple checks to ensure our intervention is successful in nudging treatment firms to seek customer feedback. All 274 firms in the sample accepted the smartphone, activated the SIM card, and set up the Contacts+ application. Our on-ground team of intervention agents also helped firms to create a Gmail address, which linked to Contacts+ and allowed for easy exporting of customer contact information. All but one firm entered customer details into the Contacts+ application.

By the end of the intervention, on average, the total number of customers entered into Contacts+ by treatment firms was about 33 and by control firms was 21.¹⁴ For treatment firms only, customers entered into Contacts+ were randomized into tapped customers (G1) or untapped customers (G2) with any new customers added each month randomized into either group. Online Figure A7 shows the month-on-month variation in feedback sought by the G1 firms. Initial feedback compliance is low but grows over time with more than 80% of tapped customers providing their feedback in May and June 2021. (Refer to Online Figure A8 for the relative split of customers between the high- versus low-intensity treatment firms).

4. Analysis and Results: Impact of Feedback on Customers

To test our hypotheses, we use a series of regression analyses. First, we examine feedback seeking's direct and spillover effects on customers, followed by its effect on firm learning and overall financial performance. Given our random assignment of customers to experimental groups, we estimate the effect of feedback as the difference in average outcomes for the tapped, untapped, and control customers (at endline) using the intention-to-treat (ITT) regression specified in Equation (1). We assess feedback's effect on the recall level toward and purchases at focal firms made by the three customer groups:

$$Y_i = \beta_0 + \beta_{\text{tap}} \text{Tapped}_i + \beta_{\text{untap}} \text{Untapped}_i + \varepsilon_i, \quad (1)$$

where Y_i is the dependent variable of interest (recall and purchase value) for customer i . Our main explanatory variables are Tapped_i and Untapped_i , which are dummy variables indicating whether customer i is

(randomly) assigned to the tapped (G1) or untapped customer group (G2), respectively. The control group customers (G3) serve as the comparison. Standard errors are clustered at the firm level. We provide unbiased intention-to-treat estimates of the average treatment effect.

4.1. Impact of Feedback on Customer Recall

Table 2 reports estimates of β_{tap} and β_{untap} from Equation (1) with customer recall as the dependent variable. The results indicate that feedback has a positive and statistically significant effect on the recall levels of both tapped and untapped customers. Column (1) presents the effect on customers' unaided firm recall (measured by asking each customer to name the five companies that come to mind when they think of purchasing products in the focal category with the dependent variable computed as the proportion who mention the focal firm). At endline, 22.2% of the control group (G3) customers recall their focal firms unaided. By comparison, 80.7% of customers assigned to the tapped group (G1) are able to recall the focal firm ($0.222 + 0.585$), whereas the number is 54.9% ($0.222 + 0.327$) for customers assigned to the untapped group (G2). And, although both customer treatment groups improved on unaided recall, the F -test comparing these two coefficients shows that the tapped group achieved significantly greater improvement than the untapped group (p -value = 0.00).¹⁵

Table 2, columns (2)–(4), show that our customer recall results are consistent across alternative dependent variables: from lightly to heavily aided recall (refer to notes in Table 2 for measurement details). Even after providing information in the heavily aided condition, 60.3% of control group customers (G3) are able to recall the focal firm, whereas 23.1% more of the untapped group and 39.7% more of the tapped group could do so. As per column (4), even after the heavy aid, tapped customers display a 19.9% effect size for the focal firm recall rate compared with those untapped (i.e., a ratio of the mean difference of 16.6% between the coefficients of the tapped and untapped groups and an average recall level of 83.4% for the untapped group). Lastly, by testing multiple independent measures, we run the risk of encountering false positives. To adjust for this, we conduct our hypothesis testing using conservative Bonferroni-corrected p -values as indicated in the table. On the other hand, combining outcome variables increases statistical power, particularly in identifying effects that align in the same direction (Drexler et al. 2014). Thus, we have established our primary recall variable as the average of the four recall measures (columns (1)–(4)), and column (5) presents this overall recall index. Notably, our findings remain consistent when considering this overall index.

Overall, these results suggest that customer feedback can lead to greater recall of the firm seeking such input. Customer recall is an important metric for firms given

Table 2. Impact of Feedback on Customer Recall

	(1) Unaided recall	(2) Lightly aided recall (all info)	(3) Lightly aided recall (any info)	(4) Heavily aided recall	(5) Overall recall index
Treat - tapped customer	0.585*** (0.0266)	0.708*** (0.0206)	0.650*** (0.0233)	0.397*** (0.0236)	0.585*** (0.0186)
Treat - untapped customer	0.327*** (0.0283)	0.198*** (0.0276)	0.271*** (0.0298)	0.231*** (0.0298)	0.257*** (0.0239)
Mean of dependent variable: Control customer	0.222	0.290	0.348	0.603	0.366
Standard deviation of dependent variable: Control customer	0.416	0.454	0.477	0.490	0.393
Effect size in standard deviation: Tapped customer	1.408	1.558	1.364	0.810	1.487
Effect size in percentage: Tapped customer	264.0	244.1	187.1	65.72	160.0
Effect size in standard deviation: Untapped customer	0.787	0.435	0.569	0.471	0.653
Effect size in percentage: Untapped customer	147.7	68.19	78.06	38.22	70.22
Adjusted R^2	0.227	0.365	0.311	0.171	0.343
Observations	1,434	1,434	1,434	1,434	1,434
$\beta_{\text{Tapped}} = \beta_{\text{Untapped}}$	0.00	0.00	0.00	0.00	0.00

Notes. This table summarizes analysis of the effect of feedback on customer recall across the tapped, untapped and control groups. Column (1) represents the unaided recall metric of the customer measured by asking the customer to name the top five firms that come up in the customer's mind when the customer thinks of purchasing products in the focal firm's category. If the focal firm is featured in this list of stores provided by the customer, we coded this metric as one or else as zero. Column (2) represents the lightly aided recall metric (all info) measured by providing the name of the focal firm to the customer and asking the customer to provide (all) information about the store (including the entrepreneur's name, store location, and three products that the firm sold) if the customer remembered it. This metric was coded as one if the customer was correctly able to recall all of this information or else it was coded as zero. Column (3) represents the lightly aided recall metric (any info), which was coded as one if the customer could provide any information about the firm correctly upon provision of the light aid as described earlier. Column (4) represents the heavily aided recall measured by providing (all) the information about the focal firm to the customer and then asking the customer to name any three products that the customer remembers the focal firm selling. The metric was coded as one if the customer was correctly able to recall this information. Column (5) represents the overall recall index computed as an average of the four recall variables. Standard errors reported in parenthesis are clustered by the firm. p -values are adjusted for Bonferroni correction (for columns (1)–(4)).

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

that the purchase decision is restricted to brands that are evoked or in a customer's consideration set (Campbell 1969, Howard and Sheth 1969, Roberts and Lattin 1991). Increased probability of featuring in a customer's consideration set could translate into higher purchases from the store as well as greater opportunities to obtain repeat customers. The higher recall shown by tapped customers (over untapped customers) also provides evidence of a solicitation effect.

4.1.1. Mechanism: Evidence for Firm Learning. In addition to testing feedback's main effect on customer recall, we explore whether our intervention's impact on customers varies depending on the business-level changes that firms make as a result of the received feedback. If the spillover is being caused by firm learning, then the more a firm improves based on feedback, the higher should be the effect observed on the customers. Next, we show how these customer recall effects vary with the changes made by the firms due to feedback. This enables us to assess the impact of firm-specific customer feedback as the changes implemented by each treatment firm corresponding to the feedback it

collected from its own customers should be more indicative of the firm learning effect.

For this purpose, we construct a feedback-action alignment (FAA) metric that measures the similarity between the feedback that was received by the treatment firms and the changes they made. First, we encode the feedback received as a 31-dimensional vector based on the same 31 feedback areas identified previously (see Table 1 for the list of identified areas/topics).¹⁶ We then encode the changes made by each firm on the 31 feedback areas. Confirmation that a business-level change has been made is based on an audit of the firm's activities (conducted as part of the endline survey).¹⁷ We then calculate the FAA as the cosine similarity between these two vectors (i.e., the cosine of the angle between the 31-dimensional vector of feedback received by the firm and the 31-dimensional vector of business-level changes made by the firm). The cosine similarity score can range from zero to one. It is zero if the firm makes no changes in any of the areas highlighted in the received customer feedback and is one if the firm makes changes in all the areas indicated in the received feedback. Therefore, the more areas in which firms make changes based on

Table 3. Interaction Effects of Feedback with Firm's FAA Metric on Customer Recall

	(1) Unaided recall	(2) Lightly aided recall (all info)	(3) Lightly aided recall (any info)	(4) Heavily aided recall	(5) Overall recall index
Treat - tapped customer	0.577*** (0.052)	0.711*** (0.021)	0.654*** (0.023)	0.397*** (0.024)	0.585*** (0.022)
FAA × Tapped customer	0.017 (0.097)	-0.007 (0.008)	-0.007 (0.008)	0.000 (0.000)	0.001 (0.025)
Treat - Untapped customer	0.112* (0.062)	0.096* (0.055)	0.091 (0.064)	0.022 (0.064)	0.080 (0.050)
FAA × Untapped customer	0.455*** (0.116)	0.215** (0.104)	0.381*** (0.116)	0.441*** (0.105)	0.373*** (0.090)
Mean of control group	0.222	0.29	0.348	0.603	0.366
Adjusted R^2	0.235	0.366	0.318	0.184	0.351
Observations	1,434	1,434	1,434	1,434	1,434

Notes. This table summarizes the interaction effects of customer feedback and firm's FAA metric on the recall levels of the customer. The FAA metric is simply the cosine similarity for each treatment firm. It is calculated as the cosine of the angle between the vector of feedback provided to the firm and the vector of actions taken by the firm. In this analysis, we have added separate interaction variables for the tapped and untapped customers with FAA. Columns (1)–(5) represent the same metrics as described in Table 2. Standard errors reported in parenthesis are clustered by the firm.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

customer feedback, the higher the FAA metric. Please note that the FAA metric can be calculated only for the treated firms as only they have the customer feedback.

Table 3 shows the recall effects based on the interaction of the customer experimental group allocation (tapped or untapped customer groups) and the focal firm's FAA. The estimates indicate a positive and statistically significant interaction effect for untapped customers but not for tapped customers. Although the interaction results are more descriptive in nature, the estimates suggest that the spillover recall effects of feedback are enhanced as the firm responds to the received feedback by making changes along those lines. This result supports our prediction that business-level changes based on firm learning drive the spillover effect of customer feedback. Additionally, it is important to note that the interaction effect between the firms' FAA and tapped customers is not significant. To explore this further, we divide the firms into FAA quartiles to test for any significant interaction effects between FAA and tapped customers within each quartile, but we do not find any. A spline analysis (Hastie et al. 2009), which fits a piece-wise linear function to our data, confirms the nonsignificant interaction effect between FAA and tapped customers (see Online Table A9).¹⁸ These results, though descriptive, suggest that, for tapped customers, simply seeking feedback is sufficient to improve customer recall regardless of the changes firms make based on the feedback. This result seems plausible because firms periodically contact tapped customers to ask about their purchase experience, an act that likely supports recall.

Further, Online Table A10 shows the same interaction effects between the experimental group (G1 or G2) and firms' non-feedback-related changes (an index calculated as an average of the changes made by the firm across the

17 areas unrelated to customer feedback as per Online Table A2). We find that none of the interactions with the nonfeedback actions index is statistically significant for either the tapped or untapped customers. We, therefore, conclude that non-feedback-related changes do not impact tapped or untapped customers' recall levels.

In addition, we conduct mediation analysis to examine how firms' feedback-related actions influence recall among untapped customers. The sequential ignorability assumptions underlying mediation analysis are difficult to justify and describe in our context given that mechanism variables were not randomly assigned (Imai et al. 2010). Nonetheless, mediation analysis essentially reinforces the mechanism analysis (Tingley et al. 2014, bootstrapping 5,000 simulations). Our findings reveal that feedback-related actions significantly mediate the impact of firms' feedback seeking on the customer recall index (see Online Table A11). Specifically, 24.1% of the total effect on untapped customers' recall is attributed to this mediating relationship. Overall, our analysis demonstrates that feedback seeking significantly and meaningfully affects customer recall with improvements in feedback-related firm actions serving as a key mechanism through which this impact occurs.

4.2. Impact of Feedback on Customer Purchase

In Table 4, we report estimates of β_{tap} and β_{untap} from Equation (1) with customer purchase as the dependent variable.¹⁹ Column (1) presents the effect of feedback on the customers' quarterly purchases at the focal firm. The estimates indicate a positive and statistically significant effect of feedback on tapped and untapped customers' purchase value (as measured at endline). On average, tapped customers (G1) spend 13,118.6 RWF (US\$13.1) more at the focal firm than control group customers (G3),

Table 4. Impact of Feedback on Customer Purchase

	(1) Total firm spend	(2) Basket value	(3) Number of visits	(4) Overall purchase index
Treat - Tapped customer	13,118.6*** (1,986.4)	2,222.3*** (445.3)	1.989** (0.697)	0.317*** (0.0721)
Treat - Untapped customer	8,097.9*** (1,665.1)	2,027.3*** (486.2)	0.695 (0.649)	0.160** (0.0730)
Mean of dependent variable: Control customer	10,457.2	2,899.0	4.832	0.00
Standard deviation of dependent variable: Control customer	12,737.9	3,054.8	6.627	0.757
Effect size in standard deviation: Tapped customer	1.030	0.727	0.300	0.418
Effect size in percentage: Tapped customer	125.5	76.66	41.17	
Effect size in standard deviation: Untapped customer	0.636	0.664	0.105	0.211
Effect size in percentage: Untapped customer	77.44	69.93	14.38	
Adjusted R^2	0.041	0.020	0.009	0.021
Observations	1,167	1,167	1,167	1,167
$\beta_{\text{Tapped}} = \beta_{\text{Untapped}}$	0.004	0.716	0.015	0.002

Notes. This table summarizes analysis for the effect of feedback on purchases made by customers across the tapped, untapped and control group. All measures reported in this table are conditional on the customer being able to recall the firm post the heavy aid. Column (1) presents a measure of the spend (winsorized 1% on both tails) of the customer at the focal firm in the past three months (September, October, and November 2021) in RWF. Column (2) presents a measure of the basket value of the latest purchase made by the customer from the focal store in a single visit in RWF (winsorized 1% on both tails). Column (3) represents a measure of the number of visits made by the customer at the focal firm in the past three months (September, October, and November 2021). This is calculated by dividing the total firm spend (as described in column (1)) by the basket value (as described in column (2)). Column (4) presents the purchase index, which is calculated as the average of the standardized inverse hyperbolic sine transformed values of total firm spend and the basket value. Standard errors reported in parenthesis are clustered by entrepreneur ID. The dependent variables were winsorized at 1% on each tail to account for any spurious outliers. P -values are adjusted for Bonferroni correction (for columns (1)–(3)).

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

who were spending 10,457.2 RWF (US\$10.4). Similarly, untapped customers (G2) spend 8,097.9 RWF (US\$8.0) more at the focal firm compared with the customers of control firms (over an observed three-month period).

While both the tapped and untapped groups show purchase value increases, the tapped group achieves a significantly greater improvement when compared with the untapped group (refer to p -values reported in the last row of Table 4). The tapped customers' average quarterly spending with the focal firms increases by 5,020 RWF compared with the untapped customers, representing a 27.0% effect size. The higher purchases made by tapped customers (over and above the untapped customers) provides further evidence of a solicitation effect from customer feedback seeking. In addition, it is worth highlighting that, purely through feedback's spillover effects, firms improve their untapped customers' purchase levels by 77.4% compared with control group customers.

Next, in columns (2) and (3), we present the regression results for customers' average basket value per trip to the focal firm and their average total visits made to the focal firm (in the previous three months). Column (2) shows there was a positive and significant effect of feedback on customers' average basket values for both the tapped group (2,222 RWF or 76.7%) and the untapped

group (2,027 RWF or 69.9%). However, p -values indicate no significant difference between the values for tapped and untapped customers with both increasing comparably. Column (3) shows that feedback has a positive and significant effect on number of visits made by tapped customers (1.99 more visits than customers in the control group) but not for untapped customers. So the additional increase in tapped customers' purchases at the focal firm (over and above the untapped group) likely comes from extra customer visits. The table indicates conservative Bonferroni-corrected p -values. Again, to avoid the risk of false positives as a result of testing multiple independent measures, we also calculate the overall purchase index in column (4) and see that our results are robust.

Our large effect sizes are consistent with the few other studies in the same context. Bone et al. (2017) study the effect of soliciting feedback from customers and find a 33% increase in customer purchases as a result of reaching out to customers one time. The study, however, ignores learning effects as the firms do not have the opportunity to make changes based on feedback. Arguably our intervention is stronger given that the firms continued to reach out to their customers for about a year. They also had an opportunity to better learn customer preferences when making changes in their business based on the received feedback. We

present more evidence on the feedback-related changes made by the firms in Section 5.1.

Again, it is important to note that our untapped group was not engaged in the feedback process, just like the control customers (G3). However, the business-level changes made by treatment firms (as a result of the feedback-driven learning) led to spillovers and increases in the purchase levels of their untapped customers.

4.2.1. Mechanism: Evidence for Firm Learning. As in the customer recall case, we test how the customer purchase effects vary with the changes made by the firms based on the received feedback. For this purpose, we again use the FAA metric. As described above, we use FAA to quantify similarity between the feedback that firms receive and the business-level changes they make.²⁰ Table 5 shows the purchase effects based on the interaction between the customer experimental group (i.e., tapped or untapped customer groups) and the FAA metric of the focal firm. The estimates indicate a positive and significant interaction effect of the FAA with tapped customers but not with untapped customers. Although descriptive, the estimates suggest that making business-level changes in the feedback areas highlighted by customers can enhance spillover purchase effects. The result is consistent with tapped customers making more purchases from the focal firm if it acts on the feedback they provided. Also, note that, when a focal firm acts on the received feedback, it does not lead to the average effect on the purchase made by untapped customers to be significant. Upon further exploration, we find that, when dividing the firms into FAA quartiles, the interaction effect between the FAA and untapped customers is significant for the fourth quartile (coefficient estimate = 2.165, *p*-value = 0.088)²¹

but not in the lower quartiles. To formalize this, we conduct a spline analysis (Hastie et al. 2009) to fit a piecewise linear function to our data. This analysis confirms the significant interaction effect in the higher quartile but not so for the lower quartiles (see Online Table A12).²² Though descriptive in nature, these results suggest that small increases in FAA might not significantly boost purchase amounts among untapped customers. However, as firms achieve higher levels of FAA by implementing more customer feedback recommendations, we could begin to observe a noticeable impact of FAA on the purchases made by untapped customers.

Online Table A13 shows similar interaction effects between the experimental group and non-feedback-related changes made by firms (with the nonfeedback change index calculated in the same manner as before in Online Table A2). We see that none of the interactions with the nonfeedback actions index is significant for either the tapped or the untapped customers. We, therefore, conclude that the non-feedback-related changes do not impact tapped or untapped customer purchase levels as expected.

We also conduct mediation analysis to examine how firms' feedback-related actions influence purchases among untapped customers (see Online Table A14). About 91% of the total effect on untapped customers' purchase is attributed to this mediating relationship. Overall, firms' actions in response to feedback emerge as a crucial mechanism facilitating the positive impact of customer feedback.

4.3. Additional Analysis: Heterogeneous Treatment Effects

Furthermore, we test for heterogeneity in treatment effects across all baseline variables. We use causal forest

Table 5. Interaction Effects of Feedback with Firm's FAA Metric on Customer Purchase

	(1) Total firm spend	(2) Basket value	(3) Number of visits	(4) Overall purchase index
Treat - tapped customer	4,339.3 (4,574.2)	2,575.7* (1,351.9)	-2.550** (1.236)	0.148 (0.140)
FAA × Tapped customer	18,506.2* (9,836.8)	-745 (2,727)	9.569*** (2.833)	0.355 (0.236)
Treat - Untapped customer	5,131.3 (4,531)	1,257.3 (1,513.9)	1.038 (1.537)	0.014 (0.163)
FAA × Untapped customer	6,038.3 (8,309.2)	1,567.1 (2,830.7)	-0.698 (2.667)	0.298 (0.285)
Mean of control group	10,457.1	2,898.9	4.832	0.00
Adjusted <i>R</i> ²	0.047	0.019	0.027	0.023
Observations	1,167	1,167	1,167	1,167

Notes. This table summarizes the interaction effects of customer feedback and firm's FAA metric on the purchase value of the customer (conditional on the customer being able to recall the firm). The FAA metric is simply the cosine similarity for each treatment firm. It is calculated as the cosine of the angle between the vector of feedback provided to the firm and the vector of actions taken by the firm. In this analysis, we have added separate interaction variables for the tapped and untapped customers with FAA. Columns (1)–(4) represent the same metrics as described in Table 4. Standard errors reported in parenthesis are clustered by entrepreneur ID. The dependent variables were winsorized at 1% on each tail to account for any spurious outliers.

p* < 0.1; *p* < 0.05; ****p* < 0.01.

to estimate the conditional average treatment effects (CATE), and then, to interpret the effects, we use best linear projection to linearly summarize the CATE in terms of the baseline covariates (Athey et al. 2019, Semenova and Chernozhukov 2021). We assess heterogeneity for both (a) the spillover effect of feedback on the untapped customers because of firm learning and (b) the direct effect of feedback on the tapped customers. We find that the treatment effect on purchases at the focal firm is influenced by customer gender and education (refer to Online Appendix A15). Customers with no education exhibit lower spillover effects, whereas female customers tend to exhibit stronger spillover effects. No such heterogeneous treatment effects are found on the recall levels of customers toward the focal firm. Next, we examine heterogeneity in the treatment effect on tapped customers (see Online Appendix A15). Again, compared with educated customers, we find customers with no education show lower treatment effects on their purchases made at the focal firm. We also uncover a negative impact of the number of household members in the tapped customer's family on their recall level toward the focal firm although this effect is marginally significant ($p = 0.097$).

Our conclusion from the heterogeneity analysis is that customers who have never received any education might not be the best target group to benefit from the feedback-seeking activities of the firm. But we also wish to note that, because of our constrained sample size and limited variation in some of the baseline variables (such as firms' age), a lack of statistically significant impact on the CATE for some of the baseline covariates does not necessarily imply that these variables are not important for treatment effect heterogeneity. More work is needed in this area to identify heterogeneous effects of feedback seeking.

4.4. Discussion

Our customer-focused analysis confirms Hypotheses 1, 2, and 4 as feedback seeking directly affects tapped customers (over and above the untapped customers) through the solicitation effect and also creates spillover effects on untapped customers through the firm's actions in response. Looking at the customer-level measure for which the differences between the experimental groups are the most conservative (i.e., heavily aided recall), we find that seeking feedback leads to significant customer recall improvement for the focal firm by about 19.9% for tapped customers relative to untapped customers and 38.2% for untapped customers relative to control customers. Feedback also leads to a significant increase in quarterly purchase levels by 27.0% for tapped customers relative to the untapped customers and 77.4% for untapped customers relative to the control customer group. This spillover to the untapped customers though positive and significant is still lower than the tapped

customers experiencing the direct solicitation impact of feedback. Despite the promising results, feedback's effect on the overall performance of firms remains unresolved. We examine this next.

5. Analysis and Results: Impact of Feedback on Firms

In this section, we present the impact of feedback seeking on firms' learning from feedback (actions taken) and firms' financial performance (sales and profits). Apart from providing model-free evidence, we present results from the ITT regressions specified in Equations (2) and (3):

$$Y_i = \beta_0 + \beta_{treat} Treat_i + x'_i \theta + \gamma Y_{i,t=0} + \epsilon_i, \quad (2)$$

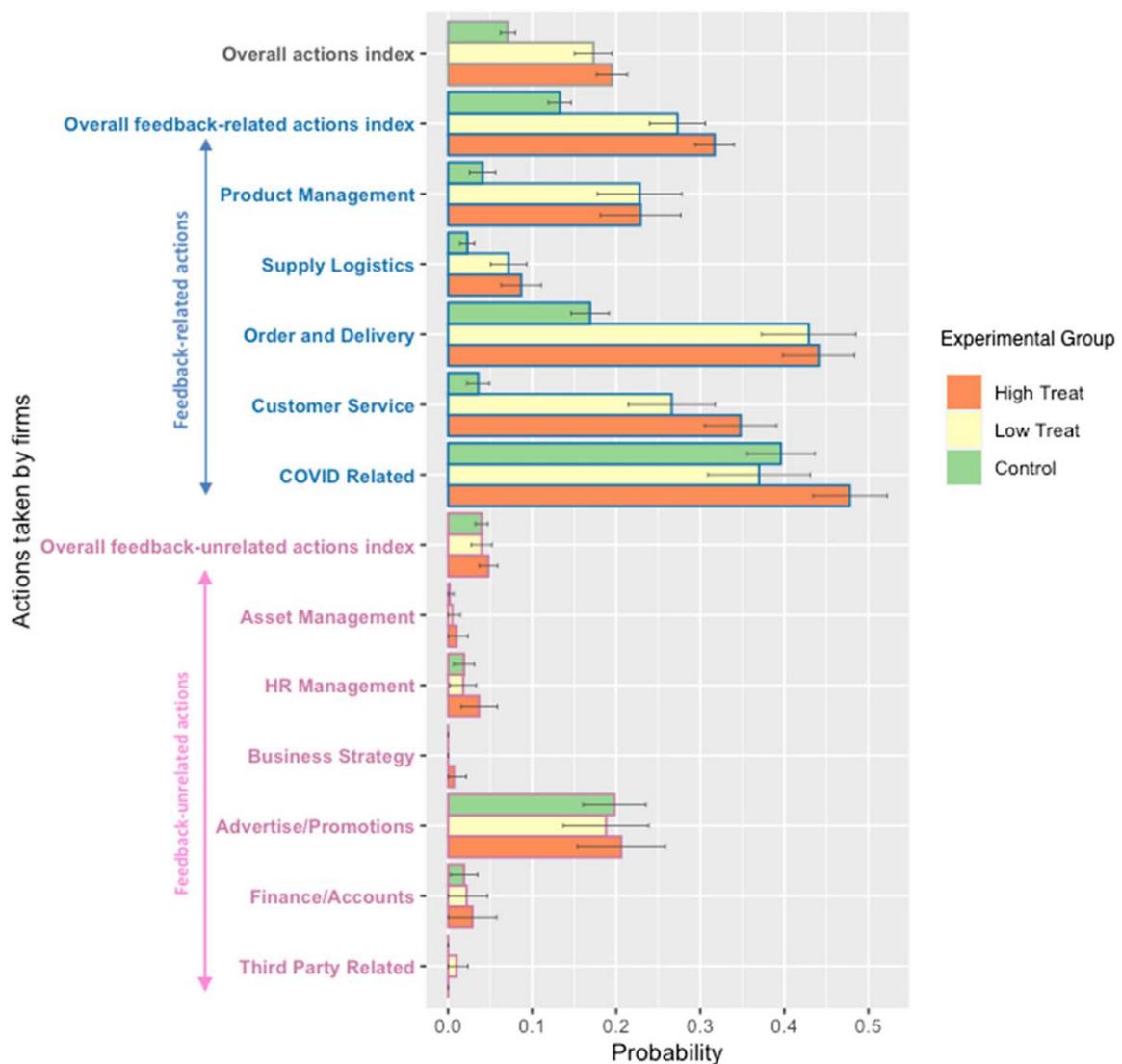
$$\begin{aligned} Y_i = \beta_0 + \beta_{high} High_Treat_i + \beta_{low} Low_Treat_i + x'_i \theta \\ + \gamma Y_{i,t=0} + \epsilon_i, \end{aligned} \quad (3)$$

where Y_i is the dependent variable of interest (firm actions, sales and profits) for firm i . For Equation (2), our main explanatory variable is $Treat_i$, which is a dummy variable indicating whether firm i is (randomly) assigned to the feedback treatment or to control. In Equation (3), to get the treatment intensity effect, we replace this variable with $High_Treat_i$ and Low_Treat_i dummies, indicating whether firm i was (randomly) assigned to the high- or low-intensity feedback treatment group, respectively. x_i represents a vector of strata (location) dummy variables. We also control for the baseline value of the dependent variable, $Y_{i,t=0}$. Finally, ϵ_i is the error term. As random assignment is at the firm level, robust (Eicker–Huber–White) standard errors are used. This analysis of covariance (ANCOVA) specification has several advantages and is recommended when there are preintervention and postintervention data collection rounds (McKenzie 2012). First, by using the exogenous treatment assignment variables (rather than endogenous treatment compliance variables), we provide ITT estimates that are unbiased for the average treatment effect. Second, by including the value of the dependent variable at baseline, along with the stratification variable, we improve precision of the estimates (McKenzie 2012).

5.1. Impact of Feedback on Firm Learning

Figure 2 provides initial model-free evidence that treatment firms take actions based on what they learn from customer feedback. The figure presents two types of actions the firms might take: (a) actions related to the feedback received or (b) actions unrelated to the feedback (see Table 1 and Online Table A2 for the complete list of the feedback-related and unrelated action categories). Also shown is the average probability of firms making changes in each category.

Figure 2. (Color online) Actions Taken by Firms: Feedback-Related and Feedback-Unrelated Areas



Notes. This graph provides the model-free evidence of business changes made by the firm. Each entrepreneur was asked questions by the auditors to check if they have made changes in a given action area since the start of the intervention, coded as one if the firm made a change in that area or zero otherwise. The category probability is calculated by taking an average across all constituent action areas (the action areas constituting each of the categories are detailed in Table 1 and Online Table A2). The overall feedback-related actions index is then calculated as an average across all 31 feedback-related actions, and the overall feedback-unrelated actions index is calculated as an average across all 17 feedback-unrelated actions. Further, the overall actions index is calculated as an average across all 48 feedback-related and unrelated actions.

Figure 2 shows that treatment firms are more likely than control firms to make changes in most categories linked to customer feedback. For example, in the first category of product management-related actions, control firms are 4% likely to make a change, whereas treatment firms are 22% likely to do the same (with the probability being similar for high- and low-intensity treatment firms). We create a feedback-related action index by averaging the scores across the five categories: product management, supply logistics, order and delivery, customer service, and COVID-related. The index is significantly higher for the treatment firms than the control firms. Interestingly, the high- and low-intensity

treatment firms are not statistically different when comparing probabilities of making changes across most categories.²³ The result shows that the additional feedback the high-intensity treatment firms receive does not drive significant additional (or different) actions compared with that of the low-intensity treatment firms.

Similarly, Figure 2 also suggests that treatment and control firms are equally likely to make changes in feedback-unrelated actions. The overall feedback-unrelated actions index, which is the average across the six categories of asset management, human resources (HR) management, business strategy, advertisement/promotion, finance/accounting, and third-party related,

is similar for the treatment and the control firms. This acts as a placebo test to show that treatment firms were not randomly making changes in all business areas, but directed their effort toward only those areas that were linked to customer feedback.

This model-free evidence is supported by the ITT regression analysis. In Online Tables A17 and A18, we report estimates of β_{treat} from Equation (3) for firm action. It indicates a positive and statistically significant effect of the treatment on feedback-related areas but not on feedback-unrelated areas. The treated firms, on average, are 118.4% more likely to have made changes in the feedback-related areas as compared with control firms. However, in the non-feedback-related areas, we don't see any significant difference between the changes made by the treated and control firms. We present the average treatment effects for the high- versus low-intensity treatment groups in Online Table A19. For most of the feedback-related categories, we do not see a significant difference between these firms. This analysis, combined with the previously documented spillover effects on untapped customers, confirms Hypothesis 3 as feedback seeking leads to the firms making business changes in feedback-related areas (thus causing a spillover to untapped customers).

Finally, we conduct a similarity analysis between the customer feedback and firm actions at an aggregate level across all treatment and control firms. Specifically, we calculated the probability of an average treatment and control firm within our sample to have made changes in each of the 31 feedback-related areas (labeled as vector 1 for treated firms and vector 2 for control firms). Additionally, we calculate the average probability of a treated firm to have received feedback in each of these 31 areas. Given the random allocation between treated and control firms, we assume that the probability vectors for customer feedback are similar for both groups at an aggregate level. This implies that, had customers of control firms been asked to provide feedback, they would have likely provided similar feedback as the customers of treatment firms given the random allocation. Next, we calculate the FAA metric at an aggregate level for the treatment and control firms by calculating the cosine similarity between the probability vector for customer feedback and vectors 1 and 2, respectively. The FAA treatment metric is 0.76, whereas for control, it is 0.43, indicating that the treatment metric is approximately 76% higher than the control metric. Although an aggregate level analysis, it reinforces our mechanism results demonstrating that treatment firms are significantly more likely to make business changes based on their learning from customer feedback compared with the control firms.

Note that we also check for the impact of feedback on the extent of advertising by the firms (conditional on them advertising their business) and find no significant

difference between the treated and control groups, indicating that our results are not driven by differences in advertising levels between treated and control firms (see Online Table A20).

We next test for the differences in feedback content received by the high- and low-intensity treatment firms. Online Figure A9 shows that the total feedback responses received from customers, on average, is about 85 for high-intensity treatment firms and 58 for low-intensity treatment firms. While the difference exists in overall feedback, the unique number of feedback areas²⁴ highlighted by the customers is not statistically different between the high- and low-intensity treatment firms. This shows that both firms were informed about similar areas of feedback, but the high treatment firms were being informed about those issues more often. Both firm types receive feedback on similar unique topics, which could justify their similar firm changes.

Overall, results indicate that customer feedback led both the high- and low-intensity treatment firms to improve their offerings but resulted in similar amounts of business changes for them (firms' learning).

5.2. Impact of Feedback on Firm Performance

Next, we analyze the impact of feedback seeking on firm performance. The model-free evidence in Figure 3 indicates that both high- and low-intensity treated firms experience significantly higher profits than the control.

Table 6 reports estimates of β_{treat} from Equation (2) for firm sales and profit. The estimates indicate feedback seeking has a positive and statistically significant effect on treatment firms. We first interpret the estimates in columns (1) and (3), in which the dependent variable is the firms' monetary monthly sales and profits, respectively. Treatment firms earn US\$219.1²⁵ more monthly revenue than the control group at endline,

Figure 3. (Color online) Model-Free Evidence: Effect of Feedback on Firm Profits

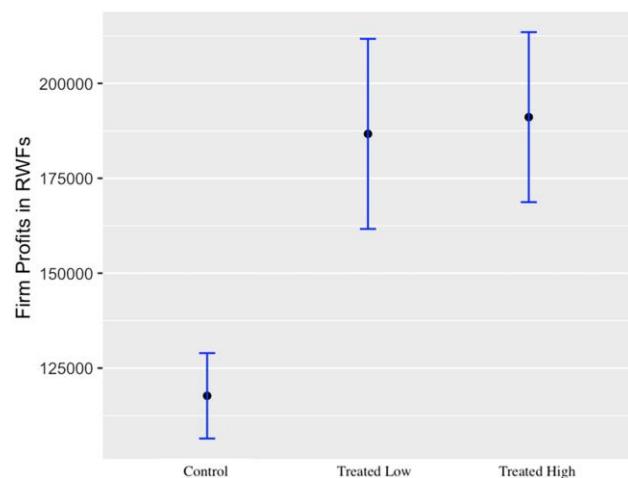


Table 6. Impact of Customer Feedback on Firm Sales and Profits

	Dependent variable: Sales		Dependent variable: Profits		Overall
	(1)	(2)	(3)	(4)	(5)
	Monthly	Inverse hyperbolic sine monthly	Monthly	Inverse hyperbolic sine monthly	Performance index
Treatment	219.1*** (31.18)	0.631*** (0.0985)	63.96*** (8.223)	0.539*** (0.0861)	0.553*** (0.0862)
Mean of dependent variable: Control	352.8	6.238	117.3	5.224	0
Standard deviation of dependent variable: Control	244.5	1.147	65.85	0.959	0.988
Effect size in standard deviation: Treatment	0.896	0.551	0.971	0.561	0.559
Effect size in percentage: Treatment	62.09	63.1	54.51	53.9	
Adjusted R^2	0.394	0.319	0.403	0.257	0.299
Observations	272	272	272	272	272

Notes. This table summarizes analysis for the effect of customer feedback on total firm performance outcomes (from baseline to endline). The results in each column represent the ITT effects of the randomly assigned intervention to a treatment group entrepreneur. Column (1) presents a winsorized (1% on both tails) measure for monthly sales (it refers to the monthly sales calculated as an average across the last two full calendar months for the firm, which, for our sample, was July and August 2021). Column (2) presents an inverse hyperbolic sine transformed measure for monthly sales: estimates after transforming monthly sales with the inverse hyperbolic sine function. Column (3) presents a winsorized (1% on both tails) measure for monthly profits (it refers to the monthly profits calculated as an average across the last two full calendar months for the firm, which, for our sample, was July and August 2021). Column (4) presents an inverse hyperbolic sine transformed measure for monthly profits: total monthly profits transformed with the inverse hyperbolic sine function. Column (5) presents an index measure for firm performance (inverse hyperbolic sine sales monthly, inverse hyperbolic sine profits monthly): the two measures were standardized, and then the average of these values was computed to construct the overall performance index. All regressions include firms that failed (nonoperational) as at endline. Any firm growth values in levels (sales, profits) are listed as RWFs in 1,000s. The regressions also include location-level fixed effects and the baseline value of the dependent variable. Robust standard errors are in parentheses. P-values are adjusted for Bonferroni correction (for columns (1)–(4)).

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

indicating an effect size of 62.0%. Similarly, treated firms make US\$63.9 more monthly profits than the control at endline, an effect size of 54.5%. In columns (2) and (4), we show that the results are robust to alternative dependent variable specifications in which we use the inverse hyperbolic sine transformation. This specification handles outliers differently but shows comparable effect sizes for both sales and profit. Finally, we calculate the overall index in column (5) to avoid multiple hypotheses testing, and we see that our results are robust. In addition, the p -values indicated in the table are Bonferroni corrected.

5.2.1. Diminishing Returns to Feedback Seeking.

Figure 3 shows that high-intensity treatment firms do not show significant improvement compared with low-intensity firms. One could argue that our experiment is underpowered to detect an effect between the high- and low-intensity treatment firms. Still, a dip in sales growth seems to emerge between the low- and high-intensity firms when compared with sales growth between the control and low-intensity firms. This does show a diminishing trend in the firms' performance improvement from customer feedback. The evidence, however, is suggestive as we have only three comparison groups to plot the response curve for feedback intensity.

In Table 7, we report estimates of β_{high} and β_{low} from Equation (3) for firm sales and profit. We see in column

(1) that the effect size for monthly sales improvement is 72.6% for the high-intensity treatment firms and 51.7% for the low-intensity treatment firms. Both effects are significantly larger relative to the control group. However, the sales improvement difference between the two groups is not significant as indicated by the p -values reported in the table's last row. We see similar trends in columns (2)–(5). Given the limitations of our sample size, we could test only two feedback intensity levels. As we do not observe variation in firm performance across the entire domain of feedback intensities (0%–100%), we are unable to identify if there exists a threshold above which firms start experiencing a performance effect of feedback or a threshold at which the firms start experiencing diminishing returns.

To identify a customer feedback response curve, we need to observe the firm performance achieved under different, exogenously varied, feedback-seeking intensities (i.e., the ratio of customers from which firms seek feedback). The approach is difficult given our sample size; therefore, our results compare only three feedback intensity levels: (a) zero (or close to zero), (b) low, and (c) high. Hence, the findings are suggestive in nature.

5.2.2. Mechanism: Evidence for Firm Learning.

Additionally, Table 8 shows the performance effects based on the interaction between the experimental group (treatment or control firms) and the focal firms'

Table 7. Impact of Customer Feedback on Sales and Profits for High- and Low-Intensity Firms

	Dependent variable: Sales		Dependent variable: Profits		Overall
	(1)	(2)	(3)	(4)	(5)
	Monthly	Inverse hyperbolic sine monthly	Monthly	Inverse hyperbolic sine monthly	Performance index
Treat - High	256.2*** (39.07)	0.674*** (0.106)	73.91*** (9.690)	0.590*** (0.0907)	0.600*** (0.0909)
Treat - Low	182.7*** (39.79)	0.590*** (0.107)	54.18*** (10.79)	0.488*** (0.0949)	0.507*** (0.0940)
Mean of dependent variable: Control	352.8	6.238	117.3	5.224	0
Standard deviation of dependent variable: Control	244.5	1.147	65.85	0.959	0.988
Effect size in standard deviation: Treat - High	1.048	0.588	1.122	0.615	0.607
Effect size in percentage: Treat - High	72.62	67.4	62.99	59.0	
Effects size in standard deviation: Treat - Low	0.747	0.514	0.823	0.509	0.512
Effect size in percentage: Treat - Low	51.79	59.0	46.18	48.8	
Adjusted R^2	0.398	0.317	0.407	0.256	0.298
Observations	272	272	272	272	272
$\beta_{-}[\text{Treat} - \text{High}] = \beta_{-}[\text{Treat} - \text{Low}]$	0.131	0.297	0.111	0.142	0.159

Notes. This table summarizes analysis for the main effect of customer feedback on firm performance outcomes (from baseline to endline). The results in each column represent the ITT effects of the randomly assigned intervention to a treatment group entrepreneur (Treat High is the effect on firms seeking feedback from 70% of customers, and Treat Low is the effect on firms seeking feedback from 30% of customers). Columns (1)–(5) represent the same metrics as described in Table 6. All regressions include firms that failed (nonoperational) as at endline. The regressions also include location-level fixed effects and the baseline value of the dependent variable. Robust standard errors are in parentheses. P -values are adjusted for Bonferroni correction (for columns (1)–(4)).

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

FAA. The estimates indicate a positive and statistically significant interaction effect of the FAA index with treatment firms. Though descriptive, these results provide evidence that firms making changes by learning from the customer feedback experience increased sales and profits. It shows that treated firms that implement business changes closely following what their customers provided in feedback (high FAA index) perform better as compared with treated firms making changes not based on their received feedback.

5.2.3. Additional Checks. As our treatment affects firm survival, we run checks to ensure nonsurvival does not threaten the validity of the experimental inferences. Online Table A22 shows the treatment effects conditional on firm survival. The results continue to hold and

confirm that differential survival levels are not primarily responsible for driving the effects on firm performance.

Furthermore, Online Table A21 shows that the business costs incurred by the treated firms did increase because of the intervention. It indicates that treated firms could possibly be investing more toward making improvements in their products and business functions as a result of the received customer feedback, thereby incurring higher costs.

We also show the average treatment-on-treated effects of our feedback interventions in Online Table A23 based on the treatment compliance by the firms. These results should be relevant to managers or policymakers allocating scarce resources to grow their businesses. They can identify firms within their distribution network or the broader economy that are predisposed to embrace

Table 8. Interaction Effects of Feedback with Firm's FAA Metric on Firm Performance

	Dependent variable: Sales		Dependent variable: Profits		Overall
	(1)	(2)	(3)	(4)	(5)
	Monthly	Inverse hyperbolic sine monthly	Monthly	Inverse hyperbolic sine monthly	Performance index
FAA	560.9** (224)	1.149*** (0.399)	102.5* (56.6)	0.637* (0.330)	0.833** (0.336)
Adjusted R^2	0.083	0.132	0.042	0.070	0.102
Observations (only treated firms)	137	137	137	137	137

Notes. This table summarizes the interaction effects of customer feedback and firm's FAA metric on the performance (sales and profits) of treatment firms. The FAA metric is simply the cosine similarity for each treatment firm. It is calculated as the cosine of the angle between the vector of feedback provided to the firm and the vector of actions taken by the firm. Column (1)–(5) represent the same metrics as described in Table 6. All regressions include firms that failed (nonoperational) as at endline. The regressions also include location-level fixed effects. Robust standard errors are in parentheses.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

feedback-seeking practices. By strategically allocating resources to enhance feedback infrastructure for these chosen firms, they can maximize the returns on their investments.²⁶

5.3. Discussion

Our main effects support Hypothesis 5 as treatment firms significantly improve financial performance by feedback seeking compared with control firms. The sales of treatment firms increase by 62.0% and profits by 54.5% relative to control firms. However, the high-intensity treatment firms do not show significant performance improvement compared with low-intensity firms despite both groups' performance (and firm learning as shown previously) improving relative to the control group. The findings suggest that, for firms to derive the bulk of the benefit of feedback, they might not need to reach out to their entire customer base.

6. Conclusion

Our primary aim is to investigate customer feedback's effect on firms, both the direct solicitation effect on customers from whom feedback is sought (i.e., tapped customers) and spillover effects on customers not directly engaged in the feedback process (i.e., untapped customers). To do so, we implemented a randomized, controlled field experiment in Rwanda involving hundreds of firms and thousands of their customers.

Based on our most conservative customer-focused measures, we find that feedback seeking leads to an increase in the recall of focal firms by 19.9% for tapped customers (relative to untapped customers) and by 38.2% for untapped customers (relative to control customers). Feedback also leads to a 27.9% increase in the quarterly purchases of tapped customers (versus untapped customers) and a 77.4% increase in the quarterly purchases of untapped customers (versus control customers). Taken together, these customer recall and purchase results provide support for a direct solicitation effect of feedback on tapped customers. In addition, we observe strong spillover effects for untapped customers despite this group not participating in the feedback process. The evidence suggests that the spillover effects of feedback are driven by firm learning, that is, the business-level changes taken by firms in response to the feedback they received (from tapped customers).

At the firm level, we find that customer feedback seeking leads to a significant impact on the performance of treatment firms with a 62.0% improvement in their monthly revenues and 54.5% improvement in their monthly profits (relative to the control firms). These effects are relevant for managers motivated to enhance business performance as well as policymakers interested in economic development via firm growth.

Moreover, while high- and low-intensity treatment firms both perform better than control firms, a higher intensity of customer feedback seeking did not lead to better revenue or profit outcomes than lower intensity feedback. The high-intensity firms likewise do not make more improvements in their offered products or experiences compared with the low intensity firms, thus revealing similar firm learning effects for both groups. Overall, these results provide suggestive evidence that diminishing returns exist to customer feedback seeking.

6.1. Implications for Practice

Insights from our study can guide managers as they decide their firm's customer feedback solicitation and response strategy. The study demonstrates that making business changes based on customer feedback can lead to positive effects for both the tapped as well as untapped customers, thus helping practitioners make informed decisions. Our results are valuable for managers deciding where to direct their feedback efforts and how many customers from which they should seek feedback. Our study shows that feedback has strong spillover effects as well as potentially diminishing returns at higher intensity levels, which can help managers optimize the number of customers they may wish to contact for feedback.

We conduct our study in the context of small, emerging-market firms, which itself is a substantively important area for further study. Large, multinational corporations actively invest in emerging markets and set up distribution units through existing small and medium enterprises in these areas (e.g., Unilever in Sub-Saharan Africa and South Asia). Indeed, small and medium-sized firms represent more than 95% of registered firms worldwide, account for more than 50% of jobs, and contribute more than 35% of gross domestic product in many emerging markets (Alibhai et al. 2017). This study creates social value for the small firm context by showing that entrepreneurs of small businesses can enhance their performance significantly by implementing a practice core to marketing: a basic customer feedback solution. Specifically, firms should track their customer details, easily achieved by using a free smartphone digital tool, and then systematically collect two pieces of information from their customers: (a) quality ratings on their purchase experience and (b) improvement recommendations. By maintaining this information and tracking it regularly, firms can improve their business actions and increase their revenues and profits. Online Table A24 estimates the intervention's cost for our sample firms. We find that these firms can break even in 3.5 to 6 months and realize a positive return on their investment even after bearing all the intervention costs themselves.

6.2. Implications for Policy

This research has additional implications for policy stakeholders who are motivated to help microfirms and small firms, especially in developing countries, grow their businesses. These stakeholders include governments, nongovernment organizations, and international institutions such as the United Nations and the World Bank. We show that a customer feedback-seeking tool can help firms increase their revenues and profits. Existing policy work focused on building managerial capital for firms has historically explored interventions such as training and consulting, which show positive effects for the treatment businesses (McKenzie and Woodruff 2014, Bruhn et al. 2018) but are quite expensive and relatively difficult to scale. The customer feedback solution we test in this paper is comparatively inexpensive and straightforward to scale as it is based on the use of simple mobile technology. By enhancing the customer centricity of small, emerging-market firms; the businesses themselves; their customers; and ultimately, the broader economy could benefit.

6.3. Limitations and Future Research

Although our study provides useful insights for both practice and policy, all of our findings represent marginal effects as the design and context of the experiment limit us from making any general equilibrium predictions that could be of particular interest to policymakers. In other words, we cannot predict what would happen if all small firms in a given country began seeking customer feedback. However, our findings indicate that firms' adoption of customer feedback solicitation leads to improved operations and increased customer purchases, suggesting that it may be the best response for firms. Future studies could contribute to the literature by assessing the general equilibrium effects of firms seeking feedback.

Additionally, in our study, we find significant effect sizes in feedback-seeking behavior, which may seem large compared with typical marketing interventions. However, it is difficult to form priors for effect sizes on feedback seeking in the context of small, emerging-market firms. For one, limited research exists on the topic of customer feedback in low-income countries such as Rwanda. In fact, existing firm-level field experiments in similar contexts demonstrate the potential for large effect sizes in marketing interventions due to firms' low starting thresholds in business practices and managerial capital (Anderson et al. 2018, 2023). Furthermore, the firms in our sample (much like most small firms in low-income markets) did not actively seek feedback prior to our experiment. Consequently, our observed effects are benchmarked against a zero-feedback baseline, which likely contributes to the stronger effects. This localized effect prompts questions about the generalizability of our findings to other

contexts. To bolster the robustness and applicability of our results, future research should prioritize replication studies across various settings, encompassing both developing and developed countries as well as small and large businesses.

Finally, while this study examines firms actively and privately seeking feedback, it suggests that firms could learn and make changes based on any feedback they were provided, which could impact other customers as well. This finding is relevant for feedback settings more broadly and, hence, provides suggestive evidence relevant for other settings in which feedback is being received by firms. One such setting that has continued to gain popularity is online and social media-based review systems and platforms. A key trait of the review context, which is absent in our study, is that it allows customer learning through viewing reviews posted by others. But shutting off that mechanism of learning among customers is an identification advantage for our study as we can then validate the spillover occurring purely through actions taken by the firm in response to the feedback. The direct application of our insights from this study to the customer reviews context might be limited, but we do have indicative evidence that firms can process received feedback and respond by taking business-level actions. Future research could evaluate how this firm learning effect operates in the presence of customers' social learning through public and primarily passive feedback systems, such as customer reviews.

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Appendix. Theoretical Model

To provide intuition for firms' feedback-seeking activities and responses, we consider a stylized model that captures

the important features in non-monopolistic consumer markets in which switching costs are low (refer to Cremer and Thisse 1991, Wang et al. 2019). In this model, there is a market consisting of a single profit-maximizing, independent firm, F , and a competing outside option, Op , across two periods. Firms incur a quadratic cost of quality in each period $c|q_F|^2$ with cost parameter $c > 0$ and firm quality q_F greater than some positive minimum level of quality, $|q_{min}|$.²⁷ Note that q_F is the k -dimensional quality vector provided by firm F , for which each dimension is a binary indicator highlighting an element of firm quality (e.g., product freshness, extended operating hours, store cleanliness).²⁸ Firms are capacity constrained with their capacity denoted by X_F for each period, and they set the price p_F for their products. Each customer i has a willingness to pay of θ_i per unit (matched) quality. Each customer also maintains a unit demand per period with the purchase utility given by

$$\theta_i(\vec{q}_i \cdot \vec{q}_F) + \underbrace{\eta_i S_i}_{\text{Solicitation effect}} + \gamma_i(S_i * \vec{q}_i \cdot \vec{q}_F) - p_F, \quad (\text{A.1})$$

where $\vec{q}_i \cdot \vec{q}_F$ represents the dot product between q_i (the preferred quality vector of customer i) and q_F (the quality vector provided by firm F to its customer base overall). It quantifies the matched quality between the customer's preference and the firm's offering. S_i denotes the binary indicator of whether the firm solicited feedback from customer i . The utility derived by the customer from the outside option, Op , is equal to zero.

The profit function of the firm can be written as

$$np_F - c|q_F|^2 - tc_F, \quad (\text{A.2})$$

where n is the total number of customers purchasing from the firm, $|q_F|$ represents the modulus of the firm quality vector, t represents the number of tapped customers from which the firm F seeks feedback, and c_F represents the per customer cost of seeking feedback incurred by the firm.

The timing of the game is as follows:

1. Firm F decides its quality dimensions and prices for the first period.
2. The first period opens and consumers make their purchases from the firm or the outside option, depending on their individual utility.
3. In the case that there is no customer feedback seeking, firm F can either vary its quality vector in period 2 or continue with the same quality dimensions as per period 1. In the case that the firm seeks customer feedback, it not only incurs an additional cost of seeking feedback, but also learns customer preferences and can make overall business changes to arrive at the optimal quality vector in period 2.

This model suggests that, if the firm is able to match its offered quality vector with customer preferences, subject to costs, then it could potentially maximize firm profits. We illustrate this with a simple example. Suppose firm F 's quality vector consists of three dimensions: (a) product freshness, (b) extended operating hours, and (c) store cleanliness. Also assume the market consists of four unique customers ($X_F \geq 4$). Suppose customers 1 and 2 highly value product freshness but do not care about extended operating hours or store cleanliness; then, their

Table A.1. Firm Profits as per the Stylized Model

Firm's quality vector (q_F)	Firm profit
{0,0,0}	0
{1,0,0}	$2p_F - c$
{0,1,0}	$2p_F - c$
{0,0,1}	$-c$
{1,1,0}	$4p_F - 2c$
{0,1,1}	$2p_F - 2c$
{1,0,1}	$2p_F - 2c$
{1,1,1}	$4p_F - 3c$

preferred quality vector is {1,0,0}. And suppose customers 3 and 4 highly value extended operating hours, whereas the other two dimensions are not important to them, so their preferred quality vector is {0,1,0}. Further assume that the willingness to pay θ_i of the customers is weakly greater than the price p_F , which, in turn, is greater than the cost parameter. Also, we assume the cost of feedback seeking is significantly low compared with the price, that is, $c_F \ll p_F$, thus ensuring $p_F > c + c_F$.²⁹ Now, if firm F 's quality vector starting in period 1 is {0,0,1} (i.e., it only offers high store cleanliness), then the firm will realize a net loss of c . Similarly, we calculate the profit for different firm quality vector combinations as shown in Table A.1.

From Table 1, it is evident that the optimal quality vector for firm F is to provide its customer base with product freshness and extended operating hours: implying a quality vector of {1,1,0}. Arriving at this optimal level, however, would require the firm to vary different quality dimensions until it eventually offers (if ever) a combination that its customers prefer. On the other hand, the firm could identify the optimal quality vector more quickly by seeking customer feedback. For example, if firm F seeks feedback from customers 1 and 3 (i.e., obtains representative input) then not only will these customers benefit from the solicitation impact, but the firm will also be able to learn the preferred quality vector of its customer base. Next, firm F could act on this feedback by making business changes that deliver the optimal quality vector and also lead to spillover benefits for customers 2 and 4 through the indirect impact of firm learning (i.e., better matched quality).

In a two-period game, for a firm that seeks and learns from customer feedback, its first period profit should (on average) equal that of a firm not seeking feedback. However, in the second period, the feedback-seeking firm's profit should approach the maximum level (i.e., $4p_F - 2c - 2c_F$) provided the customers respond with their feedback. By contrast, the non-feedback-seeking firm could take more time to reach maximum profit (if at all). In real-world scenarios, quality vectors likely have higher dimensions, thereby reducing the probability of the non-feedback-seeking firm ever reaching the optimal vector. Also, while c impacts the firm's total cost for a quality level, c_F impacts the firm's cost of understanding customer preferences. This understanding of preferences, in turn, can impact the quality costs through the firm's choice of the optimal quality vector.

Although a simplified representation, this model summarizes how feedback seeking can impact both customer utility and firm profitability.

Endnotes

¹ Note that we define the recall metric in terms of customers being able to think about the firm or remember it when considering a purchase in the product category.

² Emerging markets are important to study in their own right as they house more than 80% of the world's population (United Nations Conference on Trade and Development 2017), and small businesses contribute to more than 35% of the gross domestic product in these countries (Alibhai et al. 2017).

³ As of December 2021, 1 USD = ~1,000 RWF.

⁴ These effect sizes may seem large from the perspective of a larger company operating in a developed market; however, existing literature (Bloom and Van Reenen 2010, Bloom et al. 2013) shows that smaller, emerging-market firms (such as the ones in our sample) continue to lag behind when it comes to adopting best practices in business management and, therefore, have much more room for improvement. Further, our study shows that, in order to better meet customer needs, treatment firms are more likely to make improvements in their products and experiences based on the feedback they received. This could be another reason that we see large effect sizes from the adoption of a formal feedback process by small firms in our study. These treatment firms learn from the customer feedback and then take more effective managerial actions.

⁵ These effect sizes are similar in magnitude to other studies focused on small firm growth in developing-country contexts (Bloom et al. 2013, Anderson et al. 2018, Bruhn et al. 2018).

⁶ Evidence from the online reviews literature suggests that a J-shaped distribution is common for most company or product reviews with a handful of one-star (negative) ratings, nothing in the middle, and an overwhelming number of five-star (positive) ratings (Chevalier and Mayzlin 2006, Hu et al. 2009).

⁷ We select the group sizes based on a priori power calculations shown in Online Table A1 and the budget constraints for the project. The result is a reasonably powered study design for at least three reasons. One, our sample size is comparable to other studies on small firm growth in these contexts (Anderson and McKenzie 2022). Two, as described in Sections 3.1, 3.3, and 3.6, our intervention is sufficiently strong in terms of its design, implementation, and compliance rates (McKenzie 2021). Three, we reduce noise in the estimates of our dependent variables by using the ANCOVA specification as well as winsorizing values to reduce outlier influence (McKenzie 2012).

⁸ As the treated firms in our sample recorded the contact details for about 61% of their monthly customers, on average, the low-intensity firms effectively seek feedback from ~18% of their monthly customers and the high-intensity firms from ~42%

⁹ Note that the treatment manipulates the proportion of customers who are asked for feedback and not the absolute number. This might limit our ability to detect the impact of feedback intensity on firm performance.

¹⁰ This effect is a summation of the pure solicitation effect and an interaction between the solicitation and firm learning effects. To separately measure the pure solicitation effect, our original experimental design included a firm group seeking customer feedback but never receiving it. However, we were unable to retain this design because of sample size constraints.

¹¹ The COVID-19 pandemic creates a concern for field studies conducted during our examined period. Although our sample recruitment activities started before the initial outbreak of the pandemic, we paused these activities and data collection until after the government lifted any lockdowns. Our Online Appendix note provides further details.

¹² This randomization and recording step was repeated every month only for any new customers added to a treatment firm's

Contacts+ list. Once randomized into G1 or G2, customers continued in that same group for the duration of the study. In this way, the tapped and untapped groups were updated every month and only the tapped customers were added to a firm's feedback template.

¹³ See the American Productivity and Quality Center (2017) Process Classification Framework, version number 7.1.0. <https://www.apqc.org/process-frameworks>.

¹⁴ Thirty-three customers are, on average, about 61% of the firms' monthly customers (because, at the baseline, the firms reported an average monthly customer count of about 54 for their businesses).

¹⁵ Note that the untapped group (G2) was not engaged in the feedback process, exactly the same as the control group (G3). Changes the treatment firms made because of feedback-driven learning (discussed in Section 5.1) potentially led to spillover effects that influenced untapped customers.

¹⁶ Each element of the feedback vector for a firm is one if that specific area was highlighted in the customer feedback received by that firm and zero if not.

¹⁷ Each dimension of the vector of changes made by the firm is one if a change was made by the firm in that area and zero if not.

¹⁸ This pattern holds when using terciles as well.

¹⁹ This is conditional on customer recall (i.e., customers unable to recall the focal firm despite the heavy aid are excluded from this purchase analysis). This is because recall of a given store is required before the amount spent at that store can be provided. Nonetheless, only 267 customer observations (out of 1,434) needed to be excluded because of this requirement (i.e., only 18.6%).

²⁰ Kindly note that the FAA metric exists only for the treated businesses (with tapped and untapped customers).

²¹ The dependent variable is the *Overall Purchase Index*.

²² This pattern replicates when using terciles.

²³ We find that only 9 of the 272 businesses reported increasing prices because of margin pressures or the pandemic's impact. Thus, increase of product prices does not seem to be the major driver of the performance changes in the treated firms.

²⁴ Classified across the 31 areas of feedback as described in Table 1.

²⁵ Exchange value of 1 USD = 1,000 RWFs (as of December 2021).

²⁶ In addition, we also conducted the following robustness checks: stable unit treatment value assumption checks, attrition regressions, survival regressions, category-level purchase analysis, and checks for the impact on control firms near a competing treatment firm. None of these tests pose any threat to the validity of our study. We omit these analyses for brevity.

²⁷ The cost of goods is included as part of the dimensions of the quality vector.

²⁸ This model can be extended to include multiple cost parameters for different elements of the quality vector as well as to include continuous elements (instead of binary elements) in the quality vector.

²⁹ For the businesses in our study, the additional cost of feedback seeking is low given their small scale of operations and the data/phone costs being covered as a part of the research. Moreover, feedback-seeking costs have been diminishing given the advent of digital technologies such as internet messaging, artificial intelligence, and affordable digital connectivity.

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