Training and Subsidies vs Pay-for-Results in Spurring Digital Marketing Take-up and Small Firm Growth

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Abstract *(required)*

Digital marketing enables firms to overcome information barriers and other frictions that prevent firms and customers connecting across space. However, firms may not adopt this new technology because they lack knowledge, or because they are uncertain of the returns and consider it risky. Our key research questions are whether firms can be induced to adopt this technology, and whether they will benefit from doing so. A randomized experiment with 1,575 small firms will test the relative effectiveness of a standard input-based approach (training, assistance, and subsidies) against that of a pay-for-results approach in getting firms to adopt digital marketing, comparing each treatment to a control group and to a group that receives only information. Our main outcome is adoption of this technology as measured by firms setting up a business Facebook page and carrying out paid advertising. We will also assess how this technology affects firm growth, as measured by new customers, sales, and profits.

1. Introduction

Research question: background, importance and relevance

Firms in developing countries have often been slow to adopt new technologies (Verhoogen, 2021). One of the areas of most rapid innovation in developed countries has been the rise of digital technologies in helping firms to reach potential customers, which was accelerated further by disruptions to face-to-face commerce during the COVID-19 pandemic. The main problem this study will try to address is to understand why more microenterprises do not attempt to expand their customer base using the new technology of digital advertising. Lack of demand is a key constraint to the growth of many small firms, especially those run by women (Hardy and Kagy, 2019). Digital marketing, specifically Facebook advertising, offers a potential solution to this problem. It can help reduce information frictions that prevent customers and firms from matching with one another, thereby enabling transactions to take place that would not otherwise occur in a market with high search costs. However, for this to occur, firms must first take-up and use this digital technology. Firm owners may not adopt this technology because they lack the knowledge of how to do so, or because they are uncertain of the returns and consider it risky, among other reasons. We aim to identify whether firms would indeed benefit from using a digital advertising platform, and to test the relative effectiveness of a standard input-based approach of providing training, personal assistance and subsidies against a new pay-for-results approach in inducing firms to take-up this technology.

We will do this through a randomized experiment with 1,575 microenterprise owners in Egypt. Egypt provides an interesting context with which to study this question. It has a large informal sector dominated by microenterprises, and very low levels of female labor force participation (23 percent in 2018).[1] Many of the women who do run small businesses operate out of their own homes, producing items such as clothing and prepared foods for very local markets. The consequence is that they have very few customers, and 94 percent of them say they could double output in a week if only they had more customers. Yet internet penetration has grown rapidly in Egypt, with over half the population now online, and over 39 million Facebook users in 2019 (Digital Marketing Community, 2019). This active online potential customer base therefore offers a new opportunity for firm owners to reach broader markets for their products.

However, despite high personal usage of Facebook among microenterprise owners, very few of them currently use it for business purposes, and fewer still pay for digital advertising. We set out a simple model of technology adoption that captures several key reasons why firms may not adopt: they may think the potential increase in revenues from adopting are low, they may be unsure of the returns and consider it too risky and/or ambiguous, they may be liquidity or credit constrained, they may be impatient and not want to pay the costs now and only gain the returns in the future, they may find it too costly to adopt because they lack the knowledge and skills of how to do so, or they do not adopt because they returns are indeed low

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[1] Source: http://datatopics.worldbank.org/gender/country/egypt,-arab-rep [accessed 29 January, 2020].

and they know that it would not be worthwhile for be business. The optimal policy response (including the option of not intervening at all) will then depend on which combination of these factors is most important.

The most common policy approach for overcoming technology adoption barriers has been to try to overcome knowledge and financial constraints through a combination of training, personal assistance, and subsidies. Our first treatment arm will do this by offering microenterprise owners training on setting up a business Facebook page and conducting digital marketing and paid advertising through it, provide personal assistance in implementing this knowledge, and offer subsidies for paid advertising. This type of approach is similar to the use of agricultural extension services and input-subsidies in agricultural technology adoption, and to business training programs in getting firms to adopt the technology of better management practices (Bloom et al., 2016). The potential downsides of such an approach is that if knowledge is not the main constraint to take-up, it may end up requiring firms to spend time in training that adds very little value to them. Moreover, from a policy cost perspective, the costs of training are incurred for all firms that attend, even if only a small fraction of them go on to take-up the new technology.

In contrast, if the constraint is not that firms do not know (or cannot figure out) how to use this technology, but rather that they are unsure if doing so will be beneficial for their firm, then the demand for training might be low, and an alternative intervention which deals with the riskiness of returns may offer more potential. In the agricultural domain, this is commonly done by offering farmers insurance (e.g. Karlan et al, 2014). However, it has proven more difficult to offer insurance to microenterprises (Groh and McKenzie, 2016), and it seems particularly challenging to adequately insure firms against the risks of a new technology not yielding the expected return. Measuring the return to adopting digital marketing will be challenging enough in an experiment with hundreds of firms, and is likely to be extremely difficult for any single firm to accurately assess, and thus to contract against. Lewis and Rao (2015) show that even large U.S. firms with millions of customers find it difficult to measure the returns to advertising. Instead, our second treatment arm tests the effectiveness of pay-for-results as a way of lowering the risk in investing in a new technology. This will offer firms a guaranteed payment if they set up a business Facebook page, and further guaranteed reimbursements of their first few months of paid Facebook advertising. This increases the return and lowers the risk of trying out this technology, and because the costs are only incurred for firms that adopt the new technology, may be more cost-effective as a policy tool. These firms will also be provided an information booklet that provides them guidance on how to do digital marketing if they wanted to. This treatment arm provides an upper-bound of what an insurance product could achieve, since an insurance product would only pay out the amount we are paying in the case of complete failure of the marketing efforts.

Pay-for-results is a new intervention for small firms, but the idea has precedents in other domains. A notable example is advance market commitments for vaccines, whereby a government or funder commits to buying a certain number of vaccines at a set price from any company that manages to produce a new vaccine for some specified disease, thereby alleviating uncertainty about what the demand for these vaccines might be that would otherwise prevent investment in research and development (Kremer et al, 2015; USAID,

2017). In the context of jobs and training programs, the idea is being used to help reduce the risk of governments investing in training that does not end up improving employment outcomes. For example, the World Bank is piloting a Development Impact Bond in Palestine, in which social investors pay upfront for youth to undergo training programs, and then are only repaid if these youth secure employment at the end of training, shifting this risk away from the government.[2] Zanola et al. (2021) provide a second example from Ethiopia, where vocational training providers were paid based on whether trained youth passed an independent skills test, and whether they were in paid jobs at least four months after training. Pay-for-results also shares similarities with conditional cash transfer programs, in which payments are only made if households undertake investments in health or education that policymakers are trying to encourage.

A third treatment arm will provide an information booklet to the participants with no additional support or subsidies. This arm will allow us to test directly whether the information friction itself is the limiting barrier. By comparing the information only arm to the pay-for-results arm we will be able to directly assess the incentive/insurance aspect of technology adoption, as both groups will get the same technical support (the booklets). We will also be able to compare the information only arm to the control group which will give us indications regarding how important the information itself was. While we know that the way information is presented is an important consideration for utilization, this arm will serve as a useful low-cost benchmark relative to the control group.[3]

Our randomized experiment will randomly allocate microenterprises to receive either (1) an input-based approach of training, personal assistance and subsidies; (2) the new pay-for-results treatment; (3) a simple information treatment to test if information alone is enough; or (4) serve as a control group. We will then measure impacts on whether firms take up this digital technology. Furthermore we will use the random variation induced in technology use to assess whether digital marketing in turn leads to firm growth.

This research will contribute towards understanding the effectiveness of policies to spur technology take-up in small firms. Recent reviews of small firm interventions are provided by Quinn and Woodruff (2019) and Jayachandran (2020). Neither review contains any discussion about technology adoption, highlighting the paucity of evidence about these types of interventions.[4] Verhoogen (2021) does provide a recent review

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[2] See https://www.worldbank.org/en/news/feature/2021/09/08/palestinians-benefitting-from-jobs-and-training-despite-covid-19 [accessed November 8, 2021]

[3] It's possible that those in the pay-for-results arm may manage to engage in digital marketing without using the information by finding ways to learn on their own. We will include questions about this in the follow up surveys to assess the usefulness of the information provided.

[4] Two recent studies which examine technology diffusion and use in small firms are Hardy and McCasland (2021) and Kelley et al. (2019). Hardy and McCasland (2021) study a new technology for weaving, which produced products for which there was little market demand. They therefore artificially increase demand to look at the diffusion of technology. Kelley et al. (2019) examine a monitoring technology for transportation firms in Kenya, but only include individuals in the sample conditional on installation of the technology. This design makes it so that they cannot test what fosters technology take-up.

of technology upgrading in developing country firms, highlighting the slowness of technology adoption. His focus is on larger firms, and perhaps, as a result, the role of risk and uncertainty is not discussed as a key barrier to adoption. Instead he delineates barriers to take-up into three categories: the output side, which considers the role of consumer preferences and competition; the input side, which considers the role of credit and input market constraints; and the role of know-how, or lack of knowledge and organizational issues in larger firms.[5] He concludes that while export demand, competition, and reductions in the cost of imported inputs all play a role, lack of know-how is often a key constraint to adoption. Our interventions aim to address this knowledge constraint, while also testing the role of interventions to address risk and uncertainty in technology take-up decisions.

A second contribution is to the growing experimental research on interventions to spur firm growth in developing countries. Much of this literature has focused on supply-side interventions directed towards alleviating input constraints in microenterprises. This includes grants (e.g. de Mel et al, 2008; Fafchamps et al, 2014), business training (summarized in McKenzie 2021), formalized assistance (summarized in Bruhn and McKenzie, 2014), wage subsidies and subsidized apprentices (de Mel et al.,2019; Hardy and McCasland, 2018), and access to bank accounts (Dupas and Robinson, 2013). These supply-side interventions have helped alleviate constraints on input markets, and in some cases have allowed microenterprise owners to grow their incomes. However, they have rarely resulted in firms adding employees and experiencing sustained high growth, and the effects have been particularly limited for female-owned firms.

A key reason for the limited impact of many supply-side interventions is that firms may lack sufficient demand for their products to expand. Demand may be particularly likely to be a constraint for micro and small firms whose business is limited to consumers in their local markets. Our work will contribute to a small literature which stresses the potential of demand-side interventions to help firms grow. A first example is Atkin et al. (2017b), who helped connect rug producers in Egypt to foreign markets and found this resulted in quality and profit improvements. A second example comes from Hardy and Kagy (2018), who provide orders to garment firms in Ghana, and find that a lack of demand is particularly an issue for female-run firms. Ferraz et al. (2016) find that the demand boost from winning a government procurement contract leads to firm growth in Brazil. These existing demand interventions intervened to boost demand by directly linking firms to specific clients (and even more directly by being the client). A scalable solution requires giving small firms the tools they need to expand their customer base by themselves. Teaching firms to market their products better offers this possibility, with Anderson et al. (2018) finding that marketing training helped South African firms to expand.

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[5] For example, Atkin et al. (2017a) study the adoption of a new cutting technology in making soccer balls, and point to the problem of misaligned incentives within large firms in explaining low take-up. This constraint does not arise for the self-employed, and so cannot explain low take-up in our setting.

2. Research Design

A simple model of technology adoption

We sketch a simple model of the decision of firm owner *i* to adopt the digital marketing technology of using Facebook for business. Given general efficiency A, capital K, and labor L, we assume the profits of firm *i* in period *t* can be written as:

$$\pi\big(A_{i,t},\ K_{i,t},\ L_{i,t},\ M_i\big)$$

Where digital marketing M_i is 1 if firm *i* adopts digital marketing, and 0 if it does not.[6] A firm owner will then adopt this technology if the expected discounted value of the net benefits from doing so exceeds the costs. That is, they will adopt if:

$$\sum_{t=1}^{T}\beta\delta^t\,EU\big(\big[\pi\big(A_{i,t},K_{i,t},L_{i,t},M_i=1\big)-\pi\big(A_{i,t},K_{i,t},L_{i,t},M_i=0\big)\big]\big) > C_{Money}+C_{knowledge}+C_{liquidity} \quad (1)$$

This simple framework captures several reasons why a firm may not adopt the digital technology:

1. *Their expected returns to doing so may be low* $E[(\pi\big(A_{i,t},K_{i,t},L_{i,t},M_i=1\big)-\pi\big(A_{i,t},K_{i,t},L_{i,t},M_i=0\big)$ is negative or small). This term will be positive if digital marketing enables firms to expand sales to new customers. There are three main channels through which we think Facebook advertising may enable firms to attract new customers. The first is through pure price competition – firms which enjoy cost advantages due to superior productivity or low input costs (high A in this model) may be able to overcome information frictions that prevent customers outside their local market knowing about their lower prices. This can generate new sales provided that goods are cheap to transport and/or the value of goods is high enough to make it worth consumers travelling to get to them. The second channel is through increased variety – firms which offer products which are slightly different to others on the market may be able to attract customers looking for differentiated products. The final channel is through alleviating asymmetric information concerns about vendor quality. Consumers who are wary about the quality of items may take online advertising as a signal of quality, and also rely on ratings left on Facebook by other customers. These channels then also differ in terms of where firm growth can come from – whether it is all business-stealing from higher-priced competitors, or whether it also comes from expanding the market by increasing variety and/or removing information asymmetries that prevent some transactions occurring. In the United States, Bronnenberg and Ellickson (2015) note that online sales have had a market expansion effect, by increasing convenience and product variety, so that gains to new entrants need not come from taking market share from incumbents, and they speculate that such channels may be more important in developing country markets.

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[6] For modelling simplicity, we assume that once the technology of digital marketing has been adopted once, the firm has access to this technology to use in subsequent periods too. This is true in terms of setting up the initial business Facebook page, whereas spending on digital advertising and updating this page can be variable inputs that can be adjusted each time period thereafter.

Our sample will span many sectors that could potentially vary in the channels that we think are likely to be most prevalent. We ask the firms to report which are the primary ways they compete for customers. For example we expect firms in the electronics sector is likely to have many standardized products, so that competition may foremost be on prices. Clothing is an industry where items are light and non-perishable, and firms also compete on variety. Prepared food products is one where there is both product differentiation, as well as asymmetric information about quality. Customers may be more willing to try a food if they can see positive reviews from other customers. But if firms are small, unproductive, and mostly rely on local connections to make sales, these gains may be small.

Expected returns may also be lower than actual returns for some firm owners, if they use incorrect information in forming their beliefs about these returns. It is also possible that the firms are correct in having low expected returns because this technology is not actually beneficial for their business.

2. *The returns to technology adoption may be too risky.* The returns to adoption of this technology will be stochastic. The risk preferences of microenterprise owners may therefore enter into the decision-making process through EU(). If returns are high, but uncertain, a risk-averse owner may therefore decide not to adopt the technology because of this risk, even in situations where a risk-neutral owner would do so.

3. *The returns occur too far in the future.* The costs of adoption are paid upfront, whereas the returns occur in the future. The discount rate δ and any potential time-inconsistency reflected by the parameter β will determine the extent to which this reduces the discounted expected utility of adoption.

4. *The costs of adopting are too high.* The costs of adopting do not just include the monetary costs (C_{Money}) of adopting (which could include hiring someone to set up a page for the owner), but also the costs of acquiring knowledge about how to use Facebook for business ($C_{knowledge}$), and the shadow value of capital for liquidity constrained firms, $C_{liquidity}$.

Most existing government support programs assume that the returns to the new technology are indeed high for targeted firms (1 is not the issue), and that the problem is simply that firms do not know how to adopt the new technology, or find it too expensive to do so. They therefore seek to reduce the monetary, knowledge, and liquidity constraint costs in reason 4. The first of our two interventions will follow this standard approach. In contrast, our second intervention aims to alleviate some of the first three problems, by improving the returns to adopting the technology and lowering the risk, as well as by making some of these returns occur sooner in time.

Intervention(s)

The study randomly assigns 1,575 Egyptian small businesses (whose selection method is described in the "Data" section below) at the individual level to one of the following four groups: 525 firms will receive the traditional input-based approach of providing training, assistance, and subsidies; 525 will receive a results-based approach of pay-for-results, 175 will receive a pure information treatment, and 350 firms will be a control group. Details of these interventions are as follows:

Treatment 1 (Training, Assistance, and Subsidies) consists of teaching firms how to use digital marketing, assisting them to set up a business Facebook page, and subsidizing their initial use of digital advertising. This intervention is intended to overcome knowledge constraints and enable learning-by-doing, thereby lowering the costs of adoption. The intervention will begin with 2 full-days of training using a digital marketing curriculum. This curriculum has been developed together with a local training consultant, Ahmed Ibrahim, based on materials from Facebook Egypt, and feedback from participants in two small pilots we conducted in December 2019, and updated based on additional pilots in Spring 2021. Training will be done by 5 trainers, who all have experience in IT, social media, and digital marketing, and went through a training of the trainers course on the content taught by Ahmed Ibrahim. Training will take place in training halls that are close to the firm, to ensure that the training location is close to the firm. We are also providing firms the opportunity to do the training online, since the COVID-19 pandemic has increased the demand for this option.

The course will be taught to small groups of 15 firms at a time, and includes an introduction to basic marketing ideas around customers, competition, and the role of digital marketing. It then provides a hands-on introduction to Facebook, discussing both why it is useful, and how to use it, including different types of marketing content. Appendix A provides more details on the curriculum and examples of content. During this training, each participant will be given help to set up a basic Facebook page. Following the course, a professional photographer we have hired for this intervention will come to their firm to photograph the business and their products for their page, and they will be assigned a support person who will work with them over the next three months, ensuring they are able to upload pictures to their page and helping troubleshoot any issues that may arise. They will also be given a manual with information providing a step-by-step guide to setting up a business Facebook page and advertising on it. Firms that complete the 2 day training will also be provided with a $100 Facebook advertising coupon that will be applied to their account at the end of the second day of training. The value of this voucher expires three months after it is applied to the account. The training is intended to take place within one month of the baseline survey.

Treatment 2 (Pay-for-results) consists of attempting to overcome the uncertainty firms face about the returns from adopting this new technology by paying them if they achieve certain measurable usage benchmarks. This also increases the absolute returns from adoption, and moves some of these returns closer in time to the time period in which costs of adoption are realized. Participants in this arm will be invited to a meeting in a central location where a member of the research staff will explain the details of this treatment arm to them. If they do not attend, they will be visited/called and have this offer explained to them.

They will be given the same information manuals as intervention 1, and then offered payment in three tranches for launching and using this new technology. The first payment of $60 (equivalent to the cost of the training and support) will be made conditional on them setting up a business Facebook page. Appendix B gives examples of the criteria needed for this first pay-out. They will then be given reimbursement of up to $50 for a first set of advertising, and reimbursement for up to $50 for a second set of advertising. They will be given a deadline of 3 weeks after the offer to set up their initial page, and 2 months to use the advertising pay-for-results. The payments were calculated to directly line up with the costs of treatment 1, with the training and support costing about $65 per trainee (we are allocating about $5 to those in treatment 2 for light touch technical support if they need it). The additional two payments of $50 each in advertising re-imbursements line up with the $100 voucher that is provided to those that complete the training in treatment 1.

Treatment 3 (Information only) consists of simply giving firms the information manuals also given to treatments 1 and 2. Its purpose is to detect whether there is an effect of the information component alone (that is, whether $C_{knowledge}$ in our above sketch model is the key binding constraint to adoption). The cost of the manual is approximately $5 per firm.

The *Control Group* will not receive any of the above interventions, and simply be interviewed at baseline and in the follow-ups. However, to the extent that they operate Facebook business pages on their own, we will offer them reports on the analytics of these pages (that will also be given to those in the other groups) as an incentive for them to agree to share these analytics with our survey team at the time of our 12-month survey (the data on Facebook page and advertising performance is accessible going back to the creation of the page).

What do we learn from comparing the different arms?

Comparing the different treatment arms will provide insight into the relative importance of different aspects of the technology adoption decision.

Control vs Information Only: This will test the importance of pure information constraints on adoption. We expect the largest potential impacts from this intervention on the creation of the FB page for the business. The ads have a monetary cost for implementation and so we expect smaller impacts on ads, if any. It is possible that part of any effect we found could be due to a change in beliefs about the benefit of digital marketing due to the firm owner's belief that researchers wouldn't do all of this if the returns weren't high.

Pay for Performance vs Information Only: By comparing those in the pay-for-performance arm to those in the information only arm we will be able to recover the effect of the monetary incentives to engage in digital marketing. These incentives work along several dimensions – they decrease the perceived risk of the activity, they change the cost/benefit calculations for the activity, and they could be interpreted in a way that further increases firm owner expectations due to increased researcher effort. We interpret this arm as one where the impact is equivalent to the upper bound of the impact of a well calibrated insurance product that would provide firms funds to cover any loses from trying out digital marketing. As noted above, such a

product does not exist in the market, and would be logistically extremely difficult to operationalize given the difficulties measuring returns to advertising at the individual firm level.[7]

Pay for Performance vs Control: This will be a combination of the monetary incentives outlined above and the impacts of relieving any information constraints that may have existed.

Training+Subsidy vs Control: Comparing treatment 1 to control will inform us of the impact of providing training, personalized support and a voucher conditional on completing the training on adoption of digital marketing and advertising. By comparing it to the control group we will be able to assess the impact of the bundle on adoption of digital marketing.

Training+Subsidy vs Pay for Performance: By comparing the two main treatment arms to each other we will be able to compare the efficacy and cost-effectiveness of these two approaches to spurring digital technology take-up. As well as comparing the difference in the overall take-up rates between the groups, we will also examine differences in selection across who actually adopts the technology across the two groups. By looking at differences in selection into adoption by baseline characteristics we will be able to better characterize which aspects of the differences between the intervention bundles were most binding. For instance, if we found that those that took up in the training group were more likely to be risk averse, while those that took up in the pay-for-performance arm were more likely to be liquidity constrained, we would be able to showcase how the different arms worked through different mechanisms.

Training+Subsidy vs Information Only: We do not see this comparison as especially insightful from a theoretical perspective. While those in the information only arm will be provided the same booklet as those in the training arm, those in training will have much more support in understanding the content, and they will be provided a much stronger incentive to expend effort to do so since they will receive $100 in ad credit at the completion of the training. The other comparisons in the design provide clearer insights into the relative importance of different forces for firms adopting digital marketing. Nevertheless, this comparison may still be useful from a policy perspective, since the cost of the training and subsidy arm is 33 times that of the information-only treatment, and hence even a small effect of information-only may still be more cost-effective.

Random Assignment

Firms will be screened, surveyed, and selected for the study on a rolling basis (see description of data and sampling below). As a consequence, random assignment will be done by computer in batches. We will form batches of approximately 30-100 firms at a time, which will take firms surveyed in approximately a two week

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[7] In addition to the difficulty the firm owners themselves face in measuring the return to advertising given the volatility of sales, it would be even harder for an external insurance firm to measure this return. Firms would have incentives to understate revenues earned and claim the advertising was unsuccessful in order to trigger insurance payouts.

period from a particular geographic location. Firms will then be randomly assigned to the different treatment groups using the following procedure:

1. We form strata on the basis of survey batch (which implicitly stratifies on local geography and survey timing) and gender.
2. Within each of these batch-gender strata, we will sort firms based on our predicted likelihood of the firm setting up a business Facebook page and doing some paid advertising over the next three months if given treatment 1 or 2. To begin with, we use data from firms in Nigeria and our priors of key baseline variables that might predict this predicted likelihood to form it as follows with the first batches of baseline data:
Predicted Likelihood of Business Facebook = 0.1 * age<30 + 0.05*age between 30 and 39 + 0.1*university education + 0.05*completed secondary education + 0.1*has personal Facebook account

Once we have outcome data available, we will update this prediction for future batches using the actual data and a lasso on baseline variables to get a parsimonious model for predicting Facebook take-up.

This procedure attempts to minimize the variance of outcomes within a stratum and consequently increase statistical power. Since the probability of treatment within a stratum does not change, this procedure does not affect inference in the way adaptive experiments do.

3. We will form *nonuples* (groups of 9 firms at a time) on the basis of this predicted likelihood, and then randomly allocate 3 firms to treatment 1 (training, assistance and subsidies), 3 firms to treatment 2 (pay-for-results), 1 firm to treatment 3 (information only), and 2 firms to control within each nonuple. This random assignment will be done by computer, using Stata's *randtreat* command.

Blind allocation of treatment assignment is not possible, so we will attempt to minimize the likelihood of Hawthorne, John Henry, and Experimenter Demand Effects in several ways. First, participants are explicitly told that there is limited capacity and financing available for the training course, and that selection is made randomly. This should reduce the likelihood that they infer a signal about the promise or viability of their business from whether or not they are selected for treatment. Second, our surveys are explained as general surveys on microenterprises, and ask about a full range of microenterprise activities, and not just their digital marketing. Digital marketing questions will be asked after obtaining key profit and sales questions, to reduce the salience of the treatment when reporting firm outcomes. Finally, in the follow-up survey, some of our key outcome measures will be objectively verifiable (e.g. whether they have a business Facebook account, how much paid advertising they have done).

To bound how important experimenter demand effects could be on the number of new customers achieved through digital marketing, and on sales, we will employ the weak demand approach of de Quidt et al. (2018).

This will involve randomly selecting 10 percent of our sample to say "We expect that participants in our pilot will have more customers and sales than they otherwise would" before introducing the customers and sales questions, and 10 percent to receive the opposite signal "we expect that participants in our pilot will have fewer customers and sales than they otherwise would". Comparing the means of these two groups will provide bounds on how large experimenter demand bias could be.

Table 1 provides a pre-specification of the variables we will use to examine baseline balance on observables, and illustrates this for our first cohorts that were enrolled after the onset of the Covid-19 pandemic[8], for a total of 267 firms. We discuss the characteristics of these firms further in the Data section below.

Hypotheses

(PH1) Primary Hypothesis 1 (Take-up of Digital Marketing): Our two main interventions (training, assistance and subsidies; and pay-for-results) will induce firms to adopt and use business Facebook, while the information treatment alone will not.

This hypothesis will be tested through measuring treatment effects on the following outcome measures which capture the extensive, intensive, and quality margins of usage, measured in both the three and twelve month follow-up surveys:

1. *Business Facebook account:* This is a binary variable which takes value one if the firm has, and can prove by showing us, a Facebook account dedicated to their business, and 0 otherwise.
2. *Quality of Business Facebook page:* this is a count of the number of key digital marketing features (out of 8) that the business has on its business Facebook page: (a) Telephone number for firm provided; (b) Email address of firm provided; (c) Business address provided; (d) operating hours provided; (e) clear and attractive photograph of business premise or product shown; (f) examples of products available for sale provided on page; (g) post made in last month; (h) space for customer feedback provided. This will be coded as 0 for firms without a Facebook account.
3. *Business has conducted paid advertising in past three months:* This is a binary variable which takes value one if the firm has, and can prove having done, paid advertising on Facebook in the past three months, and 0 otherwise.
4. *Total amount spent on paid advertising in the past three months:* This variable will be winsorized at the 99th percentile, and will be reported in Egyptian pounds. It will be coded as zero for firms without a Facebook account.
5. *Index of Facebook analytic measures:* these measures will be collected from Facebook analytics for users, and will be an index of standardized z-scores of the following measures:
    a. *Engagement, as measured by total likes in past month to Facebook page.* This variable will be winsorized at the 99th percentile, and coded as 0 for firms without a Facebook page.

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[8] We initially enrolled 90 firms in a pilot in December 2019. Due to the onset of the COVID-19 pandemic we were unable to follow up with these firms so we consider them to be a logistical pilot and they will not be part of our experimental sample.

b.   *Total Reach, as measured by daily total reach averaged over past month:* This variable will be winsorized at the 99th percentile, and coded as 0 for firms without a Facebook page.

c.   *Paid Reach, as measured by daily paid reach averaged over past month.* This variable will be winsorized at the 99th percentile, and coded as 0 for firms without a Facebook page.

6.   **Aggregate Index of Facebook Take-up:** This is an index of standardized z-scores of outcomes 1 through 5,and is intended to provide a summary measure of take-up. If we find statistically significant differential reporting of facebook administrative data by treatment group we will not include items from outcome 5 in this index to protect against bias.

(PH2) Primary Hypothesis 2 (Digital Marketing Spurs Firm Growth): The digital marketing treatments will enable firms to reach new customers, generate additional sales, and grow.

This will be tested by measuring the treatment effects on the following outcome measures in the three and twelve-month surveys:

1.   *Number of customers in the past week:* this will be winsorized at the 99th percentile.

2.   *Sold goods to a customer who heard about the business through digital marketing:* the business has sold goods to at least one customer in the past three months who mentioned the firms Facebook page or a promotion found through Facebook. This is a binary variable taking value 1 if they have, and 0 otherwise. Experimenter demand effects will be tested on this variable, as detailed above.

3.   *Percent of sales going to customers that came from the digital marketing channel.* This will be constrained to be between 0 and 100 percent, and is intended to measure the extent to which the business expands its market reach.

4.   *Percent of sales going to customers who live at least 1km from the business.* This will be constructed as 100 minus the percent of sales going to customers who live locally (within 1 km) of the business, and will be constrained to be between 0 and 100 percent. This is intended to measure the extent to which the business expands its market reach, although we note that this may be difficult for firms to estimate and so we will add an additional question regarding how confident the owners are about this variable. Our previous experience asking this question in other countries has been that firms often have a good sense of what share of customers are local to their neighborhood versus coming from further afield. In our baseline data collected to date, firms report an average of 36% of sales are to customers within 1km.

5.   *The Inverse Hyperbolic Sine of Total Revenue in the Past Month:* this will be measured as the inverse hyperbolic sine of the response to a direct question on how much the firm earned in the last calendar month. Sales will be winsorized at the 99th percentile before taking the IHS transformation in order to reduce the influence of extreme values or data entry errors. Sales will be coded as 0 for firms that are closed. Experimenter demand effects will be tested on this variable, as detailed above.

6.   *The Inverse Hyperbolic Sine of Total Profits in the Past Month:* this will be measured as the inverse hyperbolic sine of the response to a direct question on how much the firm earned in profits in the

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last calendar month. Profits will be winsorized at the 99th percentile before taking the IHS transformation in order to reduce the influence of extreme values or data entry errors. Profits will be coded as 0 for firms that are closed.

7. ***Aggregate Index of Firm Growth:*** This is an index of standardized z-scores of outcomes 1 through 6, and provides a summary measure of firm growth.

Note on winsorization: the reason for winsorizing is to reduce the influence of extreme observations or potential data entry errors. When baseline values of an outcome are available, we will winsorize based on changes rather than final levels. For example, a firm that was earning 10,000 pounds in sales, and now earns 12,000 pounds is less likely to be an error or to exert as much influence on regression estimates (given the baseline value is included as a control) as a firm that was earning 200 pounds and now reports earning 10,000 pounds.

The use of the inverse hyperbolic sine transformation has two purposes. The first is that we believe it more plausible that the intervention will have a similar treatment impact on values in percentage terms across firms of different sizes than a similar absolute impact. This transform is similar to a logarithmic transform, so that impacts can be interpreted in percentage terms. Secondly, the transformation improves power by reducing the influence of outliers. Since the use of the I.H.S. transform has some drawbacks in terms of interpretability when there are zeroes, we will also examine robustness to an alternative transformation, which is the percentage change in sales or profits, defined as follows:

- For firms which have closed down, the percentage change is coded as -100%.
- Firms which report positive profits or sales at both baseline and follow-up will have percentage change calculated as 100*(follow-up value-baseline value)/baseline value. This will be winsorized at the smaller of the 99th percentile or 1000 percent, so that results are not completely driven by firms that have large percentage changes on a very small base.
- Firms which had zero (or negative) sales or profits at baseline will have percentage changes calculated relative to the level of sales or profits of a firm at the 10th percentile of those firms reporting positive sales or profits at baseline.

Secondary Hypotheses

Our secondary hypotheses concern who will benefit most from the different interventions, the impacts of the interventions on other types of marketing, and the impacts on other firm outcomes.

(SH1) Secondary Hypothesis 1 (Other Marketing Impacts): The interventions will not cause firms to cut back on other marketing efforts or worsen their other marketing practices.

We test this hypothesis by measuring the treatment impacts on the following secondary outcomes:

1. *Use of other digital marketing methods:* This is the proportion of the following other digital marketing methods employed by the firm (all are binary variables, and are also coded as 0 if the firm is closed), and are measured on the follow-up surveys:
    a. *Has a business webpage*

b. *Used Whatsapp for business in past three months*
c. *Used Instagram for business in past three months*
d. *Used an e-commerce platform such as Jumia, Souq , Yaoota, or Waffarha for business in the past three months.*

2. *Non-digital marketing practices.* This is the proportion of the following non-digital marketing practices employed by the firm in the past three months (all are binary variables, and are also coded as 0 if the firm is closed):
   a. Visited one of their competitors' businesses to see what prices they are charging
   b. Visited one of their competitors' businesses to see what products they have available for sale
   c. Asked an existing customer whether there are any other products they would like the business to sell or produce
   d. Talked with a former customer to find out why they have stopped buying from the business
   e. Asked a supplier about which products are selling well in their industry
   f. Used a special offer to attract customers
   g. Has done any form of non-digital advertising, such as using flyers, sales calls, paid advertisements at community events, etc.

(SH2) Secondary Hypothesis 2 (Who does the intervention work best for?) The training, assistance, and subsidies treatment will be most effective in encouraging take-up for those firms for which knowledge or finance were the constraints to take-up, whereas the pay-for-results treatment will be most effective in encouraging take-up for those firms for which risk aversion and uncertainty about the expected returns were the constraints to take-up of digital marketing. Take-up will also vary with gender, age, firm size, access to technology, interest of the owner, and sector/type of product competition.

We will test this hypothesis by carrying out the following pre-specified probit of the likelihood of adopting a business Facebook page among those offered treatment, separately for each treatment group, as a function of the following variables (all measured at baseline):

- *Knowledge:* years of schooling; says not knowing how to set up a Facebook page is one of the two main reasons for not using.
- *Financial constraints:* is a beneficiary of a government social assistance program; says that Facebook is too expensive to use as one of two main reasons for not using.
- *Returns uncertainty and expected returns:* risk averse (measured by the score from 0 to 10 on a standard risk aversion question used in the literature), says that they do not think Facebook will bring any benefit to the firm as one of two main reasons for not using; says that they are uncertain about whether or not Facebook would help their business as one of two main reasons for not using it.
- *Gender:* dummy variable for being female
- *Age and Age squared:* younger entrepreneurs are hypothesized to be more likely to adopt.
- *Firm Size:* number of paid employees, log sales.

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- *Access to technology:* Owns a computer, has an internet connection at home
- *Interest in expanding:* dummy for the firm owner wanting to grow their business to have more employees than they do now.
- *Type of competition:* dummies for whether the most important way they compete is on price, and on quality, and variety.

In addition to a probit, we will also run a lasso regression with the full set of baseline variables specified in Table 1 to choose a more parsimonious set of predictors of who will take-up digital marketing. We also specify below the treatment effect heterogeneity analysis that we plan. Understanding how take-up differs across groups will further help us in understanding how impacts on firm outcomes may differ across treatments.

(SH3) Secondary Hypothesis 3 (Impacts on other outcomes) If digital marketing is successful in getting firms to expand their customer bases and grow sales and profits, it may have broader impacts on the firm and its owners. We expect impacts on firm survival to be small in the short-run, but there may be impacts over 1 year. Firms may also introduce new products and innovate. The other three outcomes we consider are of particular interest to our funders, although our prior is that any changes in these outcomes will take longer to materialize than our current funding period:

1. *Firm Survival:* Digital marketing, by boosting sales, may make firms more likely to survive. This will be measured by a binary variable that takes value 1 if the firm is still operating, and 0 if it has closed. For any firms which can not be located or interviewed, cross-reports from family members and neighbors will be used to code whether the business is still operating.
2. *New product or service innovation:* A binary variable, taking value 1 if the firm introduced a new product or service in the past three months, and 0 otherwise.
3. *Informality:* Digital marketing, by making firms more visible and helping them grow, may lead some informal firms to formalize. This will be measured by (a) whether the firm has an enterprise license; and (b) whether the firm has a tax identification card.
4. *Firm employment:* Sales growth may enable firms to expand in size to the point that they add workers. This will be measured by the number of paid workers, winsorized at the 99th percentile.
5. *Female empowerment (measured for female business owners only):* women who can expand their customer base and grow their businesses may increase their empowerment. This will be measured by an index measure of female empowerment, which will be developed through field testing and piloting and then added to our AEA RCT registry entry prior to the 1 year follow-up survey.

Basic methodological framework / Identification strategy

The study is conducted as a randomized experiment. We discuss in the empirical analysis section the planned estimation methods

Context: Egypt and COVID-19

We originally designed this experiment prior to the onset of the COVID-19 pandemic, and had managed to conduct a small logistical pilot before the pandemic hit. Early on in the pandemic, Egypt instituted partial lockdowns, social distancing, and capacity restrictions in public spaces, which meant that it was not feasible to implement training. These restrictions have been relaxed over time, and as vaccinations have started to roll out, businesses are still operating despite an uptick in virus cases associated with the Delta variant.

Consumers reacted to these restrictions by increasing their online shopping. A Mastercard survey of Egyptian consumers found that 75% had increased their online shopping during the pandemic, with fashion, electronics, healthcare and groceries seeing the biggest rise in online sales.[9] Moreover, social media and particularly Facebook were the main platform for consumers to find new sellers – 83% of respondents said they had discovered new sellers through Facebook. The pandemic has therefore accelerated consumer receptiveness to online sales and advertising. However, despite this demand effect, it appears that most microenterprises in Egypt have yet to adopt this digital technology. We therefore believe that, despite the challenges the pandemic has caused for getting this work underway, it has made the interventions we are trying even more relevant.

Data

Sample

Selection of the Sample

The sample for this study will be drawn from microenterprises operating across Egypt. We will use several recruitment channels including MFIs, local NGOs, training centers and through door-to-door outreach. It may also be boosted by a sample of clients of Egypt's Micro, Small and Medium Enterprise Development Agency (MSMEDA) around Cairo, although these will be a minority of the sample. The process for selection into the sample is then as follows. Our staff will meet with partner institutions and explain the study and the types of firms we are looking for. The partners will then circulate a message to their clients/community members, telling them they are looking for individuals interested in learning more about how to use digital marketing to grow their firms. Those individuals then will be contacted by our survey team and provided more information about the study and are checked for eligibility: have an existing microenterprise, age [18 to 50]; whether they have a device such as mobile phone, tablet or computer; and interest in taking part in training. Those who are interested then do a baseline survey with our survey team.

Using the data from this baseline survey, we then call back firm owners to check that they can be reached and are interested in training on set dates. Among those interested, we further screen microenterprise owners to be working between 15 and 70 hours per week, to not already be doing paid Facebook advertising or already using Facebook to advertise for customers, to have positive revenues, and to have revenues that are not outliers (trimming approximately the top and bottom 5 percent by gender and branch).

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9   https://newsroom.mastercard.com/mea/press-releases/72-of-egyptian-consumers-are-shopping-more-online-since-the-start-of-pandemic-reveals-mastercard-study/ [accessed November 9, 2021].

Although this sampling approach does not yield a representative sample of all microenterprises in Egypt, it gives a sample of the relevant population for policy efforts to increase take-up. This approach of working through local partners and having firms self-select into a program based on some initial interest is commonplace for many business support services, and is the approach that the government and partners would use if they were to scale the interventions up after this experiment. We will examine how the characteristics of our sample compare to the average Egyptian microenterprise by using other Egyptian datasets.

Our first baseline batch of data on 267 is outlined in Table 1 sets out descriptive statistics for this sample. Table 1 is intended as a pre-specification of the variables we will provide in a balance table and table of descriptive statistics but is only a rough approximation of the characteristics of the final sample. With this caveat in mind, we see that the average firm owner is 34 years old, 30 percent have university education and a further 54 percent have finished secondary schooling, most (90%) have personal Facebook accounts, and only 16 percent are in government assistance programs. The businesses are largely informal (only 23 percent are registered), almost half (45 percent) are operated out of the home, and average monthly profits are about 2700 Egyptian pounds (US$171). Few firms have a business website, but Whatsapp is used for the business by just over half of the owners.

Power calculations

Statistical power is high to measure the impacts of our different interventions on digital technology take-up. We will screen out firms that are already using Facebook for digital marketing, and since our first follow-up survey will take place after three months, expect few of the control group firms to set up a Facebook business page between baseline and follow-up. If we assume 5 percent of the control group do, then we have over 80 percent power to detect a 5 percentage point effect of either of our two main treatments on this likelihood (comparing 525 treated to 350 controls), and 80% power to detect a 6 percentage point effect of the information treatment alone (comparing 175 treated to 350 controls). We will also have power to detect differential take-up by gender. For example, with 262 male firms and 262 female firms getting the business training treatment, we have 82% power to detect a 11.5 percentage point difference in digital marketing take-up (e.g. if 30% of women take it up, versus 41.5% of men). We also have high power to measure the difference in impact between the training and subsidy treatment and the pay-for-results treatment. For example, if 65% set up a business Facebook page under pay-for-results, we have over 80% power to detect an 8 percentage point difference under training plus subsidies.

There are relatively few interventions offering small firms technological improvements against which to benchmark our take-up rate effect sizes, but our minimal detectable effect sizes appear to be below what has been found in other studies. At the low end of technology adoption, Atkin et al. (2017a) find that only 14% of large soccer ball manufacturers take up their new innovation, which they show appears to stem from principal-agent issues within the firm. Reducing these gives them 38% take-up in a second experiment. In our microenterprises, the owner will be the one adopting, so these principal-agent issues will be less of a problem. In Nigeria, Anderson and McKenzie (forthcoming) find firms that are given treatments to hire a marketing or accounting worker or to use a professional marketing or accounting firm, experience 20 to 23

percentage point increases in the likelihood of having a business Facebook page. Since that intervention wasn't explicitly directed at digital marketing, we anticipate higher take-up rates in our study. We welcome suggestions from reviewers for other studies that intervene to get firms to adopt new technologies to enable benchmarking our take-up rates against.

Power for measuring impacts on sales and customers depends on how heterogeneous the sample is, which we will only know after baseline, but preliminary estimates suggest minimal detectable effect sizes are not massive. We will have better information for calculating the power to measure an impact on firm sales after the baseline survey has been administered, and will refine our calculations accordingly. But as a preliminary calculation, using data on Egyptian microenterprises in the clothing/textiles industry collected in 2012 by Groh and McKenzie (2016) we see that there is tremendous heterogeneity, with the standard deviation of monthly sales (5,202) more than double mean sales (2333). This shows that we will need to screen out very large and very small firms in constructing our sample – removing the top and bottom 10% in terms of baseline sales gives a standard deviation of 1209 and mean of 1379. Mean log sales is then 6.85 with a standard deviation of 0.89. The autocorrelation in log sales over 3 months is 0.50. Using these parameters, we have 81.2% power to detect an ITT of 0.17 log points, or a 18.5% increase in sales when comparing 525 firms in a treatment arm to 375 firms in the control arm. If take-up of digital marketing is 65%, then this would require a 28.5% increase in sales for firms taking up the treatment. By way of comparison, Anderson et al. (2018) find a 64% increase in sales from their marketing training intervention.

We aim to maximize power further through the use of our stratified randomization, and pre-specified post-double-selection lasso to remove explainable variation in the outcomes (see methods below).

Data collection and processing

The key data sources are as follows:

1. *Baseline survey of 1,575 individual firms (January 2021-June 2022)*. The baseline survey is being conducted by Athar, an Egyptian survey firm, using survey tablets. Surveys are conducted in Arabic. The baseline survey collects basic demographic information about the owner, details of the location and sector of the firm, information about the customers, competitors, existing digital marketing efforts, use and interest in Facebook for business, business performance measures (including sales and profits), informality status, access to finance and capital, and follow-up contact information. We will recruit this sample through several channels including partner MFI's, training centers, NGOs and door-to-door recruitment.

2. *Administrative data on training attendance and performance payments (March 2021-September 2022)*. This data will be provided by Athar who will be implementing the training, and include days of attendance for firms invited to training, whether a photographer was able to visit the business, how often people utilized the troubleshooting support and topics addressed, and which payments in the pay-for-results treatment were paid.

3. *Three and Twelve month follow-up surveys (beginning May 2021 for three month; ending June 2023 for 12 month):* These surveys will be face-to-face surveys administered by Athar to all 1,575

firms. The follow-up surveys will collect the pre-specified outcome measures outlined above. In addition, the three-month survey will ask some process-related questions to understand why firms did or did not take-up the various treatments. Qualitative insights from field visits will also be used to determine additional potential measures to add to the 12 month survey, which will be added in advance to the AEA registration entry.

4. *Administrative data on Facebook Page Performance (retrieved at 12 month follow up, data going back to creation of Facebook Page):* We will provide incentives for firms to share administrative data from their businesses' Facebook page. These data provide information about the number of views the page has had, the number of engagements (e.g. likes and comments), the amount spent on advertising, etc. The data can be disaggregated down to the daily level.

We will take the following measures to ensure data quality and minimize the risk of attrition (which is also discussed below). First, we will use the same survey firm for baseline and follow-up, to maximize trust in enumeration and the chance of re-locating individuals. Second, surveys will be done on tablets, with multiple consistency checks, and will be geo-coded and time-stamped to verify where and when surveys are done. Third, random callbacks will be done to a sub-sample to check data quality. In addition, as outlined above, we will employ the de Quidt et al. (2018) method to bound any experimenter demand effects on customer and sales outcomes.

Variations from the intended sample size

We separate this into three potential issues: baseline sample; non-compliance with treatment; and attrition in follow-up.

Baseline sample: Our plan calls for 1,575 firms in our baseline sample. We anticipate being able to achieve a baseline sample of approximately this size. If we struggle to get enough firms to agree to participate, or experience other difficulties in achieving this target number we have the flexibility to add additional partners or locations to build the sample to our desired size. This may increase the timeframe over which the baseline is measured, but since our recruitment and interventions are delivered in batches, any such delay will not affect our analysis. A second issue we are aware of in drawing the baseline sample is that it will be difficult to recruit and interview firms during Ramadan. We will therefore take a break during the baseline surveys during this month.

Non-compliance with treatment: There are two potential issues here. The first is whether everyone assigned to a particular intervention actually receives the treatment offer. Note that we conduct the baseline survey in batches, then randomize, and then deliver the offer of treatment to the selected firms. An alternative would be to deliver the offer of treatment at the time of the baseline, but this would give us less control over ensuring the correct treatment assignments are followed, and less control over the quality of the information provided about each treatment. Instead we will aim to keep the period between baseline and the offer of intervention short, and follow-up with in-person visits and phone reminders to ensure that as many firms as possible are informed of their treatment offer. We anticipate that we will be able to deliver the treatment offer to at least 95 percent of those assigned an offer.

The second issue is whether or not individuals take-up the treatments, given that they receive the treatment offer. Take-up of the pay-for-results intervention depends on whether or not firm owners who set up a business Facebook account claim the payment for these actions. We believe this will be high. Moreover, this is one of the advantages of pay-for-results – payment comes after the desired action, so to the extent that firm owners set up business Facebook and do not request the performance payment, it just lowers the cost of achieving the desired outcome. In contrast, for the training, assistance, and subsidies intervention, we need firm owners who are offered the training to attend. McKenzie and Woodruff (2014) report an average attendance rate of 65% in business training experiments. We aim to boost this rate by i) screening on interest in taking part in training (95% of those in our pilot data, described below, say they are interested); ii) organizing many of the trainings in collaboration with an organization these firm owners have an existing relationship and trust in (MFIs or NGOs); and iii) keeping the training short and at a convenient time, with personalized follow-ups, to ensure it works with their schedules.

The take-up rate of digital marketing is our primary outcome. However, our secondary outcome is the impact of digital marketing on firm growth (our second primary outcome), and this will depend on the take-up rate. If we get very low take-up from our initial treatments, we will therefore consider after our three-month follow-up whether there are additional interventions we can add to boost take-up before the twelve-month survey.

The third potential issue is *attrition* in collecting follow-up data. We will take standard measures to reduce this risk, including the use of the same survey company for the follow-up surveys, using questions on the baseline survey that ask for details of two other people that can help reach them if they move, and repeated visits to find those who cannot be interviewed. In a previous experiment in Egypt with microenterprises who Groh and McKenzie achieved a 98.9 percent follow-up rate in a 7-month follow-up of 2,961 clients. We therefore anticipate low attrition in this study as well, but discuss below our approach to dealing with attrition.

Pilot data

Pilot data from 263 firms that were recruited after Covid are presented in Table 1, and discussed above.

3. Empirical Analysis

Statistical methods and Statistical Model

Our main estimation will then involve estimating the following equation for a given outcome Y for firm *i* at time *t*:

$$Y_{i,t} = \alpha + \beta_1 Training_i + \beta_2 PayforResults_i + \beta_3 Information_i + \sum_{s=1}^{S} \delta_s 1(i \in s) + \gamma Y_{i,0} + \theta' X_{i,0} + \varepsilon_{i,t} \text{ (2)}$$

Where δ_j are randomization strata fixed effects (following Bruhn and McKenzie, 2009), $Y_{i,0}$ is the baseline value of the outcome of interest where available, and we will use Huber-White standard errors for the $\varepsilon_{i,t}$. Note that this Ancova specification which controls for the baseline value of the outcome variable can boost power (McKenzie, 2012) for outcomes like sales and profits in which all firms have this baseline value (if baseline information is missing for some firms, we will dummy this out by setting $Y_{i,0}$ equal to zero for these firms, and then adding a separate dummy variable which takes value one if the baseline value is missing).

However, for our primary outcomes of Facebook take-up and usage, the baseline value will be 0 for almost all firms, and so to further boost power, we will use the post-double-selection lasso approach of Belloni et al. (2014) to choose a set of baseline control variables X. This offers a transparent way of deciding which baseline variables to control for and offers protection against chance imbalances arising in the randomization as well as against imbalances in observables arising from any selective attrition. We pre-specify here that we will implement this using the *pdslasso* command in Stata, using the default data driven penalization term, partialling out the baseline outcome and randomization strata fixed effects, and then using the set of baseline covariates specified in Table 1 as inputs.

Note that β_1, β_2 and β_3 will then give the intention-to-treat (ITT) effects, which are the impacts of being offered our various treatments. For the pay-for-results and information treatments, we believe that we will be able to deliver the treatment to almost 100 percent of those assigned to treatment, so that the ITT will be equivalent to the treatment effect on the treated (TOT) for these treatment groups. For training, we can also estimate the impact of actually attending training for those who take it up when offered (the TOT), by replacing assignment to training with receipt of training in equation (2), and then instrumenting receipt of training with treatment. The exclusion restriction here will be that the offer of training by itself does not change firm outcomes, which appears plausible in this setting.

We will then also test $\beta_1 = \beta_2 = \beta_3 = 0$ as a joint test of whether any of the three treatments has an effect.

Since we will have outcome data at three months and twelve months, this raises the question of whether to combine data and average over multiple survey rounds to potentially boost power (as in McKenzie, 2012), or whether to estimate round-by-round treatment effects to examine the time path of treatment effects. We believe that the short-run and medium-run effects are likely to differ in magnitude, and so that our prime interest should be in examining the time path. This will entail estimating equation (2) round-by-round. However, in order to also test whether the treatment impacts differ over time, we can stack the data into a panel, and run the following regression for *t=1,2*:

$$Y_{i,t} = \sum_{w=1}^{2} \alpha_w 1(t=w) + \beta_{11} Training_i 1(t=1) + \beta_{21} PayforResults_i 1(t=1) + \beta_{31} Information_i 1(t=1) + \beta_{12} Training_i 1(t=2) + \beta_{22} PayforResults_i 1(t=2) + \beta_{32} Information_i 1(t=2) + \sum_{s=1}^{S} \delta_s 1(i \in s) + \gamma Y_{i,0} + \theta' X_{i,0} + \varepsilon_{i,t} \qquad (3)$$

Where 1(t=w) is an indicator variable taking value 1 if the time period is *w* and zero otherwise. We can then test for equality of treatment effects over time by testing $\beta_{j1} = \beta_{j2}$ for *j=1, 2, 3.* The standard errors will be clustered at the firm level in this estimation to account for multiple observations per firm.

Note that β_1 and β_2 will give the treatment impacts of being offered our training or pay-for-results treatments on firm outcomes. We are also interested in estimating directly the extent to which using digital marketing through Facebook for the business improves firm growth. To estimate this, we will exclude the information treatment arm (since we anticipate it having weaker impacts on digital marketing take-up), and estimate the following instrumental variables regression:

$$Y_{i,t} = \alpha + \theta BusinessFacebook_{i,t} + \sum_{s=1}^{S} \delta_s 1(i \in s) + \gamma Y_{i,0} + \theta' X_{i,0} + \varepsilon_{i,t} \qquad (4)$$

Where we instrument the dummy variable for business Facebook use with the two assignment to treatment dummies *Training_i* and *PayforResults_i*. Under the additional assumption that the two treatments only affect

firm growth through the use of business Facebook, then θ will give the causal impact of digital marketing usage through Facebook on firm growth. The exclusion restriction here could be violated if (i) the training independently affects firm growth other than through digital marketing – which we will attempt to assess in part through measuring impacts on other marketing activities, and by directly asking firms at follow-up how the training affected the way they run their business; and (ii) if the pay-for-results had other impacts on the business, other than through Facebook use. The most plausible alternative channel here is through a potential wealth effect, if the payment for setting up a Facebook account is more than the cost to the firm of setting this account up (the advertising payments are directly tied to amounts spent on advertising). We will ask in our follow-up surveys about how much it cost the firm to set up their Facebook account, and attempt to bound the size of any wealth effect based on the effective wealth transfer and the cross-sectional return to capital.

Finally, we will also be interested in examining heterogeneity of treatment effects with gender and several other variables, as specified below. To estimate treatment effect heterogeneity with respect to variable Z (e.g. gender), we will include the level effect of the variable Z as an additional control in equation (2), and its interactions with each of the treatment effects.

Procedures for dealing with attrition, missing values, and outliers

We anticipate item non-response using baseline data to be low, and any missing baseline data will be dummied out when being used for controls in the post-double-selection lasso. That is, we will create dummy variables for having missing baseline data, and then replace the missing value with 0, including both variables in the control variable set.

Attrition in endline variables is much more of a potential concern, and we will use several approaches to attempt to mitigate this problem and to examine the robustness of our results to this issue. The most serious concern is that of survey attrition. We will mitigate this concern using the following procedures.

1. Screening participants on our ability to re-contact them. Before being randomized, all participants are called to check again their availability and interest in taking part in training at a given point on time. Anyone who cannot be reached a second time will not be included in the initial sample.
2. Collecting detailed tracking information at baseline: our baseline survey collects multiple forms of contact information for each individual, including their home and business addresses, their email address if they have one, their national id number, their personal phone number and firm phone number if they have a separate one, and full contact information for two people who can help locate them if they move.
3. We also can use the information collected by any of our partner institutions on changes in address to help re-locate individuals who cannot be found, as well as using their reputation with clients to help reduce refusal rates conditional on being found.

As noted above, in a previous experiment with ABA clients in Alexandria using similar tracking procedures, Groh and McKenzie (2016) achieved a 98.9 percent follow-up rate in a 7-month follow-up of 2,961 clients. We therefore anticipate the absolute levels of survey attrition rates to be low, especially at our 3-month survey. We will test for non-random attrition and non-random survey item non-response based on the baseline variables specified above for balance testing, and by treatment status. If we observe significant differences by groups, we will employ several approaches to examine the robustness of our results to this.

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These will include: i) Lee bounds to account for differential attrition; ii) imputation of the missing observations; and iii) inverse-probability weighting to account for differential attrition on observables.

We have three approaches to handling large outliers. First, many of our specified outcomes are binary outcomes (e.g. use Facebook for business or not), for which large outliers are not a problem. Second, for skewed continuous outcomes, we have specified in our outcome measures that we will winsorize these at the 99th percentile of levels or changes (to reduce the impact of the very largest outcomes), and thirdly, we will carry out the inverse hyperbolic sine transformation which also downweights the influence of outliers. Outliers can be genuine, or reflect measurement error, and so before any of this transformation, our field survey data quality protocols will implement automated checks in which large outliers in our specified outcomes are checked again for accuracy.

Multiple outcome and multiple hypothesis testing

We will use three different approaches to address different aspects of multiple hypothesis testing.

The first approach arises from multiple treatments. Young (2019) notes that many papers fail to take account of multiple testing arising from multiple treatments. Since we have three treatments, all of our outcome regressions will include an F-test that tests the null hypothesis that all three treatments are jointly zero.

The second and third approaches deal with issues arising from multiple outcomes. Our second approach to dealing with this issue is to i) pre-specify a limited number of primary outcomes, broken up into two domains (take-up and firm growth) by primary hypothesis, as set out above; ii) aggregate variables into pre-specified indices that are averages of standardized z-scores. In particular, we have a summary index measure of digital marketing technology take-up, and a summary index measure of our firm growth measures, as pre-specified above. Single-estimate p-values from this approach are then useful for understanding results in a pre-specified primary hypothesis domain, as well as for comparing results for this outcome to those for the same treatment and outcome in other studies. Finally, our last approach is to also provide sharpened q-values that hold constant the false discovery rates when testing multiple treatments against multiple outcomes. This will be used for examining the range of secondary hypotheses, as well as for our treatment heterogeneity analysis (specified below).

Heterogeneous Effects

Suri (2011) argues that a key reason why farmers do not take up new technologies is heterogeneity in the returns to these technologies. We likewise anticipate that there will be considerable heterogeneity in the potential returns to taking up digital technology, and plan to examine this heterogeneity in the following dimensions:

1. *Heterogeneity by gender of the owner:* there are a number of potential reasons why the impact will vary according to the gender of the microenterprise owner, although ex ante it is unclear whether we should expect the impacts of our treatments to be larger for male or female-operated businesses. Female-operated businesses are more likely to operate out of the home and face

demand constraints to expansion, and women may face more physical mobility barriers to advertising their products, making digital marketing particularly useful for them. This would suggest women should be more likely to take-up Facebook in their businesses, and that it may have higher impacts on their business growth. However, male owners may be more risk-seeking, may have greater computer skills to begin with (in our first baseline data, 72% of men say they know how to use email, versus 54% of women), and they run larger firms on average that may be more growth-oriented.

2. *Heterogeneity by whether knowledge is the main constraint:* we would expect training to be relatively more effective than pay-for-results for individuals for whom a lack of knowledge about how to use Facebook is one of the main reasons they don't use it in their business. We will therefore examine heterogeneity in treatment effects by whether they list lack of knowledge as the major constraint at baseline.

3. *Heterogeneity by whether access to finance is the main constraint:* we might expect that firms that are liquidity constrained may be more likely to benefit from the training arm due to the provision of the coupon upon the end of training as opposed to the reimbursement strategy of the pay-for-performance arm. We will therefore examine heterogeneity in treatment effects by whether they list lack of access to finance as the major constraint at baseline.

4. *Heterogeneity by whether return levels or uncertainty is the main constraint:* in contrast, the pay-for-results may be more effective for firm owners whose main reasons for not using business Facebook are that they think it will not be beneficial to their business, or that they are uncertain of the benefits of using Facebook. We will create a dummy variable which takes value 1 if either of these reasons is given at baseline as a key reason for not using Facebook, and 0 otherwise, and then examine heterogeneity with respect to this variable.

5. *Heterogeneity by type of competition:* we ask firms to rank the top 3 ways in which they differentiate their products from their competitors. We will characterize these ways into 3 main types of competition: price, variety & unobserved quality. We do not have strong priors over which type of competition will show strongest effects, so will test for equality of treatment effects across the three.

We will examine treatment heterogeneity for both take-up and impacts on firms, in each case interacting a dummy for the dimension of heterogeneity with each treatment in our estimation.

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5. Appendices

Appendix A: Facebook Training Content

<u>**DAY 1**</u>
- Topics in order:
    1. Introduction (1 hour)
    - Trainer introduces himself and the study
    - Basic introductions: Name, project name, whether they have a Facebook page etc.
    - Asking participants about their expectations:
    - After participants state their expectations, trainer tells them what they should learn by the end of the training
    - By the end of the current training program, the participant will be able to:
        1. Know the concept of marketing and its types.
        2. Enumerate the importance of electronic marketing in increasing the number of customers for projects.
        3. Create a professional Facebook page.
        4. Connect Instagram to Facebook page.
        5. Depict its product with good photography
        6. Promote publicly funded products.
    - Code of conduct during sessions (phones on silent, raising hands, not talking over someone else, mutual respect for each others' opinions)
    2. Marketing (1 hour)
    - **Marketing concept.**
    - Marketing is a group of processes or activities that work to discover customers' desires and develop a group of products or services that satisfy their desires and make profits for the corporation within an appropriate period of time.
      Marketing can be defined as the art of selling.
    - **Marketing types.**
        - Direct Marketing
        - Network Marketing
        - E-Marketing
        - Hierarchical Marketing
    - **The concept of E-Marketing and its importance.**

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- The concepts and meanings of e-marketing differ for many people and we will explain in this section about different concepts of e-marketing and names that we may use to understand the true meaning of e-marketing in the world of marketing

- **E-marketing tools.**
- E-Marketing via Search Engine Optimization (SEO)
- E-Marketing via Search Engine Marketing (SEM)
- E-Marketing via Social Media Marketing (SMM)
  - Increase customer loyalty to your brand significantly if you interact with them using social media channels.
  - Efficiently target a specific segment or category and know your customers' needs.
  - Find followers of your page and increase their number.
  - Quickly respond to followers of your page and know what they did in a short time.
  - Increase the number of visitors to your website and increase your ranking in the search engines by directing your followers in the communication channels
  - Socialize to your website indirectly.
- Advantages of E-Marketing:
  - Developing the relationship between clients in a very big way, where you can interact permanently with your existing clients and new clients arriving at your website.
  - You can use electronic marketing methods to study the market case about the hypothesis of marketing the product at the present time or to postpone its marketing and replace it with another product currently required in the markets.
  - Easily contact customers with you to obtain information about your service or the product you provide.
  - The ability to request a service or product via your website and deal directly via the Internet with the customer to obtain that service or product without fatigue, fatigue or research on the part of the customer.
  3. **Competition**
  - Explaining the concept of competition
  - Emphasizing E-Marketing as a tool
  4.Facebook
- Explaining to the participants the difference between a page, an account & a group (visually)
- Creating a business page
- To create the page, we also explain to the participants how to create an email & a Facebook account because they will be necessary to create a page
- Discussing the page's user interface (only looking at tools they necessarily need to know when applying a promotion)

- Settings
  - Page roles
    - Telling them about us being included in their page at an analyst capacity
  - Creating a URL for the page
  - Payment
    - Notifications centre
    - Ad-centre
    - Different types of posts that can be presented on the page
    - Managing promotions
    - The appropriate sizes of photos posted as a cover, profile picture or posts
  - We'll use an app on their phone to teach them and show them how to change the sizes of different photos
  - Practical application for 30 minutes.
    - The trainer states that he will display the interface of the page as well as the list of settings and they will be asked after the presentation about what was done during the explanation.
    - The interface display: incoming messages _ notices _ language _ publishing tools _ more. Help - publications and types - events - opinions - videos - community and groups - management of promotions.
    - General settings for the page _ female senders _ page roles _ payment processes-create URLs for user roles for the page _ electronic responses.
  - Questions (15 minutes)
  - How does language change?
  - How do you get your page title or its link?
  - How do you put an employee with you added to your page?
  - What are the types of publications?
  - How to create a post?

5. **Instagram:**

→(Instagram will be explained right after Facebook and before conducting an actual promotion so that participants will have enough information to ask all of their questions on the spot)

- Discussing the business uses of Instagram (in parallel to Facebook)
- The general instructions about:
- How to link the Facebook business page to an Instagram business page
- Apply this during training
- If they already have a business Instagram account, they will also link it to their Facebook page
- Basic settings on Instagram

6. **Discussing in detail the characteristics of a good photo:**

- Importance of:
- The dimensions of the photo

- The quality of the photo (even if it's not professionally photographed) makes a difference
- The lighting and the background
- Positioning the product in the most efficient way to grab customers' attention
  - Teaching them by application
- Photographing their products
  7. **Wrap up and review all information to make sure participants grasped everything**

DAY 2:

  8. **Facebook (Cont'd)**
- Review
- Creating a post together and boosting it
- Start discussing promotion and creating boosted content on Facebook
  o Promoting your business through the page
- Paid vs. unpaid ads
  - Different content to promote
- Posts
  o Of a certain product to be sold
  o Of a sale they're undertaking and would like to advertise
- Page itself
- Asking one participant to volunteer and promote a post for one of the participants to learn through application
  o In the process, teach them the settings of creating an ad:
  - Budgeting
  - The length of time for which the ad will be circulated
  - The intended audience
- Who do they think will buy their products?
  o Area
  o Age group
  - Discussing the importance of following up on the analytics of an ad
- Talk about different tools that could be used to do so
  o Likes, shares & comments
  o Looking at the analytics of the reach of the boosted ad
  - Discussing the importance of engaging with their posts and responding to any inquiries
- Following-up with & Responding to clients
- How to send automated messages/messages through whatsapp
**Remind them about us being included in their page at an analyst capacity only
- Whatsapp Business
  1. Differentiate between WhatsApp business and WhatsApp individuals
  2. Download WhatsApp business together and create an account
  - Business name must be unified for all media platforms
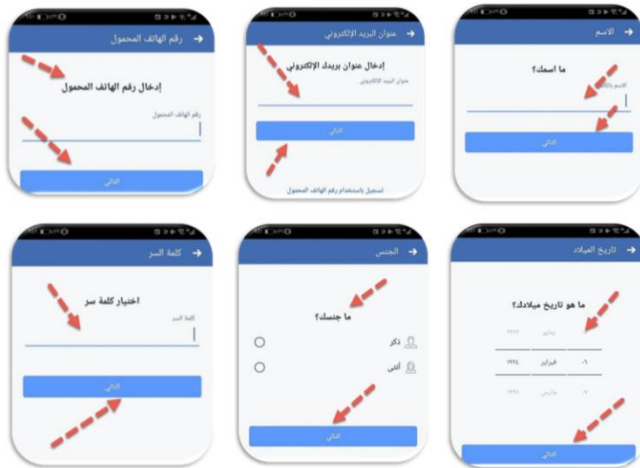 - Adjusting the settings for the WhatsApp business account with participants

- Discussing a broadcasted ad through Whatsapp and learn through application
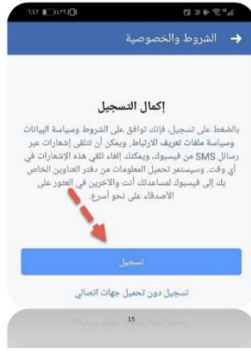- Review & Questions

Examples of details included in Training Materials

a. Difference between Facebook Account, Page & Group:
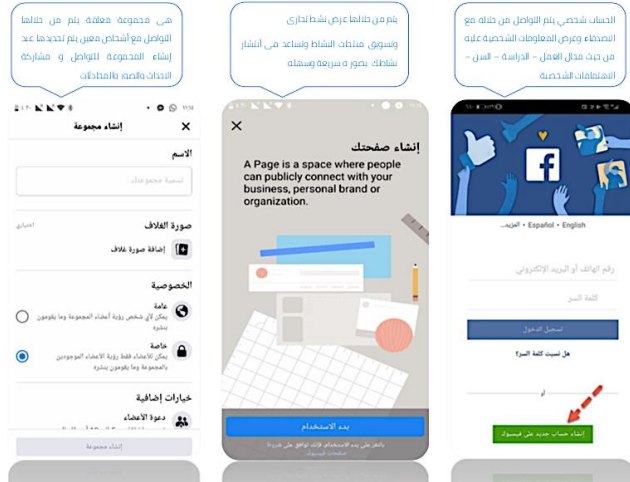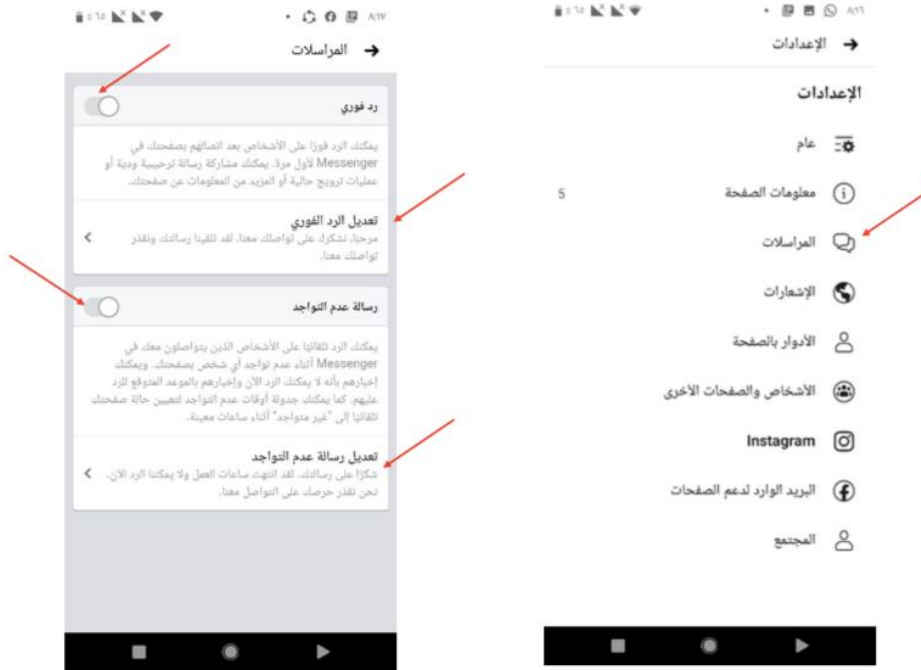

b. Steps to Create Facebook Page:

1- الدخول على انشاء ثم إنشاء صفحة من خلال حساب الفيس بوك
2- تحديد نشاط الصفحة (تحديد نشاطك التجارى)

أسم الصفحة والضغط على متابعة

3- عنوان النشاط(فى حالة وجود مقر لنشاطك التجارى
4- إخال رقم الهاتف (يكون رقم صحيح يتم التواصل من خلاله)
5- ضهور رسالة تم إنشاء الصفحة

c.   Facebook Page Important Settings

d.   Different Facebook Page Roles

أدوار الصفحة

1- مسئول
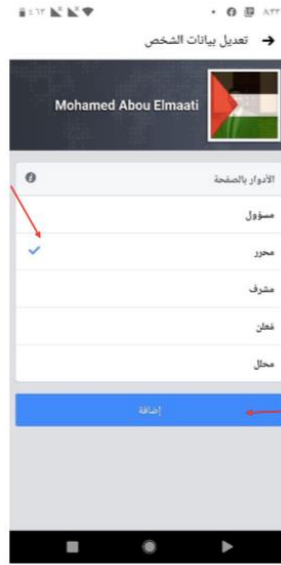
بإمكانهم إدارة كل جوانب الصفحة, حيث بمكنهم النشر وإرسال رسائل على Messenger باسم الصفحة والرد على التعليقات وحذفها من الصفحة, والنشر من Instagram على فيسبوك وإنشاء إعلانات ومعرفة من قام بإنشاء منشور أو تعليق وعرض الرؤى وتعيين الأدوار بالصفحة. وفي حالة ربط حساب Instagram بالصفحة, بمكنهم الرد على التعليقات وحذفها وإرسال رسائل Direct ومزامنة معلومات الفضال بالنشاط التجاري وإنشاء إعلانات.

2 - محرر

إمكانهم نشر محتوى وإرسال رسائل على Messenger باسم الصفحة والرد على التعليقات وحذفها من الصفحة, وإنشاء إعلانات ومعرفة من قام بإنشاء منشور أو تعليق والنشر من Instagram على فيسبوك وعرض الرؤى. وفي حالة ربط حساب Instagram بالصفحة, بمكنهم الرد على التعليقات وحذفها وإرسال رسائل Direct ومزامنة معلومات الاتصال بالنشاط التجاري وإنشاء إعلانات.

3 - مشرف

بإمكانهم إرسال رسائل على Messenger باسم الصفحة والرد على التعليقات وحذفها من الصفحة, وإنشاء إعلانات ومعرفة من قام بإنشاء منشور أو تعليق وعرض الرؤى. وفي حالة ربط حساب Instagram بالصفحة, بمكنهم الرد على تعليقات Instagram وإرسال رسائل Direct وإنشاء إعلانات.

4 - معلن

بإمكانهم إنشاء إعلانات ومعرفة من قام بإنشاء منشور أو تعليق وعرض الرؤى. وفي حالة ربط حساب Instagram بالصفحة, بمكنهم إنشاء إعلانات.

5 - محلل

يمكنهم معرفة المسؤول الذي قام بإنشاء منشور أو تعليق وعرض الرؤى.

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e. Steps to link Facebook Page with Instagram:

ربط الفيس بوك بحساب Instagram

عند ربط حساب Instagram, يمكن للأشخاص الآخرين الذين يديرون الصفحة النشر واتخاذ إجراءات أخرى بشأن حساب Instagram المرتبط. الرد على التعليقات والرسائل في البريد الوارد.

يمكن لمسؤولي الصفحة ومحرريها ومشرفيها قراءة والرد على تعليقات Instagram والرسائل الخاصة, على كل من الكمبيوتر وفي تطبيق مدير الصفحات.

إنشاء إعلانات لحساب Instagram على فيسبوك

يمكن للمسؤولين والمحررين والمشرفين والمعلنين إنشاء إعلانات على فيسبوك تظهر على Instagram وربطها بحسابك على Instagram.

خطوات ربط الفيس بوك بحساب Instagram.

1- الدخول على الأعدادت .
2- أختيار Instagram.
3- الضغط على رابط الحساب .
4- يظهر شاشة تسجيل الدخول على Instagram
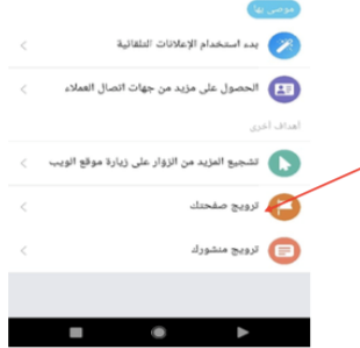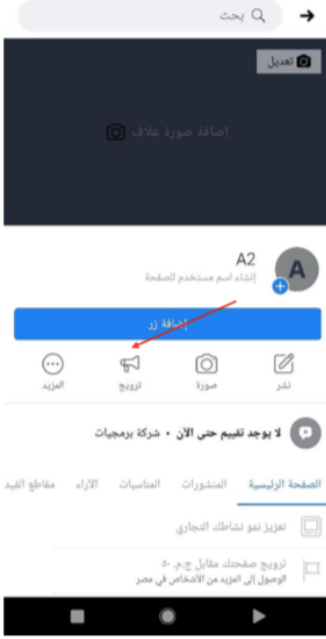5- يمكن تسجيل الدخول عن طريق إنشاء حساب جديد او تسجيل الدخول عن طريق حساب
6- الفيس بوك

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f. Steps to boost an ad:

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التـرويـج

خطوات عمل ترويج

- من الصفحة الرئيسية نختار كلمة ترويج
- تحديد نوع الترويج وهى :
1- ترويج منشور
2- ترويج صفحة
3- ترويج زار ارسال رسالة
4- ترويج موقع الويب
5- ترويج طبيقك
6- الحصول على المزيد من بيانات العملاء

موصى بها

- بدء استخدام الإعلانات التلقائية ‹
- الحصول على مزيد من جهات اتصال العملاء ‹

اهداف اخرى

- تشجيع المزيد من الزوار على زيارة موقع الويب ‹
- ترويج صفحتك ‹
- ترويج منشورك ‹

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g. Important Settings of a boosted ad

ترويج الصفحة:

خطوات ترويج الصفحة

1- الدخول على الصفحة الرئيسية
2- ثم الضغط على ترويج
3- أختبار من أنواع الترويج   ترويج   صفحة
4- أختبار صورة من صور صفحتك أو فيديو أو عرض شرائح
5- تحديد الجمهور والفئة العمرية
6- تحديد أيام تشغيل الترويج
7- تحديد عملية الدفع
8- ثم الضغط على ترويج

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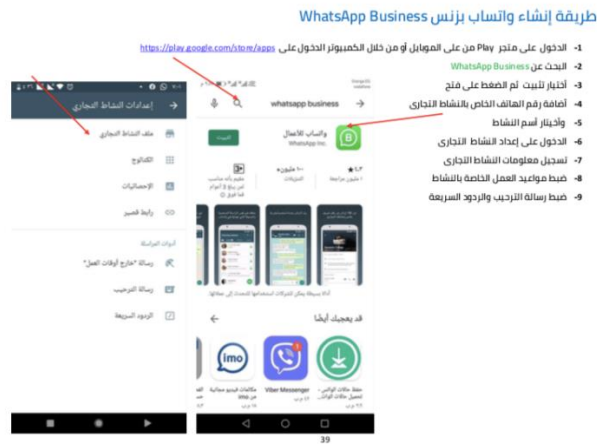## h. Managing and following a boosted ad:

خطوات إدارة عمليات الترويج

1- من الصفحة الرئيسية أختيار إدارة عمليات الترويج
يتم من خلالها متابعة ترويج الاعلانات وعدد التفاعلات وعدد النقرات على الرابط.

i. Steps to create and download WhatsApp Business Account

طريقة إنشاء واتساب بزنس WhatsApp Business

1- الدخول على متجر Play من على الموبايل أو من خلال الكمبيوتر الدخول على https://play.google.com/store/apps
2- البحث عن WhatsApp Business
3- أختيار تثبيت ثم الضغط على فتح
4- أضافة رقم الهاتف الخاص بالنشاط التجاري
5- وأختيار أسم النشاط
6- الدخول على إعداد النشاط التجاري
7- تسجيل معلومات النشاط التجاري
8- ضبط مواعيد العمل الخاصة بالنشاط
9- ضبط رسالة الترحيب والردود السريعة

Appendix B: Example of Standards Needed for first pay-out in Pay-for-Results Treatment

The first payment will be made to participants in this treatment group if they are able to show they have created a Facebook page for their business that meets the following criteria:

1. **Page Name**

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       a.   The name of the page should be written in a clear way to express the firm's activity

2. **Choosing the Business Category**
   a.   The business category must match the business activity of the participant
3. **Page Profile Picture**
   a.   The picture must be appropriately chosen to express the firm's activity, for example it can include a product, the project logo or the name
4. **Page Cover Picture**
   a.   The picture must be appropriately chosen to express the firm's activity, for example it can include a product, the project logo or the name
5. **Description**
   a.   Participants must add a description of their firm in the "About" section
   b.   The description must include details about the firm, at least the following:
   - ✓ Firm activity
   - ✓ Working hours
   - ✓ Telephone number of the firm
   - ✓ Firm address (if the firm is not managed from home)

6. Administrative information *(required)*

Table 1: Descriptive Statistics and Proposed Balance Table

Variables used in Stratification

Label	N	Mean	SD	Training	Pay For Performance	Information	Control	Test for equality
Owner is Female	267	0.44	0.50	0.48	0.43	0.42	0.41	0.77
Age of Owner	267	34.2	8.40	33.6	34.2	32.6	35.8	0.26
Owner has university education	267	0.30	0.46	0.33	0.30	0.29	0.25	0.82
Owner has secondary education	267	0.54	0.50	0.54	0.53	0.61	0.53	0.90
Has a personal Facebook account	267	0.90	0.30	0.92	0.89	0.87	0.90	0.78
Owner Characteristics								
Owner is in government assistance program	267	0.16	0.36	0.13	0.14	0.19	0.20	0.63
Owns a computer	267	0.50	0.50	0.46	0.53	0.74	0.37	0.00
Has home internet connection	267	0.60	0.49	0.55	0.63	0.61	0.61	0.76
Firm Characteristics								
Competes on Price	267	0.30	0.46	0.24	0.38	0.42	0.20	0.03
Competes on Quality	267	0.47	0.50	0.46	0.42	0.45	0.58	0.29
Experience Goods	267	0.18	0.38	0.13	0.19	0.23	0.19	0.63
Firm 3+ years old	267	0.58	0.49	0.58	0.56	0.58	0.63	0.87
Firm is registered	267	0.23	0.42	0.26	0.22	0.26	0.20	0.82
Weekly hours business operates typically	267	54.9	26.5	54.5	52.1	60.7	56.4	0.42
Number of paid workers	267	0.86	1.56	0.89	0.69	0.87	1.05	0.60
Operates out of home	267	0.45	0.50	0.44	0.48	0.48	0.39	0.72
Keeps business records	267	0.50	0.50	0.49	0.43	0.42	0.64	0.06
Number of customers in past week	267	68.2	267.14	85.93	66.01	59.23	49.42	0.75

Percent of customers in 1km of business	267	35.96	28.95	37.16	33.19	36.61	37.95	0.71
Firm is Demand Constrained	267	0.94	0.24	0.96	0.90	0.94	0.98	0.13
Index of Basic Marketing Practices	267	3.15	1.88	3.12	3.16	3.00	3.25	0.92
Last month's sales	264	14702	19227	14315	15304	14736	14385	0.99
Last month's profits	254	2691	3345	2900	2549	3185	2313	0.52
Wants to grow the number of workers	267	0.90	0.30	0.91	0.93	0.97	0.81	0.07
Use of Digital Marketing								
Has a website for business	267	0.01	0.12	0.02	0.01	0.03	0.00	0.29
Has a business Facebook account	267	0.08	0.28	0.09	0.10	0.10	0.03	0.26
Lacks knowledge on how to use Facebook	267	0.43	0.50	0.38	0.48	0.32	0.49	0.24
Thinks no benefit to using Facebook	267	0.14	0.35	0.12	0.09	0.29	0.17	0.10
Lacks Equipment	267	0.01	0.09	0.01	0.00	0.00	0.02	0.58
Thinks using Facebook too expensive	267	0.08	0.27	0.06	0.10	0.10	0.07	0.69
Very likely to try paid advertising if subsidy	267	0.71	0.45	0.75	0.70	0.74	0.64	0.57
Uses Whatsapp for business	267	0.58	0.49	0.63	0.55	0.71	0.47	0.07
Says knows how to use email	267	0.48	0.50	0.53	0.43	0.55	0.42	0.39

Note: Table based on only 267 of proposed 1,575 observations, and intended as pre-specification of variables to be used.